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**Impact of agricultural transformation policy on food security: Case study of selected smallholder farmers in Gicumbi District, Northern Province, Rwanda**

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**MA in Development Studies**

Institute for Social Development  
Faculty of Economic and Management Sciences  
University of the Western Cape

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## **DECLARATION**

I declare that this dissertation entitled, *Impact of agricultural transformation policy on food security: Case study of selected smallholder farmers in Gicumbi District, Northern Province, Rwanda* is my own work that it has not previously submitted at any university for a degree or examination. All sources that I have used or quoted have been indicated and duly acknowledged properly and the full references exhibited in the reference list.

**PRUDENCE UMULISA**

**Signed:**

**Date: December 2021**



## DEDICATION

I humbly dedicate this thesis to my beloved Son, my Mom, my entire family, my friends and colleagues.

In loving memories of my Dad.



## **ACKNOWLEDGEMENTS**

First, I wish to thank our Almighty Lord for granting me the strength and wisdom to be able to undertake this study. This research work was made possible thanks to the commendable efforts of many people to whom I would like to express my sincere and heartfelt thanks.

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I am thankful to the UWC authorities for providing all necessary facilities during the research work, especially during the period of national lockdown. I acknowledge all the academic staff, lecturers and students of the Institute for Social Development (ISD) for their kind assistance in both theoretical and practical knowledge provided. They were a wonderful family to me throughout my study period in Cape Town. I particularly want to thank Mrs Priscilla Kippie for all her untiring efforts during my study.

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To my beloved son and my mother, whose affection and encouragement have been a driving force for the best result of this research work. My thanks are finally addressed to all those who in some way contributed to the success of this work. I cannot forget my very wonderful friends, Aunty Donatha, Aunty Constance, my brothers, Father of my Son (Christopher), Celse, Dr Innocent, Dr Rissa, Philbert's Family, Alphonse's Family, Antoinette's Family (Maman Patrick), Adeline ( Maman Gisa), Solange, Ange Mugeni, Nickitta ( Maman Gianna).

## **ABSTRACT**

The agricultural sector significantly contributes to the economy of many countries and it arguably remains the backbone for sustainable economic growth, livelihood standards and employment opportunities among households in different societies across the world. However, an agricultural transformation policy is required, especially in developing countries where clear policies are needed to transform the agricultural sector from subsistence to a commercial market-oriented sector. This study focuses on transforming the Rwandan agricultural sector as a pivotal way to reduce poverty, food insecurity and malnutrition. In efforts to address the issue of food insecurity, Rwanda has developed an agricultural transformation policy to eradicate hunger and poverty within households, especially in rural areas. The agricultural transformation policy involves more than changes in farming practices. It is also about catalysing the transformation of a country's rural economy. For example, land use and food production are key at the start of an agricultural transformation process, as a way of influencing farmers' investment in their production.

The study had the following research objectives: (a) assessing the impact of an agricultural transformation policy regarding food security on smallholder farmers in Gicumbi District, Rwanda; (b) examining the implementation process of an agricultural transformation policy concerning food insecurity eradication in Gicumbi District; (c) examining the effect of an agricultural transformation policy on the livelihood assets of smallholder farmers in Gicumbi District; (d) investigating the socio-economic characteristics of farmers, crops farmed, farming techniques used and challenges faced by farmers in Gicumbi District.

The study employed the Sustainable Livelihoods Framework (SLF), adapted from the Sustainable Livelihoods Approach (SLA). In this study, the SLA is viewed as a method of analysing and changing the lives of smallholder farmers experiencing poverty and other issues such as finance. The study adopted a participatory approach based on the recognition that all people have abilities and assets that can be developed to help them improve their lives. The study revealed that farmers who adopted practices which fall under ATP such as land consolidation, crop intensification (prioritisation of selected crops, and one cow per family experienced higher agricultural productivity. The practices include land consolidation, crop intensification (prioritisation of selected crops), and one cow per family, all of which fall under the agricultural transformation policy. Further findings showed that farmers face many challenges in agricultural activities when attempting to increase productivity for reducing food insecurity. These challenges include water scarcity and drought due to irregular rain seasons

and prolonged dry seasons; long-lasting precipitation and floods; insufficient selected seeds; diseases and pests. The findings also revealed that the livelihood strategies adopted by farmers, including their capabilities and socio-economic resources, demonstrated that there was a big improvement in agricultural production, especially where farmers had managed to get enough food for domestic consumption and for sale, and to get extra income for children's school fees and other utilities. Moreover, the findings related to the support structures of farmers such as government institutions and organisations also revealed that farmers improved their livelihoods in terms of sustainable income, well-being, reduced vulnerability and improved food security. Last but not certainly least, the study puts forward six recommendations for the Rwandan government, interested stakeholders, and NGOs.

**Keywords:** agricultural transformation policy; food security; Sustainable Livelihoods Framework (SLF); Gicumbi District; Rwanda



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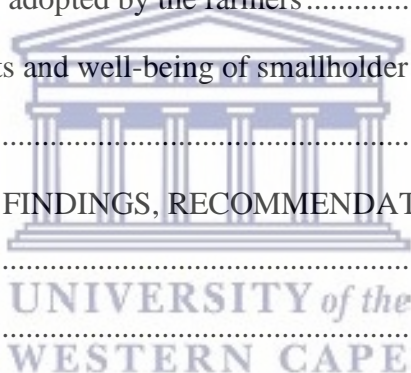
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## LIST OF ABBREVIATIONS AND ACRONYMS

CAADP:	Comprehensive Africa Agriculture Development Program
CIP:	Crop Intensification Program
COVID-19:	Corona Virus
DfID:	Department for International Development
EDPRS:	Economic Development and Poverty Reduction Strategy
EWSA:	Energy Water and Sanitation Authority
FAO:	Food and Agriculture Organisation (of the United Nations)
GDP:	Gross Domestic Product
ha:	hectare
MDGs:	Millennium Development Goals
MINAGRI:	Ministry of Agriculture and Animal Resources
MINECOFIN:	Ministry of Finance and Economic Planning
NAP:	National Agricultural Policy
NGO:	Non-Governmental Organisation
NISR:	National Institute of Statistics of Rwanda
NST:	National Strategies Transformation
PSTA:	Strategic Plan for the Transformation of Agriculture
RDB:	Rwanda Development Board
SDGs:	Sustainable Development Goals
SLA:	Sustainable Livelihoods Approach
SLF:	Sustainable Livelihoods Framework
SNS:	Smart NKUNGANIRE System
U-SACCOs:	Umurenge-Saving and Credit Cooperatives
WFP:	World Food Program
Zigama CSS:	Zigama Credit and Savings Society

## **CHAPTER 1: INTRODUCTION TO THE STUDY**

### **1.1 Overview and rationale of the study**

Agricultural transformation policies significantly aid countries to be food secure in both urban and rural areas. The literature shows that the demand for agricultural products is on the increase and as a result is generating income and employment along the value chain as well as enabling many to have food for both consumption and the market. In efforts to address food insecurity, Rwanda has developed an agricultural transformation policy to reduce hunger and poverty in rural areas (Niyigaba and Peng, 2020). Globally, agriculture is the primary economic sector in many countries, especially developing countries, and it contributes significantly to the gross domestic product (GDP). In Rwanda, agriculture accounts for 29% of the GDP, 69% of employment, 63% of foreign exchange earnings, and 90% of the country's food needs (Niyigaba and Peng, 2020).

Importantly, besides food, agriculture provides raw materials (soya, coffee, rice, fruit and vegetables, cassava, potatoes, wheat, hides and skins) to many industries, which form the backbone of the nation's GDP. For example, the leather industry, bread from cassava, alcohol from potatoes, and other agrarian products. Rwanda, being primarily an agrarian country, has the bulk of its working population (70%) engaged in agricultural activities (Kathiresan, 2012). Accordingly, Rwanda's economic growth has over the years depended on agriculture. Against this background, in 2016 the Ministry of Agriculture and Animal Resources (MINAGRI) was mandated to promote the sustainable development of a modern, efficient and competitive agriculture and livestock sector, to ensure food security, agriculture exports and diversification of production, for the benefit of the farmers and the economy of the country (MINAGRI, 2012). The new agricultural policies are based on the assumption that effectively implemented practices would empower smallholder farmers in terms of food production, poverty reduction and food insecurity for households, especially in rural areas. Kathiresan (2012) maintains that the new agricultural transformation policies are geared toward developing and boosting the agricultural sector to respond to food insecurity in rural households.

Additional intervention measures such as those contained in the Government of Rwanda's vision 2020 and 2050 were established to ensure agricultural transformation, particularly how to assist small-scale farmers adopt new techniques, such as those applied in commercial farming. Yet, MINAGRI (2018a) traces the broad guidelines of agricultural intensification in its new policies – the National Agricultural Policy 2018; the Agricultural Improvement Act of

2018; the 2018 Farm Bill (MINAGRI, 2018b) – in the areas of commodity programs and crop insurance; conservation on agricultural lands; agricultural trade (including foreign food assistance); and nutrition (primarily domestic food assistance), to prioritise crop intensification that may lead to greater productivity amidst the growing number of consumers. While this is so, Rwanda experiences scarcity of land, population growth, and poor farming methods, which are seemingly a problem to food insecurity and the reason government developed new policies to aid rapid transformation of agriculture in the country (MINAGRI, 2013). However, it is important to note that the majority of Rwandese reside in the rural areas, where 70% practice subsistence farming and 30% are engaged in commercial farming (MINAGRI, 2013).

In order to empower smallholder farmers in rural areas, MINAGRI has published new policy guidelines on agriculture to prioritise...., and list some of these policies have placed emphasis on crops intensification. MINAGRI's new policy of transformation was included in the National Agricultural Policy (NAP) of 2018 (MINAGRI, 2018a, 2017). The updated NAP has the main aim of responding to evolving dynamics in the agricultural sector and the current policy priorities (MINAGRI, 2018a). The agricultural sector has been working in the context of ensuring sustainable food production and modernised food production. This ongoing modernisation brings an increase in agricultural productivity and the food scheme at national, regional and international levels (MINAGRI, 2017). Given this seemingly good intervention for improved agricultural production, food production is still low, averaging food produced on subsistence agriculture parcels to 0.6 ha – faces the challenge by government to replace subsistence farming with a value-creating market-oriented food sector, compared to the high demand for food. This is due to land scarcity, the population growth, and poor control of agricultural methods (MINAGRI, 2013). While the implementation of the new agricultural policies are viewed as providing support for the national economy, it is not clear how Gicumbi District, in the Northern Province of Rwanda has improved its food production as a result these policy interventions (MINAGRI (2017). This is particularly the case of farmers in the agro-ecological zones of the Highlands of Buberuka, the Eastern Plateau and the Central Plateau in the Northern Province of Rwanda, including farmers in Gicumbi District. The main aim of this study was to assess the impact of the agricultural transformation policy on the socio-economic characteristics of smallholder farmers, crops farmed, farming techniques and challenges farmers face in Gicumbi District, Rwanda.

The study assesses the effect of agriculture on the livelihoods of farmers in Gicumbi District and the success of the sequence related to policy implementation. The significance of this study

is to evaluate the impact of Rwanda's agricultural transformation policy on food security in the country and also to share Rwanda's lessons with other agriculture-dependent countries trying to transform their agricultural sectors, drawing on specific lessons from Gicumbi District of in the Northern Province of Rwanda.

## **1.2 Background and contextualisation of the study**

Rwanda is a developing country, landlocked and characterised by a very high population density, together with steep slopes and high rainfall (Clay and Lewis, 1996). Subsistence farming is practiced on small, splintered and fragmented lands. As a result, the government of Rwanda has developed policies to help the population intensify their production and raise their income on their limited land (Kathiresan, 2012). Since independence, Rwanda has depended on agriculture as the main engine of economic growth (MINAGRI, 2004). According to the Rwanda Development Board (RDB, 2013), the basic document of the second Economic Development and Poverty Reduction Strategy (EDPRS II: 2013-2018) is "Shaping our Development". Rwanda's agricultural sector currently encompasses 69% of the total population; and the land for cultivation is not enough, given the country's estimated population of 12,661,733 in 2016 (Munyaneza, Wakeel & Chen, 2016). Meanwhile, the current statistics estimates Rwanda's population to be 13.03 million inhabitants on a 26,336 km<sup>2</sup> area which translates to be 495 inhabitants per km<sup>2</sup>, with an annual growth rate of 2.95% (Imasiku & Ntagwirumugara, 2020).

Rwanda's agricultural policies were drawn from the Strategic Plan for Agricultural Transformation [*Projet d'Appui du Plan Stratégique de Transformation de l'Agriculture (PSTA)*] and were disseminated among farmers to reduce the number of people living below the poverty line by 2020 (MINAGRI, 2004). The agricultural transformation policy in Rwanda based on the PSTA was established in 2004 and was implemented in phases: phase one (PSTA I) took place in 2005-2008; phase two (PSTA II) in 2009–2012); phase three (PSTA III) in 2013–2017; and phase four (PSTA IV) from 2018–2024.

The PSTA plays a crucial role in Rwanda's agricultural sector and has made a positive and satisfactory impact on the country's economy, in particular the alleviation of poverty and food insecurity. According to the National Institute of Statistics of Rwanda (NISR, 2016) the percentage of people living below the poverty line (\$1.90) fell to a new low of 46% in 2010/11 to 39.1% in 2013/14. In 2017, poverty in Rwanda was still significant, with 38.2% of the population living below the national poverty line. According to the PSTA, the Ministry of



Agriculture and its agricultural extension program attributions are based on the notion of reducing poverty and improving household income through agriculture. This strategic plan is a realistic policy related to the development of agriculture to improve people's livelihoods and the country's food security (MINAGRI, 2004).

According to MINAGRI (2004), the Rwandan government has also introduced in its agricultural policy framework, the idea of farming certain crops in specific regions because of good soils and high yields (Irish potatoes, and maize) being grown in Gicumbi District, for example. Furthermore, agricultural development in Rwanda is not only about the surface of arable land, but also about how small holder farmers can utilise their skills to produce more in highly land fragmented country with poor farming practices, and land degradation (MINAGRI, 2004). In this way, the introduction of changes such as plant breeding, hybridisation, gene manipulation, better management of soil nutrients, and improved weed control would aid farmers to produce more for their families and the market (MINAGRI, 2007). In light of the above, high yields of Irish potatoes, maize and beans have been experienced in the agro-ecological zones of the Highlands of Buberuka, the Eastern and Central Plateaus in Gicumbi District.

### **1.3 Overview and justification of the study area**

This study is delimited to farmers of the three sectors of Gicumbi, namely Rukomo, Byumba and Kageyo. According to the Energy, Water and Sanitation Authority (EWSA, 2011), Gicumbi District is located across three agro-ecological zones: in the Highlands of Buberuka in the North-South axis (from Kaniga sector to Rutare sector); the agri-ecological zone of the Eastern Plateau in its East-South axis (from Bwisige sector to Bukura sector); and the agro-ecological zone of the Central Plateau in its western part (comprising the large part of Mutete and Rutare sectors) (EWSA, 2011).

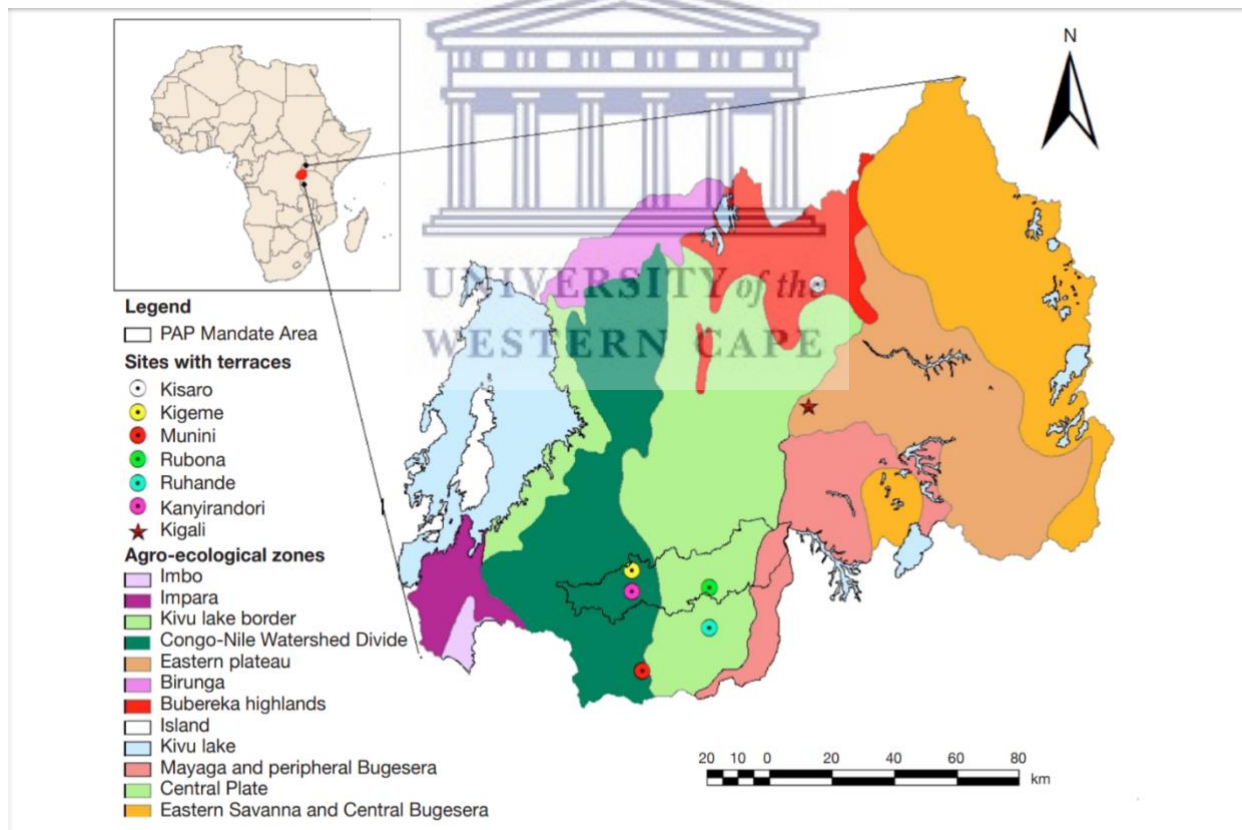
The three agro-ecological zones of the Highlands of Buberuka, and Central Plateau are among ten agro-ecological zones of Rwanda's agriculture. According to the Food and Agriculture Organisation of the United Nations (FAO, 2010a), in the 1980s MINAGRI geographically subdivided Rwanda into ten regional classes of agro-ecological zones of agriculture:

1. Imbo (rural area of Bugarama)
2. Impala (rural area of Cyangugu)
3. Shores of Lake Kivu

4. Highlands of Buberuka
5. Lavas land of Birunga
6. Central Plateau
7. Congo-Nile watershed
8. Mayaga and Bugesera periphery
9. Watershed and Eastern Plateau adjacent to the Eastern Savannah
10. Eastern Savannah and Central Bugesera

Since 1974, the above regional classification scheme was extensively used in Rwanda's agricultural sector which, according to Clay and Dejaegher (1987), has been supported by agricultural research and development across the country. Figure 1.1 below indicates the agro-ecological zones of Rwanda.

**Figure 1.1 Location of Rwanda within Africa: Agro-ecological zones of Rwanda**



Source: Rushemuka et al. (2014:144)

According to EWSA (2011), Gicumbi District is one of five districts of Northern Province of Rwanda. It is located in the east of this province with a surface area of 829 km<sup>2</sup> and a total population of 374,639 (with 182,478 males and 192,161 females). Furthermore, Gicumbi District has 480 inhabitants/km<sup>2</sup> of population density, which is above the national average (416 inhabitants/km<sup>2</sup>) while its population growth is 1%, which is below to the national average of 2.6% (Gicumbi District, 2013; EWSA, 2011).

The capital of Gicumbi District is Byumba. It is bordered by Burera and Nyagatare Districts to the north, Gatsibo, and Rwamagana Districts to the east, Kabare District of Uganda, Gasabo and Rwamagana Districts to the south, and Gasabo, Burera, and Rulindo Districts to the west. The major economic activity of Gicumbi District is based on agriculture whereby 90% of citizens are farmers and the major cash crops are Irish potatoes, wheat, sorghum and maize (Mutandwa and Kwiringirimana, 2015; Ndahiro, 2015). Various other economic agricultural activities include growing vegetables and beans; and rearing animals such as cattle, goats, sheep, and pigs. In addition, agricultural activities constitute 85% of the total production in Gicumbi District and nearly 70% of households also own farm animals that largely contribute to the dairy production and to the welfare of the population in the district (Nathan, Madjild, Fabrice and Mutimura, 2019).

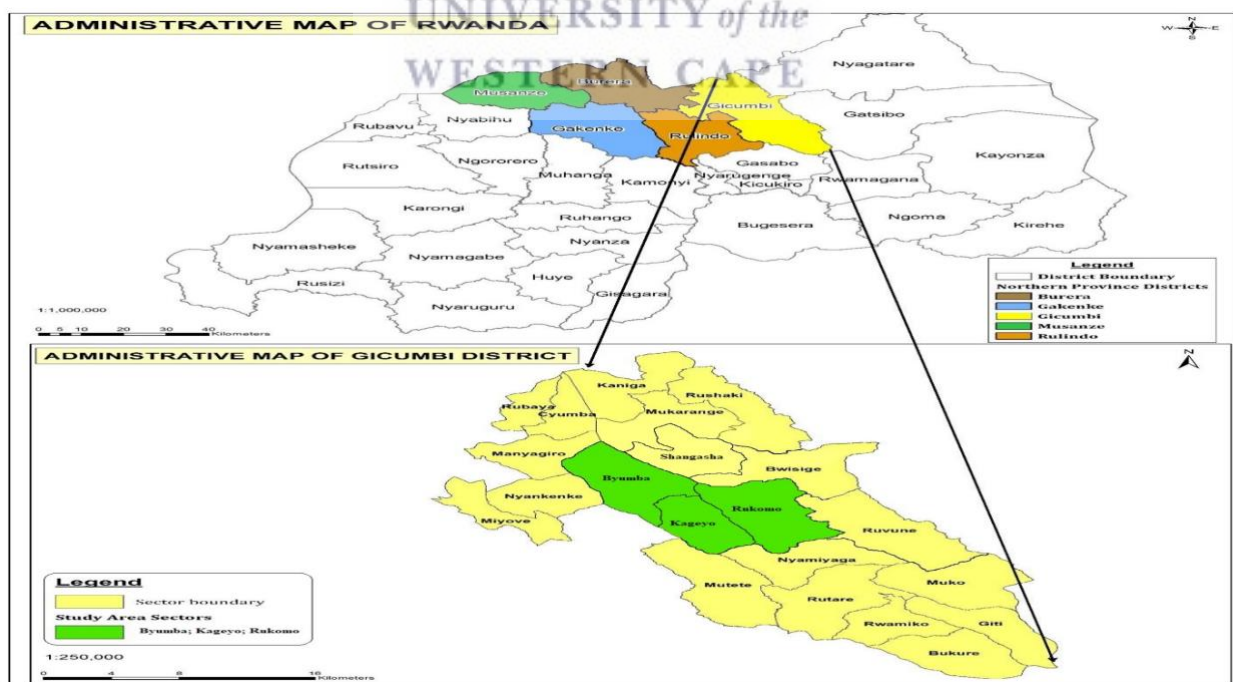
Gicumbi District has financial institutions (commercial banks, micro finance and cooperative savings as listed below) that help households in terms of savings and credit. These financial institutions in Gicumbi District include financial cooperatives (microfinance institutions – MFIs), comprising 21 saving and credit cooperatives – Umurenge (U-SACCOs); Zigama CSS; COOPEC Ishema; and Vision Finance – and commercial banks, such as IandM Bank, Bank of Kigali (BK), and Urwego Opportunity Bank S.A. (Mutandwa and Kwiringirimana, 2015). Likewise, Gicumbi District also has an art and craft industry which is practised by individuals and collective associations. The major artisanal activities are masonry, shoe-making, carpentry, pottery, brick-making, joinery, hairdressing, and weaving (Mutandwa and Kwiringirimana, 2015).

According to the last Rwandan census of 2012, the poverty in Gicumbi District has declined from 44.8% in 2002 to 31% in 2012 (NISR, 2016; Booth and Golooba-Mutebi, 2014). However, in 2019, the mortality rate of children in Rwanda was 34.3 deaths per 1,000 live births (Sebera et al., 2020). The literature shows that the child mortality rate of Rwanda fell gradually from 221.3 deaths per 1,000 live births in 1970 to 34.3 deaths per 1,000 live births

in 2019, which is still high and partly associated with food malnutrition, especially among rural households (Agho et al., 2019). In a similar way, Gicumbi District has a 6.52% child mortality rate (Niragire et al., 2017). In comparison with other districts across the country, Gicumbi District recorded between 4 and 15% which is an indication of food insecurity as compared to Western Province stands at the rate of 46-49% (Niragire et al., 2017). A number of organisations, such as the Food and Agriculture Organisation of the United Nations (FAO), the *Institut de Formation et d'Appui aux Initiatives de Développement* (IFAID), and the World Food Program (WFP) argue that the increase in production and income of smallholder farmers are the major factors that contribute to rural development and poverty alleviation (FAO et al., 2015). It is thus essential to assess the contribution of country's agricultural transformation policy on food security in order to analyse the areas where this policy has failed or succeeded in accomplishing its objectives in Gicumbi District. This study provides more insight regarding the impact of the agricultural transformation policy on small holder famers particularly the sustainability of food production or other non-farm factors that enhance the productivity in terms of improving food security in Gicumbi District.

Figure 1.2 below shows the administrative map of Rwanda, as well as the administrative map of the study area in Gicumbi District. Gicumbi District is highlighted in yellow and the administrative sectors are indicated in green colour.

**Figure 1.2 Administrative map of Rwanda indicating the location of Gicumbi District**



Source: Adapted from Ndahiro (2015:4)

#### **1.4 Problem statement**

Agriculture remains one of the backbone for sustainable economic growth, including the provision of high standards of livelihoods, creation of employment for communities, and improved living standards, among many others. However, to achieve the above objectives, clear policies that guide the transformation of agriculture from subsistence to commercial farming (to improve the productivity of smallholder/subsistence farming) needed to be in place. This is particularly important for a country like Rwanda that is currently attempting to transform the agricultural sector, reduce poverty, and increase food production, but there is still a long way to go. According to the World Food Program of the United Nations (WFP, 2009) smallholder farmers should be encouraged to adopt more commercial agricultural practices if countries like Rwanda aim to alleviate poverty and produce enough food for local consumption and exports. You are juggling between ideas without discussion. Abruptly moved from employment to economic growth without explanation.

Agriculture is not only the source of nutrition and income but also provides employment to the majority of Rwandese (Habyarimana, 2015). Williams and Morris (2016), Booth and Golooba-Mutebi (2014), and World Vision (2014) argue that transformation in agriculture has led to increased food production and ultimately economic growth in developing countries. However, in recent times, reforms and changes in developing countries focused on emphasising agricultural industries of technology and markets by foregrounding the basic need of food security within poor households.

According to the FAO et al. (2015), a total of 72 developing countries aimed to achieve the Millennium Development Goal (MDG) of the reduction of hunger during the period 2014–2016. Of these, only 31 developing countries achieved the MDG’s hunger target by reducing 50% or more in the prevalence of undernourishment (PoU) or bring the PoU below 5 % (FAO et al., 2015). Another 9 countries, including Rwanda and Sierra Leone were close to reaching the MDG hunger target by 2014–2016 (FAO et al., 2015). Despite the hunger burden which remains high, Rwanda had made good progress in fighting hunger, maintaining the political conditions and expanding the agricultural sector with strong policies in place that aim to promote and protect the access to food (FAO et al., 2015).

World Vision (2014) argues that food insecurity is prevalent in rural households in Rwanda and presents a huge challenge to the country. According to Williams and Morris (2016), the main target of the agricultural sector in Rwanda is to secure the rural households from food insecurity. The adaptation of the agricultural transformation policy in Rwanda is aimed to encourage and improve health and sufficient food for the population. Despite efforts made by the Rwandan government to ensure food security across the country, the implementation of the 2004 agricultural transformation policy remains problematic due to the high population growth, the high unemployment rate, and income levels in agriculture that remain low. Booth and Golooba-Mutebi (2014) maintain that food production in Rwanda is still low due to the fact that the agricultural transformation policy has not succeeded yet. For example, Gicumbi District has experienced approximately 6.52% of child mortality associated with food insecurity (Booth and Golooba-Mutebi, 2014; Niragire et al, 2017). This is an indication that the agricultural transformation policy intended to improve food security have failed or needs to be revised. Thus, the agricultural sector in Rwanda and Gicumbi District in particular is faced with the problem of limited land holdings, lack of public and private capacity, and limited commercialisation constrained by poor access to output and financial markets (Imasiku & Ntagwirumugara, 2020).

### **1.5 Research questions**

The study attempted to answer the following questions:

- A) How has the agricultural transformation policy influenced food security and livelihood assets of smallholder within smallholder farmers in Gicumbi District?
- B) What are the factors causing the failure or success of the agricultural transformation policy in relation to the promotion of food security among smallholder farmers in Gicumbi District?

### **1.6 Research aim and objectives**

The main aim of this study was to assess the impact of the agricultural transformation policy on the socio-economic characteristics of small holder farmers, crops farmed, farming techniques and challenges farmers face in Gicumbi District, Rwanda.

The specific objectives of this research were:

- a) to assess the impact of the agricultural transformation policy in relation to food security on smallholder farmers in Gicumbi District;

- b) to examine the implementation process of the agricultural transformation policy in relation to food insecurity eradication in Gicumbi District;
- c) to investigate how the agricultural transformation policy has contributed to food security among smallholder farmers in Gicumbi District;
- d) to investigate the socio-economic characteristics of farmers, crops farmed, farming techniques used and challenges faced by farmers in Gicumbi District.

### **1.7 Structure of the thesis**

This study assesses the impact of the agricultural transformation policy on food security. It examines the implementation process of the agricultural transformation policy in relation to food insecurity eradication and the effect of this policy on the livelihood assets of smallholder farmers. The research is organised into six chapters.

**The first chapter** begins with an introduction of the study. It presents an overview of the agricultural transformation policy and in particular the Strategic Plan for Agricultural Transformation in Rwanda (PSTA). Thereafter, the chapter provides background information related to the study. This is followed by an elaboration of the significance of the study and problem statement. Lastly, the chapter discusses the research question as well as the research aim and objectives.

**The second chapter** presents the literature review of the study. The chapter begins with a review of the agricultural transformation policy in relation to food security and the food security status in Rwanda.

**The third chapter** presents the theoretical framework of the research under investigation. It is contextualised based on the Sustainable Livelihoods Approach. In addition, it defines some key concepts related to the research, such as food security, and agricultural policy.

**The fourth chapter** presents a discussion and explanation of the research design and methodology. The study employed a mixed-method approach, which involves both qualitative and quantitative methods of gathering the information from the farmers in three selected sectors of Gicumbi District. The chapter presents the techniques or methods and tools used in the data collection process as well as the methods that guided the data analysis during the study. Lastly, this chapter presents the ethical considerations that have been followed during data collection within the case study area.

**The fifth chapter** presents the findings of the study. It provides a detailed discussion, analysis and interpretation of the findings.

**The sixth chapter** provides a conclusion of this study. It presents a summary of the research findings and recommendations.





## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Chapter overview**

The literature on food insecurity and agriculture has been increasing, as a result of the growing interest in the significant role that the agricultural sector can play in addressing and finding remedies to resolve the food insecurity crisis, especially in developing countries and in sub-Saharan Africa in particular. The food insecurity in sub-Saharan African countries remains a challenge due to several possible reasons, including poor farming practices, failure to effectively implement agricultural policies, and wrong policies put in place for which a policy change is required.

This chapter reviews the relevant literature associated with food security and agricultural policies. Firstly, this chapter examines global food security, the agricultural sector, development in sub-Saharan Africa, and the agricultural revolution in relation to food security from an African perspective. Furthermore, the chapter reviews the Rwandan perspective by highlighting the impact of agricultural policies and the food security status in Rwanda. The chapter then provides an overview of the agricultural transformation policy, including the Strategic Plan for Agricultural Transformation (PSTA), Rwanda's Vision 2050, and the Economic Development and Poverty Reduction Strategy (EDPRS).

### **2.2 Global food security**

The food situation is critical for the consumers in the world, especially in low-income developing countries. The number of food-insecure people remains relatively high in the world, with approximately 925 million undernourished people recorded in 2010, where more than 16% of them were located in developing countries (FAO, 2010b). Recently, the Food and Agriculture Organisation of the United Nations (FAO, 2019) reported a slight decrease in the number of undernourished people in 2018 with an estimation of 820 million undernourished compared to the 2010 estimate (FAO, 2019, 2010b). This number is comprised of 9.2% of the world population (more than 700 million people) who are exposed to severe levels of food insecurity (FAO, 2019). The African continent – especially sub-Saharan Africa – faces the problem of food insufficiency. According to the FAO (2016), this hungry population of 681.43 million people are located in South Asia and sub-Saharan Africa, they live in poor rural communities, are involved in food production (crops, livestock and fisheries) and suffer from diseases due to malnutrition (FAO, 2016; Halberg and Müller, 2012).

According to Chauvin et al. (2012), the main causes of food shortages are the lack of water management, poor use of agricultural inputs, and ignorance of new agricultural transformation policies. To counter this scourge, the Green Revolution (an increase of production in developing countries achieved by the use of artificial fertilisers, pesticides and high-yield crop varieties) has been launched in several countries of the world, especially in the least developed countries of Southeast Asia such as Thailand, Cambodia, Malaysia, Philippines, and Vietnam (Tanaka et al., 2020; Yanai et al., 2020). The green revolution has resulted in a dramatic increase in agricultural productivity and has avoided catastrophic famines. While Green revolution might have increased food production, it has consequences, for example, until now the varieties of food consumed more by adults have more calories which has led to an increase in obesity in both rural and urban populations (Yanai et al., 2020). Though green revolution itself was a moment of struggle according to Patel (2013), it has contributed to high food yields for crops such as wheat and rice to mention but two. This was possible because of improved seed, and fertilizer. The Southeast Asian countries and India in particular were the first countries to experience the impressive impact (in the 1960s) of the green revolution, specifically rice yields and other crops like maize and wheat and in the subsequent decades of the 1980s and 1990s China and other Asian regions similarly observed the strong yield trends (Pingali, 2012). According to Evenson and Gollin (2003), Green Revolution has contributed to the development of modern varieties of crops which have generally benefited from the decline of food prices and farmers benefiting only when cost reductions exceeded price reductions. This widespread success of green revolution technology led to a significant shift in the food supply function and a decrease in food prices during the period 1960-2000. Following the results achieved by the countries that experienced the success of the green revolution – including Asian countries and elsewhere – several other developing countries followed suit by providing modern inputs such as improved seeds, fertilizers and pesticides to farmers (Pingali, 2012; MINAGRI, 2007).

Interestingly, African states have similarly adopted using the application of improved seeds, fertilizers, pesticides and as result farmers experiencing high crop yields (Pingali, 2012). According to Pingali (2012) the green revolution strategy was not convenient in places where the population densities are too low and market infrastructure is poor. In addition, Pingali (2012) argues that the innovations scheme that stimulated the green revolution in Asian countries was broadly inconvenient for the African context. However, despite the failure of the green revolution, Africa observed emerging success stories regarding the agricultural

productivity growth in the 1980s and 2000s. This means that there is a dramatic shift in agricultural development and investments in agricultural research (Pingali, 2012). African states (Kenya, Ghana, Rwanda to name but three) consequently started to introduce some varieties of crops and agricultural practices from Asia and Latin American countries (Harwood, 2018; Pingali, 2012). Literature show that despite the success of Green Revolution in terms of food production output, it has been criticised for its negative impact on human health and such people are increasingly concerned about the social impacts and has created a scenario in which food choices are experienced in society (Conway & Barbie, 1988).

### **2.3 Introduction of the Comprehensive sub-Saharan Africa Agriculture Development Programme in sub-Saharan Africa**

Although the agricultural sector in the sub-Saharan countries remains a critical component in the alleviation of poverty and food malnutrition, Booth and Golooba-Mutebi (2012) argue that agriculture is still neglected and under-developed in sub-Saharan nations. Other scholars agree that this under-development of agriculture in sub-Saharan Africa is the main contributor to the failure of agricultural policy in sub-Saharan Africa (Poulton, 2011; Masters, 2009). For instance, agriculture contributes 80% of the GDP in sub-Saharan Africa, where 175 million people are involved in the sector as smallholder farmers. According to the FAO (2015), agriculture in sub-Saharan Africa contributes 80% to the economy, in crops produced during the 24 years (FAO, 2015). Regarding the failure of agricultural policies in sub-Saharan African states, the governments and policymakers responded by introducing the Comprehensive Africa Agriculture Development Programme (CAADP) to assist the increase of food production in the agricultural sector. It was therefore, in 2003, that the Comprehensive Africa Agriculture Development Programme (CAADP) was established to assist different African governments in enhancing agricultural productivity and reducing food insecurity among African households. CAADP's main aims include: expanding partnerships, catalysing investments, and integrating the best practices in private sector support for agriculture in Africa (Cheru et al., 2013). The objective of CAADP is to reduce poverty and malnutrition, increase productivity and farm incomes, and improving the sustainability of agricultural production and use of natural resources (FAO, 2015).

### **2.4 The green revolution in relation to food security in Africa**

Currently, food insecurity is one of the many challenges facing the African continent, in particular sub-Saharan Africa. Studies by Cheru et al. (2013) and Boussard et al. (2006) show that more than 50% of the sub-Saharan population depend on subsistence farming as their only

source of income (livelihood). With a number of people facing starvation, projected to increase from 165.5 million 1990 to 198.4 million in between 1990 to 2001 (WHO, 2020; FAO, 2017). The figures above indicate that the numbers are on the increase. Nonetheless, according to the World Health Organisation and the Food and Agriculture Organisation (WHO, 2020; FAO, 2017), 690 million people worldwide suffered from hunger in 2019, accounting for 8.9% of the entire global population, with 250 million of those people living in Africa, accounting for 19.1% of the continent's total population. Furthermore, the locust crisis (pest outbreak of 2019–2021) that is threatening the food supply in East Africa, the Arabian Peninsula and India, as well as the global pandemic of COVID-19 and its lockdown regulations, have increased the number of undernourished people across the world (Devereux et al., 2020; WHO, 2020). These statistics show the significant increase of undernourished people and reflect the insufficiency of domestic or imported food supply to deal with the sub-Saharan population growth (Boussard et al., 2006).

Given the continent's diversity in terms of natural resources (land and water) there is a potential for the Africa continent though (diverse and asymmetrical) to produce more food for her growing population (Cheru et al., 2013). However, despite having the diversity of agricultural potential and the need for agriculture by the majority of the African population, Africa is one of the regions across the world where the green revolution did not materialise (Cheru et al., 2013; Pingali, 2012).

From the early 2000s, the need for transforming the agricultural sector in Africa has featured on the policy agenda of different African governments, the African Union (AU) and development practitioners, by addressing the challenges to growth and structural change in the sector of agriculture and the economy as a whole (Cheru et al., 2013). The increasingly significant role of emerging countries such as India, China, and Brazil in global trade and global financial investment has initiated the new economic cooperation opportunities, specifically in the African agricultural sector. The above three countries have been the most notable actors that expanded agricultural cooperation with the African continent and they have already recorded a significant improvement in agriculture, known as the green revolution (Cheru et al., 2013; Xu and Li, 2013). The growing relationship in Africa's agriculture sectors and other is making a significant contribution and already has a tangible impact on agricultural productivity on the continent. Countries also support other African national interests, including the transfer of policy experience, technologies, and finances needed to boost agricultural productivity and

to leverage the new investments and market opportunities. This is illustrated by the intensive interest in agriculture by some African (Cheru et al., 2013; Xu and Li, 2013).

An ambitious and comprehensive approach is required to address the challenges preventing the development of the African agricultural sector. This involves the diversification of markets and products; the development of technologies in agriculture and infrastructure; empowerment in growth and export for small and medium-scale farmers; and the improvement of the environment for agricultural investments (Cheru and Modi, 2013). More explicitly, as concluded by Cheru and Modi (2013), the lesson learned from China, Brazil, and India, is that the green revolution project in Africa is mainly driven by governments that have a high regard for agricultural revitalisation aimed at increasing food security.

## **2.5 Agricultural transformation policy in Rwanda**

The Rwandan government aims to enhance rural development and to transform agriculture from subsistence farming to market-oriented modern farming. The government aims to embark on a new era of rapid sustainable development, with an estimated 5% to 8% of the country's GDP assigned to agricultural sector in order to attain the stated objectives of the 2020 Vision policy (MINAGRI, 2004). Thus the following policies were developed to guide the country's agricultural transformation: National Agricultural Policy; Strategic Plan for the Transformation of Agriculture; Rwanda's Vision 2050; Economic Development and Poverty Reduction; Strategy Economic Development and Poverty Reduction Strategy.

### **2.5.1. Strategic Plan for the Transformation of Agriculture (PSTA)**

The Strategic Plan for the Transformation of Agriculture (PSTA) serves to facilitate the development of activities and programs that will lead to enhanced agricultural development through the implementation of PSTA's guidelines within a sector-wide approach in agriculture (MINAGRI, 2004). It is based on this assumption that poverty can be reduced if the agricultural sector aid small holder farmers to increase their food production which obviously would improve people's livelihoods. Consequently, agricultural development is determined by the way in which resources such as land, water and human capital are combined to transforming the agricultural sector. Therefore, the agricultural sector in Rwanda is dependent on the integration of farming systems, farmers' training, the development of entrepreneurs' capacities, and the strengthening of the supporting institutional framework. To this end, the PSTA is based on the following: intensification and development of sustainable production systems; support

of the professionalisation of the producers; promotion of commodity chains and agribusiness development; and institutional development (MINAGRI, 2004).

With the implementation of the agricultural transformation policy in Rwanda, as part of the PSTA, farmers are expected to improve agricultural production, driven by improvements in sustainable land management, input provision and irrigation, and crop and livestock intensification. The agenda for agriculture continues to be critical, with yield increases of staple crops being vital for increasing rural incomes and agricultural growth. The expansion of high-value commodity crops is also important for increasing exports, increasing foreign exchange, reducing imports, and sustaining higher incomes over the long-term. These were significant interventions which had driven productivity during PSTA I (adopted as a pilot project for poverty reduction proved as success) (2005–2008), and thus, a broad consultation with all partners (MINAGRI, 2004). Meanwhile, the PSTA II, with the timeline of 2009–2012 was envisaged to implement the Land Use Consolidation Policy, and the Crop Intensification Program, focusing on protection against soil erosion, and increased area under irrigation; more productive utilisation of extensive fertile marshlands areas; as well as access to improved agricultural financing and advisory services (MINAGRI, 2009). PSTA phase III, approach was used to define the inherent risks in the procurement environment. The assessment covered the institutions directly responsible for the program, namely: Ministry of Agriculture and Animal Resources (MINAGRI), Rwanda Agriculture Board (RAB), and National Agriculture Export Board (NAEB); Rwanda Public Procurement Authority (RPPA); National Public Prosecution Authority (NPPA); Office of the Ombudsman (OM); Office of the Auditor General (OAG); and one District Council from each of the four provinces based on the size of budget transfers and population. The assessment also involved discussions with key non state actors and stakeholders, including the Private Sector Federation and member confederations, Transparency International (TI) Rwanda chapter, and the National Cooperatives Confederation of Rwanda (MINAGRI, 2009).

In terms of support, MINAGRI provides smallholder farmers with a comprehensive package enabling them to cope with the impact of the COVID-19 pandemic (note, the pandemic broke out in 2019 and the economic lock down had an impact on small holder farmers), which includes the development of trials for new fertiliser products, particularly for wheat, beans, and soybeans, by setting up demonstration plots for this purpose. As a result, farmers are expected to utilise the new skills both in terms of irrigation and fertiliser use to improve food security for consumption and the market (MINAGRI, 2013).

The fourth phase (PSTA IV, 2018–2024) aims to achieve improved wealth and prosperity, economic opportunities, jobs and poverty reduction, increase food security and nutrition, improved self-resilience and sustainability (MINAGRI, 2013). The PSTA in Rwanda describes the agricultural transformation as a process to transform the agricultural sector into a modernised and efficient agricultural sector that responds to more agricultural productivity, ensures food security, reduces poverty and raises economic growth across the country (Alinda and Abbott, 2012). The PSTA intends to address the issue of small plot size (land fragmentation) and land scarcity for farmers in Rwanda by advocating crop specialisation in order to increase national crop production for the market (commercialisation). The PSTA is designed to assist farmers to combine their small lands with those of their neighbors (land consolidation) and grow selected crops – especially specified commercial crops – by using selected seeds and appropriate fertilizers (Alinda and Abbott, 2012). More explicitly, the mission of the transformation of the agricultural sector in Rwanda is to enable farmers to master the evolution of their productivity exploitation and their environment as well as improving their income and living conditions.

In light of the above, the PSTA (phase I) and the agricultural diagnosis in Rwanda, revealed that the transformation and modernisation was moving apace. The Rwandan agricultural sector has 1.4 million households with an average of 0.76 hectares of land, which is exposed to the progressive degradation process of soil losses, estimated at 14 million tons of soil annually, due to intensive erosion and human pressure (MINAGRI, 2013). The traditional production techniques and the use of resources (soil, water, labor, capital), combined with the low use of modern inputs, account for the very poor accomplishment and performance on agricultural production. It is within these circumstances that the mission of the PSTA (phases I, II, III and IV) are derived from the orientation of the 2020 Vision (MINAGRI, 2004). As stated previously, through its PSTA program, Rwanda has adopted the priority of six crops, namely: rice, wheat, beans, cassava, maize, and Irish potatoes, to be advantaged with more concern in order to fight the problem of food insecurity. This study is concerned with these crops produced by the farmers of Gicumbi District. The mission of the PSTA sets forth the orientation of the Vision 2020, which in turn became catalyst for Vision 2050.

### **2.5.2 Rwanda's Vision 2050**

Vision 2025 was established during the National Dialogue presented on the 16 December. It aimed at government's target of achieving a middle-income economy status before the end of 2050 (Gatete, 2016; Tashobya, 2016). The Government of Rwanda, through Vision 2050, plans

to progress from the last Vision 2020 plan, build on the lessons learned and become an upper middle-income economy by 2035 and a high-income country by 2050. The Ministry of Finance and Economic Planning (MINECOFIN, 2015), with its Vision 2050, also aims to reduce poverty and improve the quality of life with a high life expectancy of (70 years) and high standards of living. Furthermore, Vision 2050 has emphasized universal access to sustained food security in which the agricultural transformation policy will continue to modernise the agricultural sector in the years ahead (Gatete, 2016; Tashobya, 2016). This will require an increase in agricultural outputs through enhanced agro-food industry, technology-intensive agriculture with a commercial focus, to produce enough food as well as supporting the trade gap and creating export for surplus to reduce the import of foodstuffs and also to nourish 50% of non-farm households (Gatete, 2016). The Ministry of Finance and Economic Planning (MINECOFIN, 2015) has identified the five pillars of the Vision 2050 Program: human development; competitiveness and integration; agriculture for wealth creation; urbanisation and agglomeration; and accountable and capable state institutions. However, the agricultural sector will continue to play a greater role in economic growth and alleviation of poverty as it has a significant impact on food security, export and nutrition. According to the MINECOFIN (2015), by 2050 the agricultural sector needs to be renewed with specialised farmers and commercialised by value chains (MINECOFIN, 2015).

One of the five pillars (agriculture for wealth creation) of the Vision 2050 program is designed for the agricultural sector in Rwanda. According to MINAGRI (2017), the agricultural sector is the major yardstick of economic growth and its innovation is also one of five pillars of the Vision 2050 program. The modernisation in agriculture requires the promotion and transformation of agriculture and the promotion of livestock and fisheries.

### **2.5.3 Economic Development and Poverty Reduction Strategy (EDPRS)**

The EDPRS program was launched by the GoR in years 2008–2012 to facilitate Vision 2020 in achieving its targets (FAO, 2016), through improved and increased GDP and human development (HD), through the Millennium Development Goals (MDGs); and the reduction of poverty and income inequality in rural areas. The Economic Development and Poverty Reduction Strategy (EDPRS) was to ensure food security through improving agricultural production and livestock rearing. The EDPRS program have been divided into two stages: EDPRS I (2008–2012) with the target of increasing income among households and providing food security to all citizens. EDPRS 1 aims at increasing income and provision of food security while EDPRS 2 (2012–2018) serves to improve commercialisation and modernise the



agricultural sector, thus reducing inequality, (Abbott and Malunda, 2014). In practice, EDPRS I and EDPRS II are both aimed at improving agricultural production, enhance the business climate, reduce income inequality, and increase food security, especially in rural areas (FAO, 2016; Williams and Morris, 2016).

According to Muhinda (2013), the EDPRS has six priority actions for improving the production of agriculture, namely: the land husbandry envisaging soil fertility, soil conservation and water management; the development of irrigation and agricultural mechanisation; the increased utilisation of inputs such as improved seeds, organic and mineral fertilisers; encouraging modernisation and creativity within the agricultural sector; the innovation of livestock rearing; and capacity enhancement of farmers.

#### **2.5.4 The urgent need for an agricultural transformation policy in Rwanda**

Rwanda as a developing country with a low-income agriculture-based economy is facing the high population pressure – its population is growing while the demand for more food, better nutrition and employment is also increasing. This is a big challenge for a developing country that is already lacking enough land for growing. More explicitly, agriculture in Rwanda is dominated by approximately 80% of farming households that practice small-scale and subsistence farming and mostly depend on rain-fed farming (MINAGRI, 2017). On top of that, the possession of land by a farmer in Rwanda has also dropped in size from 2 ha in 1960, to 1.2 ha in 1984, to 0.7 ha in the 1990s (MINAGRI, 2017). More than 60% of farming households in Rwanda practised agriculture on less than 0.5 ha of land in the 2000s (Musahara and Huggins, 2002). Furthermore, Rwanda is experiencing other diverse problems, including food malnutrition, poverty, and high population density; and these illustrate the problems impacting on agriculture and the food system in Rwanda. According to World Bank (2017), close to 800,000 of Rwandan children under 5 are stunted and suffer from chronic malnutrition (wasting or low weight-for-height).

In addressing these issues, Rwanda has a vision plan that draws on being a nation by 2030 where its people will be enjoying food security, nutritional health, and sustainable growth from a productive, green and market-led agricultural sector (MINAGRI, 2017). In 2004 the Rwandan government established the National Agricultural Transformation Policy and integrated it in its vision plan. Its core policy guidance is based on increasing agricultural productivity for food security, nutrition and incomes with the support of other diverse policies, including land consolidation as well as enhancing resilience and sustainable intensification for the population

(MINAGRI, 2017). As a result, the National Agricultural Transformation Policy has contributed to food production and nutrition within households across the country. Despite these positive improvements, Rwanda has yet to meet its agricultural production potential and considering its proposed vision plan, Rwanda is committed to achieve sustained agricultural growth and productivity that stimulate a broadened nutritional food production process and opportunities for farm income diversification (MINAGRI, 2017).

This study assesses, through empirical analysis, the contribution of the national agricultural policy within the selected smallholder farmers of three selected sectors of Gicumbi District by looking at agricultural productivity from their agricultural activities and the improvement of their household livelihoods in terms of food security, nutrition and income.

## **2.6 Impact of agricultural policy and food security status in Rwanda**

The need for food security and economic growth were the drivers behind the Rwandan government's establishment of Vision 2020, Vision 2050, and the Economic Development and Poverty Reduction Strategy (EDPRS), all of which aimed at tackling the above issues (MINAGRI, 2004). The EDPRS was not introduced only for agricultural development in rural areas, but also for food insecurity alleviation. Bizimana et al. (2012) observe that since the introduction of EDPRS, some rural areas seem to be transformed due to improved farming. The improvement is based on boosting agricultural produce through the transformation of policies accompanied by national strategies of agricultural transformation.

Rwanda is committed to achieving a middle-income agriculture-based economy (sustained agriculture) by reinforcing the Strategic Plan for Agricultural Transformation (PSTA) and the Crop Intensification Program (CIP). These programs focus on food security in agriculture for different varieties of crops, such as Irish potatoes, maize, beans and other vegetable crops because they are easy to manage and take a short period to harvest. The latest estimates of food insecurity in Gicumbi District, compared to the districts across the country, indicate that in 2016, the food security was between 4%–15% as compared to 46%–49% in districts of Nyamasheke, Nyamagabe, Karongi, Nyaruguru, Nyabihu, and Rutsiro in the western province. The lowest rate of food insecurity (3%) was in the Kigali Province in the Districts of Gasabo, Kicukiro, and Nyarugenge (Williams and Morris, 2016). This inspired the researcher's interest in carrying out the study in Gicumbi District as a case study, with the aim of assessing the level of food insecurity and the impact of the agricultural transformation policy regarding the improvement of food security within Gicumbi District.

## 2.7 Crop prioritisation in agro-ecological zones of Rwanda

The Ministry of Agriculture and Animal Resources (MINAGRI) is committed to encouraging farmers to grow prioritised crops (specified crops) that can create job opportunities and generate extra household income in efforts to increase food production and nutrition within households across the country (Katherisan, 2012; MINAGRI, 2007). The government has gazetted 10 areas of agro-ecological zones for specific food crops purposely to obtain high yield in terms of food production. Three regions of Gicumbi District where this study/ research is conducted. Table 2.1 illustrates the calculation of food production based on food crops made by MINAGRI in 2012 in order to select the specified crops of commercial-based crops to be prioritised in each agro-ecological zone.

**Table 2.1 Comparing production cost, value and profit per specific unit area of 1 ha of food crops in Rwanda**

Crops	Total cost of production (Rwf)*	Production value (Rwf)*	Gain/profit (Rwf)*
1. Maize	470,250	1,200,000	729,750
2. Irish potatoes	367,987	986,600	618,613
3. Sorghum	350,350	750,000	399,000
4. Rice	540,550	1,800,000	1,259,450
5. Dwarf beans	459,000	540,000	81,000
6. Climbing beans	477,500	750,000	272,000
7. Soybeans	260,000	630,000	369,350
8. Groundnuts	430,000	650,000	220,0 00
9. Peas	494,500	700,000	205,000
10. Cassava	570,000	1,500,000	930,000
11. Vegetables	634,500	1,250,000	615,500

\*Amounts are in Rwandan Francs (RWF) [1 US Dollar = 991.5 RWF]

Source: MINAGRI (2012)

The calculation of the profitability crops shown in Table 2.1 above is based on an area of 1 ha per 1 season. In light of this table comparing crops profitability on a specific unit area of 1 ha, it is noted that the rice crop takes first place. Cassava ranks second, followed by maize, Irish potatoes, vegetables, sorghum, soybeans, climbing beans, groundnuts, peas and ultimately the dwarf beans.

The high profitability of food crops explains how the agro-ecological zones in the Highlands of Buberuka, Eastern and Central Plateaus have specialised in growing Irish potatoes, maize, beans, vegetables, wheat and sorghum according to their climate. In this specific study, the researcher evaluates government policy of agriculture (agricultural transformation policy) has affected smallholder farmers in Gicumbi District, given their involvement in the farming prioritized food production such as Irish potatoes, maize and beans. According to AMIS-Rwanda (2010) and MINAGRI (2004, 2013), the farmers in Gicumbi District were also growing other crops such as sweet potatoes, yam, and taro (plant of arum family which has edible starchy corms and edible fleshy leaves) in addition to Irish potatoes. With the introduction of the CIP program, and the implementation of PSTA II and PSTA III, crop productivity improved, especially Irish potatoes, maize, beans, wheat, sorghum and vegetables (Musabe, 2012).

## **2.8 Chapter summary**

This chapter examined the extant literature linked to food security and agricultural policies. The impact of the agricultural transformation policy on food security was assessed and the issue of global food insecurity was discussed with the perspective of developing countries and sub-Saharan Africa in particular. It further introduced the review of the literature on the agricultural sector and the development in sub-Saharan Africa, as well as the agricultural revolution in relation to food security, from an African perspective. From the Rwandan perspective, this chapter highlighted the impact of agricultural policy and food status in Rwanda. The chapter discussed the goal of producing more food for both consumption and export. Rwanda developed the agriculture policy to reduce the problem of food insecurity. Finally, the chapter highlighted various strategies developed towards the agricultural transformation policy scheme, including the Strategic Plan for Agricultural Transformation (PSTA), Rwanda's Vision 2050 program, and the Economic Development and Poverty Reduction Strategy (EDPRS). The next chapter provides the theoretical framework employed by the present study.

## **CHAPTER 3: THEORETICAL AND CONCEPTUAL FRAMEWORK**

### **3.1 Chapter overview**

This chapter presents the theories related to the research, including the description of the key concepts of the study that allow the conceptual framework to provide a good understanding of the research. This study also incorporated the Sustainable Livelihoods Framework (SLF) and illustrates the key-elements of the framework. It further discusses the critiques of the SLF and applicability of the SLA to this study as well as the conceptual framework of the research. More explicitly, the first section of this chapter analyses the concept of SLA as the theoretical basis of this study and discusses its core principles. This is followed by the discussion analysis of the key-elements of the SLF and its critiques.

### **3.2 Theoretical approaches**

In this section, the study introduces the theory that relate to the research, namely the Sustainable Livelihoods Approach (SLA).

#### **3.2.2 Sustainable Livelihoods Approach (SLA)**

The Sustainable Livelihoods Approach (SLA) is a theoretical framework that was employed to inform the research. The SLA is a useful way of effectively prioritising and formulating different selected development activities. It is based on deeply understanding the way the poor and other disadvantaged people manage their lives regarding the livelihood strategies which they adopt and opportunities and vulnerability context (stress and shocks) which they encounter. The SLA also evolves the thinking about the significance of policies and institutions that influence the access to livelihood assets.

The SLA is a participatory approach based on the acknowledgment that all people possess abilities and resources (assets) that can be used to develop and enhance their living conditions. However, a livelihood refers to the capabilities, assets and activities that are necessary to make a living. It is considered sustainable when such livelihood can cope with and recover from stresses and shocks of people and when it provides opportunities to the future generation and contributes in the short- and long-term to the utility and benefit of other local or global livelihoods (Chambers and Conway, 1992).

The SLF was chosen as it fosters the participatory approach to rural development in the adoption of innovations in rural areas. The SLF serves to understand the way the poor and other disadvantaged people manage their lives. However, the SLF is particularly useful framework

to understand the complexity of the livelihoods of the poor and their strategies they enforce to survive.

The SLF was developed to provide solutions to poverty alleviation and inequality. According to Norton et al. (2001), this framework has its conceptual origins in various fields such as agro-ecosystem or farming systems analysis, applied social sciences and participatory approaches to rural development. The SLF also has a big impact on the contribution from Marxist scholars and economists, particularly in the field of agricultural economics (Scoones, 2009). The SLF has also been used in various effects of the livelihood studies and the Green Revolution in India, focusing on the microeconomics of farming production and patterns of household accumulation (De Haan and Zoomers, 2005). The SLF has been largely developed in the works of Chambers and Conway (1992). They put forward the description of a livelihood as follows:

A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. (Chambers and Conway, 1992:7).

The above description means that small holder famers have the capabilities make use of their assets such as land to sustain themselves. In this way, the framework contributes to net benefits of other livelihoods at the local and global levels in the short and long term.

The SLF as applied by the Department for International Development (DfID, 2001) in its works and activities has emerged as a framework promoting 'the sustainable rural livelihoods' as a main developmental right of way built on the capabilities approach with assets, pentagon and social or financial capital. According to DfID (2001), the SLF emphasises how people operate and function when they face vulnerability, shocks and trends caused by many factors that can limit them from attaining the intended food production. However, the SLF is primarily preoccupied with the assets, how they are managed, used to overcome vulnerability and shocks and by what necessary means they are assembled to achieve the livelihood outcome (DfID, 2001).

The SLA framework has already indicated significant assets, which help the engagement of people's activities in their lives. All these capital assets need to be combined for a holistic and sustainable livelihood. The sustainable livelihoods framework deals with vulnerabilities, poverty and shocks. However, livelihoods can be sustainable when poor people can recover from shocks for example, floods or poor harvest.

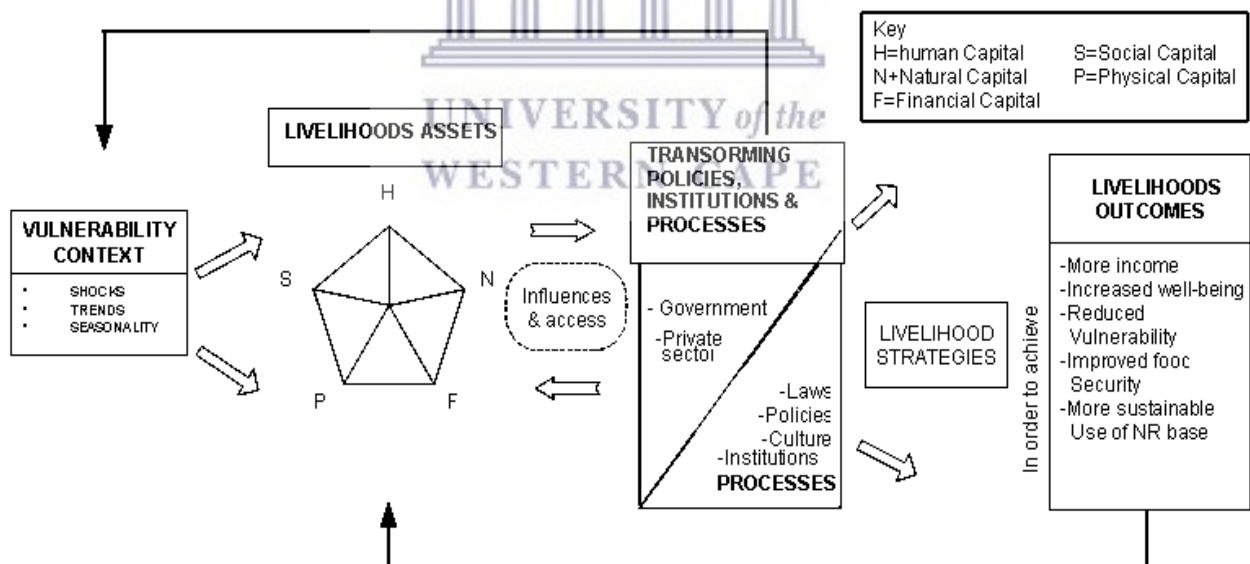
### 3.2.2.1 Principles of the SLA

Authors such as De Satgé et al. (2002) name five core principles of the SLA: firstly, the SLA is seen as being people-centered and participatory, which means that it is about knowing how people make their living. Secondly, the SLA is a comprehensive and integrated approach to poverty alleviation or eradication. It advances a holistic analysis to identify factors within and outside households that have an advantage or negative impacts on livelihoods. Thirdly, the SLA considers the differences among households or people in a given community. Fourthly, SLA should result in maximum advantage; consequently, a successful poverty eradication strategy must address a whole range of issues. Lastly, SLA should be reflective in practice especially in relation to the quality of analysis and intervention taken to improve the livelihoods of small holder farmers. The SLA recognizes that households and livelihoods are constantly changing in response to shocks, stresses and seasonality (De Satgé et al., 2002).

### 3.2.3 Sustainable Livelihoods Framework (SLF)

This framework has been largely used in development work as an analytical tool and checklist to analyse poverty. Figure 3.1 below reflects the theoretical framework for sustainable livelihoods.

**Figure 3.1 Sustainable Livelihoods Framework**



Source: DfID (2001)

The above figure illustrates the SLF in which this framework examines how people pursue different activities within the vulnerability context surrounding them, in which by using their availability assets with different strategies, they achieve a certain livelihood outcome. The

functions of the main elements (human capital, financial, natural, social and physical capital) of the above SLF in Figure 3.1 are summarised below.

### **3.2.3.1 Vulnerability context**

The vulnerability context refers to the particular shape of the external environment where people stay. It includes the external factors that have an impact on the livelihood assets of the population of such an environment, which include among others, droughts, floods or pests. In this light, farmers may be vulnerable especially if they have no control of the manner that sustains their livelihoods. In context, vulnerability therefore, comprises of shocks and trends that are seasonal but might be out of the control of individuals in the society (De Satgé et al., 2002). These factors can create more or fewer opportunities or can refrain and prevent people from having access to the source of the assets in the community (De Satgé et al., 2002).

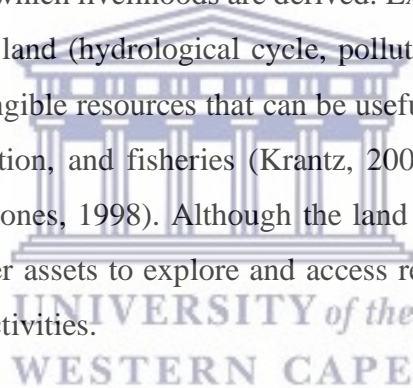
### **3.2.3.2 Livelihoods assets**

There are five livelihood assets in the SLF framework. All people need these assets (not only poor people) in order to make a living. People can determine their proposed plans, particularly in the context of the trends, shocks and seasonality of their livelihood, and in light of the processes and institutions that they encounter (Mensah, 2011). Those assets are the following:

- **Human capital:** Human capital can be defined as labour the skills, knowledge, experiences, good health and physical capability required for the successful pursuit of different livelihoods strategies. Many scholars argue that human capital is determined by the quality and amount of labor existing at family, household or community level, as it is important for the utilisation of the others' assets as well as being dependent on the others for the protection of livelihood outcomes (Krantz, 2001; Ashley and Carney, 1999; Bebbington, 1999; Farrington et al., 1999; Scoones, 1998).
- **Financial capital:** Financial assets are comprised of credit used to accomplish livelihood objectives, cash or money in a savings account in a bank. The livestock, stocks of jewelry and savings can also contribute financially to the individual's daily life (Krantz, 2001; Ashley and Carney, 1999; Scoones, 1998). Therefore, having employment provides increased financial capital to poor people (Olivier, 2015). However, the single income might not be adequate for households to survive. This contributes to income of poor urban people engaged in informal jobs – such as urban gardening – for alleviating food malnutrition (Scoones, 1998).



- **Physical capital:** Capital assets contain the basic infrastructure, and include: food stocks, houses, tools and machinery and farm equipment, communication, transport and others means for enabling individuals to pursue their livelihood. This capital sustains the life expectancy of a farmer who have land to produce food to generate income by selling the produce, which in turn brings money used for various purposes in their daily life (Krantz, 2001; Ashley and Carney, 1999).
- **Social capital:** Social assets can be defined as the features of social organisation, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions (Olivier, 2015). Social capital contributes to the quantity and quality of resources such as networks, social relations, members in groups and access to wider institutions in the community, upon which individuals draw, in pursuit of their livelihoods (Krantz, 2001; Ashley and Carney, 1999). Therefore, social capital has a greater positive effect on enhancing human assets (Olivier, 2015).
- **Natural capital:** Natural capital consist of the natural resources acquired from nature, that are useful or from which livelihoods are derived. Examples are soil, water, air and genetic resources, and land (hydrological cycle, pollution sinks etc.) Natural capital can be intangible or tangible resources that can be useful in activities such as mining, farming, timber plantation, and fisheries (Krantz, 2001; Ashley and Carney, 1999; Bebbington, 1999; Scoones, 1998). Although the land on its own is not adequate, it also interacts with other assets to explore and access resettled farmers to enhance or limit their livelihood activities.



### **3.2.3.3 Policies, institutions and processes**

Policies, institutions and processes play an important role in the use of resources. They are comprised of laws, policies and entities that regulate and control how people use the resources and determine and influence who gets access to such resources for sustainable livelihood and decision-making (DfID, 2001).

### **3.2.3.4 Livelihoods strategies**

In the Sustainable Livelihoods Framework (SLF), DfID (2001) defines strategies as a combination of activities and assets for attaining livelihood goals. The main objective is to accomplish the benefits of livelihood goals. The main objective of livelihood strategies is to accomplish beneficial livelihood outcomes to people in the community or society in which the more people adopt different livelihood strategies, the more they will achieve various livelihood

outcomes. Consequently, livelihood strategies are dependent on the availability of resources (assets) that people have and also having access to knowledge regarding policies, institutions and processes (structures) (DfID, 2001).

### ***3.2.3.5 Livelihoods outcomes***

Livelihood outcomes refer to the outputs or achievement of livelihood strategies. It reflects the improvement of the overall quality of life which is based on a certain standard of living for people in the community or society. The quality of life for example, is comprised of the increase in income and food security that can be enjoyment to improve the standard of living, and to lower the levels of vulnerability and at the same time advance ways and means of using sustained natural resources such as land to improve small holder farmers' income (Serrat, 2008).

### ***3.2.3.6 Critiques of the Sustainable Livelihoods Framework***

The SLF focuses on poverty alleviation in poor communities and how people cope with poverty, shocks and uncertainty, while the focus on poor people is useful for highlighting specific issues of poverty (Scoones, 2009; Carney, 2003). For example, a large body of research has demonstrated that household-level motivations, cultural and social values, and socialisation have a primary influence on agriculture (Carney, 2003). When considering Figure 1.1, the word 'population' is not noticeable and yet the entire agricultural value chain is dependent on the population of farmers. To be precise, it means that the SLF pays more attention to policies and institutions rather than the individuals (Olivier, 2015). For example, PSTA has put more emphasis on modernisation and transformation of agriculture without mentioning how small holder farmers were involvement in the implementation of poverty reduction through agriculture (Gatete, 2016; Tashobya, 2016). In this case, the SLF does not indicate the traditional farming practices, of which some individuals in the community are accustomed to (growing food crops or farming techniques of their choice) (Tao and Wall, 2009). What is at play, is improved agricultural productivity through land consolidation and the Crop Intensification Program. In this case, there is a lack of conceptualisation of social structure in the SLF which, according to Snidder (2012), present challenges in terms of households farming practices. The sustainable livelihoods framework sees lack of resources, economic opportunities, and poor infrastructure as key components to be addressed in order to realise sustainable livelihoods for small holder farmers (Tao & Wall, 2009; Levine, 2014).

### **3.2.4 Application of the SLA to the study**

A detailed investigation of agricultural transformation policies in Rwanda and specifically their impact on food security and generally the livelihoods of farmers of Gicumbi District, was the starting point of this research.

Despite the critiques, this approach helped this research study to generate a theoretical foundation for the study. Consequently, the contribution of the Rwandan agricultural policy of the Strategic Plan for Transformation of Agriculture (PSTA) to the livelihoods of the population is reviewed in the context of the SLA. As discussed previously, the agricultural policy of the PSTA benefits the population, especially the poor people, in various ways, and in this study's context, this policy proves to be a precious strategy for food security for the people of Gicumbi District. The SLA confirms this statement by focusing on the assets of the poor people who are experiencing food insecurity. Additionally, the study uses this approach to explore the subject matter of food insecurity in the study site. Therefore, the SLA proved to be effective in its application to the research at household level in Gicumbi District, of the beneficiaries of the agricultural policy of PSTA, initiated by the government of Rwanda.

Accordingly, the SLF was used to attain insights into the well-being of farmers of the case study area (Gicumbi District) by taking into account their vulnerability and assets and to investigate the resources and capabilities that farmers have access to. According to the Food and Agriculture Organisation of the United Nations (FAO, 1996, as cited by Devereux and Nzabamwita, 2018), farmers are cognisant of food security especially when they (farmers) are able to produce for consumption to nutritious to meet their dietary needs and for sale to cater for other household needs such as tuition. Food security includes availability and access to food both economically and in terms of consumption (Devereux and Nzabamwita, 2018:8–9). According to FAO (2010a), food security provide opportunities for small holder farmers to grow what they need for consumption and the market.

### **3.3 Chapter summary**

This chapter discussed the rationale of employing the Sustainable Livelihoods Approach (SLA) as a theoretical framework of the research. The chapter discussed the core principles of the SLA and outlined the Sustainable Livelihoods Framework (SLF) as well as its key-elements. The discussion presented reasons why the SLA is a practical theoretical instrument to assess the impact of the agricultural transformation policy on food security among smallholder farmers when they try to increase agricultural productivity by using the transformation of

agriculture in order to reduce food insecurity among their households. The chapter further articulated the application of the SLA to this study and presented critiques of the SLF. The next chapter presents the research design and methodology that guided this study.



## **CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY**

### **4.1 Chapter overview**

The methodology in research helps to show the challenges and opportunities emanating from PSTA as outlined in the study objectives. It also assists the readers to critically assess in a logical way, the overall quality, solidity and accuracy of the research. This chapter presents the research design and methodology that guided this study. By applying certain sampling criteria, the chapter defines the techniques or procedures employed to identify the research sample of the study. The chapter outlines the arguments that justify why such research population and sampling methods were designated. It further presents the techniques or methods and tools used in data collection as well as the methods that guided the data analysis during the study. Lastly, this chapter presents the ethical considerations that have been followed during data collection within the case study area.

### **4.2 Research design**

Creswell (2003) explains the term research design as the specific procedures involved in the research process. Research design is an overall strategy the researcher chooses to integrate the different components of the study in a coherent and logical way, thereby, ensuring he/she effectively address the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data (De Vos, 2002). According to (De Vos, 2002), four types of research exist namely: descriptive research design, correlational research design, experimental research design, and exploratory research design. This study adopted exploratory research design since it is described as a credible method for gaining an understanding and meaning of Rwandan agricultural transformation policy (De Vos, 2002).

### **4.3 Research methodology**

According to De Vos (2002) and Babbie and Mouton (2001), the research methodologies in social science research comprise qualitative methods, quantitative methods and participatory research. Babbie and Mouton (2001) and Babbie (2007) argue that in research, a qualitative method points to the collection of data with a deep understanding of human behavior and the cause of such behavior. In addition to that, qualitative research is directed towards an inductive approach, rather than a deductive approach. On the other hand, Babbie and Mouton (2001) indicate that, the quantitative method examines the phenomena without presuming on it. For the purpose of this study, a mixed-method of qualitative and quantitative research was

employed. The motive for this is to accommodate the strengths and weaknesses of each method.

The study used open-ended questions to guide and facilitate the interview process (Creswell, 2003) in relation to Rwanda's Strategic Plan for Agricultural Transformation, 2018–2024. As an example, the interview questions started with an opening question such as, "Can you tell me about your understanding of the agricultural transformation policy of Rwanda?" and then progressed, based on the initial response, using the data collection techniques elaborated under the data collection process (Neuman, 2011).

### **4.3.1 Quantitative methods**

#### ***4.3.1.1 Structured questionnaire***

According to Ahmed (2012), a questionnaire is an instrument used to pose questions on a topic designed by research to get answered for the study. The administered structured questionnaire represents social behavior, past behavior and the motive of the research project. Furthermore, the data collected is centered on the socio-economic characteristics of the farmer households of the three different sectors in Gicumbi District, assessing the degree of participation of farmers, identifying the impact of agricultural transformation policies on household food security, and examining the challenges confronted by farmer participants.

#### ***4.3.1.2 Sampling***

Social science research recognises two kinds of sampling defining the sample representative of the study, namely: the non-probability sampling and the probability sampling method. The scholars, De Vos (2002) and Babbie and Mouton (2001) argue that the non-probability sampling method is employed when it is not easy for the researcher to choose and determine the sample from the population in the study because the population is not known. On the other hand, the probability sampling method is employed when the population is known, and the researcher can identify the behavior of the population in the study. In this research, the sample representative of the population was established based on a multi-stage procedure of probability sampling, as the farmers of Gicumbi District practicing farming based on the agricultural policy of PSTA, are known. At the outset, a list of all sectors of Gicumbi District was obtained from the literature, including structures of Rwanda's government. Out of 21 sectors of Gicumbi District, a simple random selection of 3 sectors was done. The simple random sampling made it less complicated for the researcher, since all sectors are accessible and can be easily located. In this study, a total sample of 36 farmers were selected from three

sectors of Gicumbi District – with 12 farmers selected from each sector. The content of the administered questionnaires (see Appendices A and B) is linked to the research question.

During the second stage, the researcher emailed the mayor of Gicumbi District, requesting permission to collect data. The mayor gave the authorisation to collect the required data; the researcher then emailed the district agronomist who provided the name and contact details of the agronomists operating at the sector level for the three selected sectors (Byumba, Kageyo, and Rukomo) in Gicumbi District. In turn, the agronomists at the sector level provided the list of the potential farmers at the sector level in Gicumbi District, to be selected for participation in the study. The researcher selected a sample of 12 farmers in each of the 3 selected sectors and was able to acquire the number needed by using a non-probability sampling method (snowballing) (altogether 36 farmers from 3 selected sectors). Potential participants who declined participation (15 farmers) were replaced. The researcher provided farmers with an equal chance of being selected in the sample. Each interview lasted between 20 to 30 minutes.

#### **4.3.2 Qualitative methods**

Qualitative research is a research paradigm that researchers adopt to explore and understand the meaning assigned to a social or human problem (Creswell 2003; Nkwi et al., 2001). In this study, the researcher interviewed government policy advisors (agronomists) on their views and perceptions of the agricultural policy of PSTA as a strategy to alleviate poverty and food insecurity in Gicumbi District. Furthermore, the researcher interviewed the farmers on the contribution of the agricultural policy of PSTA on their livelihoods. This method enabled farmers and government policy advisors the autonomy of expression in indicating the impact of the agricultural policy of PSTA on farmer households. It also helped the researcher to have a deep understanding of the agricultural policy of PSTA under investigation as a strategy to improve food security and alleviate poverty in Gicumbi District.

##### **4.3.2.1 Semi-structured interview**

According to Kajornboon (2008), a semi-structured interview is a methodical line of listening and talking to the participant while getting information from them, which was useful for the study. Semi-structured interviews in this study included a series of open-ended questions to gather in-depth information from informants such as small holder farmers. The interview questions were established on the motive of obtaining clarification on the impact of transformation policy on food security in Gicumbi District and this was done via telephone from small holder farmer, policy advisers etc. The researcher selected a total sample of 10

informants for focus group interview. This comprised four government policy advisors (agronomists) and six farmers. The selected farmers represented the overall group. In addition, as each sector had one agronomist, the researcher identified 3 agronomists as policy advisors in each of three selected sectors (one agronomist from each of three selected sectors) and one policy advisor (Director of the Department of Agriculture of Gicumbi District). In addition, regarding the telephone interviews, the researcher recorded the interviews conducted in Kinyarwanda using a phone recorder, after which the researcher transcribed and translated the recordings into English. Questions were directed towards farmer informants, who had been appraised about the themes, which focused on the contribution of the agricultural policy of PSTA in increasing the level of food security and livelihood assets of households. The questions directed towards policy advisors were similarly based on the agricultural policy of PSTA as a strategy to alleviate poverty and food insecurity in Gicumbi District.

#### **4.3.3 Data collection tools**

This study collected primary and secondary data. The primary data was collected using a telephone by use of structured questionnaire with the farmers and policy advisors in the case study area. The data from the telephone questionnaire was captured in Microsoft Office Excel and then imported into SPSS software for analysis. The secondary data was collected from existing sources. The researcher employed the literature review to reinforce the quality of the study. The literature review consisted of reviewing the empirical evidence of the agricultural transformation policy, as contained in the relevant Rwandan government policies, namely Vision 2020, Vision 2050, EDPRS I and II, PSTA phases I, II and III, and economic plan reports of Gicumbi Districts. The researcher also reviewed the relevant literature produced by the FAO, World Bank and NISR, including reports on agricultural policies and food security. Lastly, the researcher consulted other academic sources related to this research topic, such as material by Williams and Morris (2016), Ezeanya (2014), Alinda and Abbott (2012), Booth and Golooba-Mutebi (2012), and Liwenga (2003).

#### **4.3.4 Data collection by telephone process**

In fulfilling the objectives and attempting to answer the research questions for this study, the researcher mainly utilised the collected primary data using the telephone survey questionnaire and telephone interviews from the informants. Thus, possible selection bias could have occurred since the research could not collect the data through face to face because of COVID-19. According to Reid and Mash (2014), primary data is collected with the intention of



uncovering a particular problem using the mixed-method approach. More so, it improves existing knowledge previously written by other researchers. For the purpose of this study, the researcher employed open-ended interviews.

The researcher collected the data in the words and categories of the participants, exploring what, how, when and where the phenomena occurred (Reid and Mash, 2014). The researcher was able to question (see Appendices A and B) the participants about food security/insecurity, policy implementation, policy impact on livelihoods and knowledge about the transformation of the policy itself.

#### **4.3.5 Data analysis and presentation**

After collecting information using the survey questionnaires and interviews, the data was analysed. According to Bird et al. (2009) the analysis of datasets obtained from a mixed-method approach is referred to as triangulation. The researcher integrated the qualitative and the quantitative data to identify apparent themes. Regarding the role of triangulation in research, Bird et al. (2009:1316) assert the following: “Triangulation helps overcome inherent bias within a single-method, single-observer and single-theory study and thus offers greater validity.”

This study conducted qualitative data analysis based on the themes that emerged from the study objectives. Since the researcher used in-depth interviews, the data consisted of written transcripts from different individuals. Data analysis involved various stages; firstly, the researcher read and re-read the transcripts of recordings; secondly, the researcher focused on the analysis and developing categories, derived from coding of the data (for example, 1 for agronomist, and so on). The narrative analysis further involved identifying themes or patterns and organising them into coherent categories. By organising the data into categories, the researcher was able to identify patterns and connections and to finally use the themes to explain the findings.

#### **4.3.6 Research techniques, data collection paradigms and participants**

The data collected from the questionnaires was coded and captured into excel sheets for coding. The datasets generally contain large quantities of information, known as variables. Additionally, SPSS allows users to present the findings through descriptive and inferential statistics, illustrated in tables, graphs, charts, and figures. This study employed the SPSS software because it is fast and easy to learn and is known to produce reliable analysis.

#### **4.4 Limitations of the study**

The researcher was not able to travel and conduct face-to-face interviews to collect data due to global travel restrictions resulting from the Corona Virus (COVID-19). Consequently, the researcher used the alternative option of gathering data by using telephone calls and WhatsApp calls. This method was time-consuming and it was problematic to reach some respondents in remote areas due to connectivity issues. The researcher could not make testable observations that relates to participant's views during the interview process.

#### **4.5 Ethics statement**

Ethics play a significant role in research, in particular the norms that researchers have to take into consideration when conducting social science research (Babbie, 2007). The ethical consideration in this study was based on the assurance that the researcher ensured there would be no harm or risk to the informants or anyone else involved in this research study. The respondents' personal information, including their names, were not to be disclosed to anyone; only pseudonyms were to be used in the final report and in all published reports to protect privacy. Information collected employing phones and WhatsApp recordings, was used solely for research analysis and treated with privacy and was thereafter destroyed. The researcher also guaranteed that permission to participate in this study would be sought from the participants and that participation would be voluntary. The ethics process recommends that whenever possible, the process of informed consent should be done in person and not via telephone calls (Josephson and Smale, 2020). However, as there is a worldwide pandemic of the Corona Virus (COVID-19) that shut down the local and international movement of people, the researcher decided to obtain telephonic consent, which was regarded as an appropriate method and was approved by the Senate Higher Degrees Committee of the University of the Western Cape (UWC) as an appropriate technique for data collection, since the researcher could not physically travel to the study site due to COVID-19. Thereafter, the researcher contacted only the informants who were willing to participate in the study by first requesting their oral consent telephonically, which was recorded and regarded as a written consent form.

The researcher took into consideration the global issue of poverty and food security in general, which was the reason why the information of participants collected from the field interviewees, was used only for academic purpose and was treated with strict confidence. The research participants were guaranteed the full respect of their valuable information and the full freedom of refusing to respond to any of the questions for personal reasons or withdrawing from the

study at any time they felt not to do so. In order not to violate any ethics in social science research, this study was carried out only after approval from the Senate Research Committee, the Board of the Faculty of Economics and Management Sciences, and the Management of the Institute for Social Development of the University of the Western Cape.

#### **4.6 Chapter summary**

This chapter discussed the research design and methodology used during this research. The mixed-method approach that includes both qualitative and quantitative methods was employed to inform the research. The chapter further provided an extensive discussion of the research population and sample population as well as the sampling criteria and methods employed in order to obtain the sample representative of the research. In addition, the chapter also outlined in detail the different methods used in data collection and provided a brief overview of the data analysis process, as well as ethical considerations addressed in this study. The next chapter presents a detailed discussion of the research findings and analysis. It attempts to answer the research questions through the empirical analysis of the data collected from the field research. The study used open-ended questions and group focused interviews to guide and facilitate the interview process in relation to Rwanda's Strategic Plan for Agricultural Transformation.



## CHAPTER 5: RESEARCH FINDINGS, INTERPRETATION AND DISCUSSION

### 5.1 Chapter overview

This chapter presents the research findings, interpretations and discussion based on the study objectives. The chapter evaluates the impact of the agricultural transformation policy on food security in one district of Rwanda. In addition, the chapter presents themes such as agricultural transformation policies, types of crops, source of increased agricultural production, improvement of food security by households, and the improvement of household well-being. It further discusses factors underlying the failure or success of the new agricultural transformation policy in promoting food security for households that emerged during the investigation. Moreover, it presents the results and analysis of the study's findings, as well as a discussion that emerged from personal interviews/in-depth interviews. Furthermore, this chapter provides answers to the research question, which reviews the impact of the agricultural transformation policy on food security in Gicumbi District, Northern Province, Rwanda.

### 5.2 Socio-demographic characteristics of the respondents

The general information collected from the respondents was based on the age, gender, marital status, level of education, family size, quantities of production, and income per year.

#### 5.2.1 Description of participants

The majority of participants in both quantitative and qualitative approaches were in the groups of 40-50 years old and many of them were members of the Smart NKUNGANIRE system (SNS). The SNS helps farmers in terms of boosting agricultural production and cutting food shortage as well as getting seeds and fertilisers either on credit or at the subsidised government price (Stokke, 2019). This system operates between agro-dealers (small and often independent distributors of agricultural inputs, such as pesticides) and farmers through telephone communication and the final decision usually comes from the district level for accepting the application and receiving seeds and fertilisers (Stokke, 2019).

**Table 5.1 Age of participants**

Age	Frequencies
20–30	1
31–40	3

41–50	23
51–60	6
61–70	1
71–80	2

Source: Researcher’s fieldwork, 2020

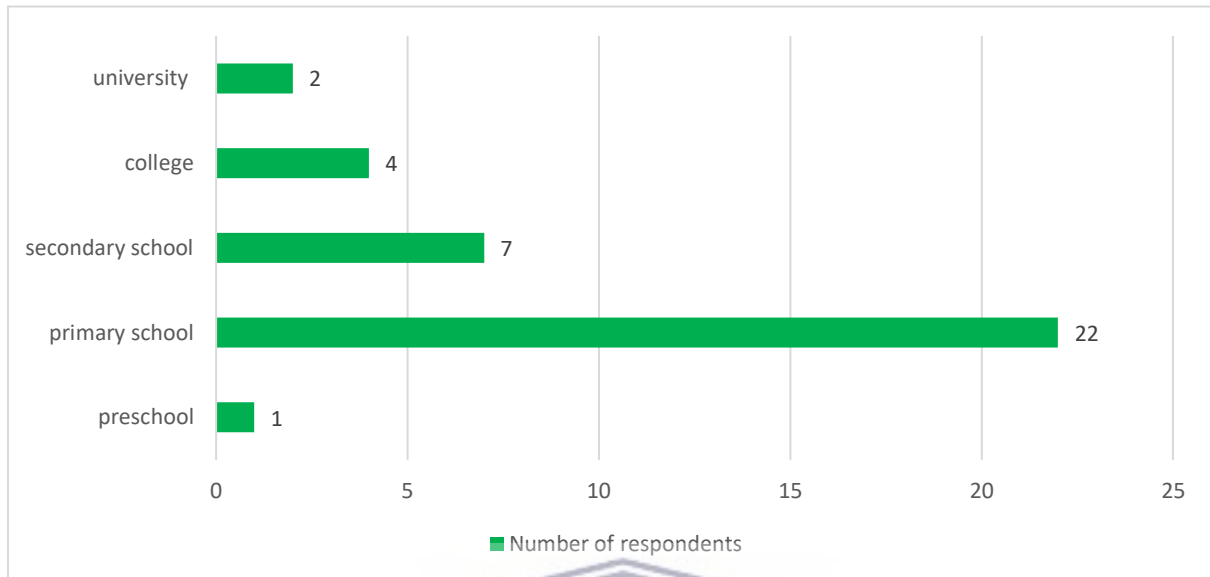
The highest number of respondents were in the age group 41–50. However, the majority of participants (41–50 years) are involved in the agricultural sector. This information is corroborated by the research of Niyibizi (2019), and Mutandwa and Kwiringirimana (2015) who assert that the majority of the farmers in Gicumbi District are in the age bracket of 41–50 years. The study findings show that the middle-aged and elderly people are ones who are still fruitful, productive and energetic mainly in agricultural activity in Gicumbi District. Comparatively, this seems to suggest adults have a better understanding of their physical and social environment in terms of agricultural activities (Musafiri, 2014). The researcher observed that adult household heads are supposed to have greater land accessibility than young heads for the reason that young people either have to wait for land delivery through heritage, or shares from their kin. The above corroborated by Musafiri (2014) who argue that a large majority of young people inherit land from their parents and parents with many children find it difficult to provide for them in terms of land. Frelat et al. (2016) add that family size determines the amount of food produced in the household. In the line of insufficient land in Gicumbi District, young people frequently do not have a land heritage from their parents due to scarcity of productive assets. In this respect, young people depend on low wage casual labor in agricultural activities or non-agricultural employment (Musafiri, 2014). In addition, young people below the age of 40 are the least involved in farming. Therefore, Table 5.1 below illustrates how young people are less involved in farming and most participants involved in this study are mostly in the age range of 41–50.

### 5.2.2 Gender of respondents

Majority of the participants involved in this study were male as most women approached were not available. However, Manishimwe et al. (2019), Mutandwa and Kwiringirimana (2015), and MINAGRI (2017) found that men-headed households are more likely to assume new agricultural techniques than women-headed households. This could be due to various reasons, such as economic and social activities – males are more exposed to land-related activities than

females, and in general, females have limited access to the land. Additionally, females in Rwanda are less likely to engage in socio-economic activities than males, because of cultural matters (Manishimwe et al., 2019).

**Figure 5.1 Education level of the respondents**



Source: Researcher's fieldwork, 2020

Figure 5.1 shows that most of the farmers have different levels of education, except one who did not complete at least primary school, and six farmers have some level of tertiary qualification. However, this level of education was attained of various programs and strategies, including Rwanda's mandatory education policy for primary school (6 years) and lower secondary schooling (3 years), which is called Nine-Year Basic Education (9YBE). According to the World Bank (2019), the main goal of the program (9YBE) is to help children complete school. This is intended to help the reduction of barriers to learning among the children. Furthermore, Dufitumukiza et al. (2020) recommended re-examining policy involvement in addressing the management of adult children in education, at household level and to address individual students' challenges at school. The findings of this study may not generally reflect the implementation of the agricultural transformation policy of PSTA, since there is a likelihood of measurement errors and respondent bias. Measurement errors could have occurred because the sample was too small to be generalisable. Respondent bias, defined as the tendency in respondents to answer untruthfully or inaccurately (West et al. 2018), could have occurred since the researcher was not on the ground to ensure that the participants' response correspond with reality.

**Table 5.2 Family size of the respondents**

<b>Household numbers</b>	<b>Frequencies</b>
1 to 2	1
3 to 4	5
5 and above	30

Source: Researcher's fieldwork, 2020

Table 5.2 above indicates the family size of the farmers who participated in this study and the results show that the majority of participants (30 out of 36 farmers) have 5 or more household members, 5 out of 36 farmers interviewed highlighted that their households constitute 3 to 4 household members. Moreover, one of the 36 farmers in this study indicated that they have 1 to 2 household members. However, a large household size has a greater positive influence on livestock farming and diversification of crops and it can provide cheap labor. This seems to suggest that households with small household are likely to benefit from livestock farming and crop diversification due to scarcity of land and farm size. However, given the scarcity of land, households may be disadvantaged in one way or the other (Manishimwe et al., 2019; McKenzie, & Woodruff, 2017). Nonetheless, as Alinda and Abbott (2012) point out, the PSTA has been designed to assist farmers to combine their small lands with those of their neighbors (land consolidation) and grow selected crops, especially specified commercial crops, by using selected seeds and appropriate fertilisers.

The findings indicate that the big household size plays a significant role in improved agricultural production. That means that family size can provide cheap labor and increased production (Frelat, et al., 2016; Manishimwe et al., 2019) – see the theoretical framework on SLF where labor (human capital) is critical for farmers (DfID, 2001). Additionally, the big household size seems to benefit the household's well-being and also in terms of having energetic household members to take part in other remunerated employment opportunities (Mensah, 2014). This finding shows that the human capital required by this household includes labor assistance from children, spouses, relatives and hired help. As indicated by the SLF, human capital is about labor, skills, knowledge, experiences, and good health, which are all important to the physical capability for the successful pursuit of different livelihood strategies. Moreover, the PSTA program is built around the human, financial, natural, and social capital forms of farmers in the Gicumbi District. Therefore, household farmers need to be in good health and physical condition to be able to engage in their farming activities. In the same way,

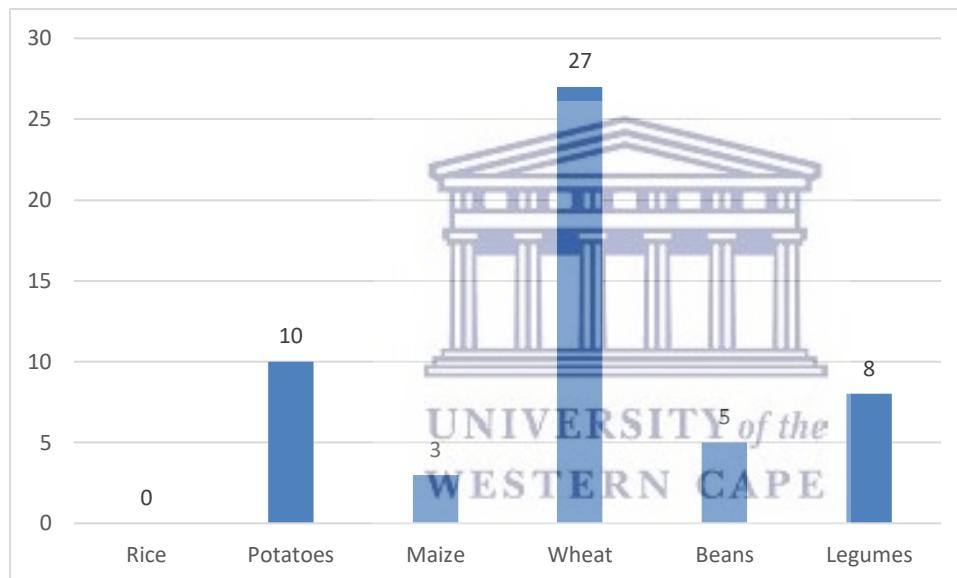
farmers require physical capital in their handling of implements such as grape hoes, wheelbarrows, watering cans, rakes, iron forks, etc.

### 5.3 Main components of the agricultural transformation policy

#### 5.3.1 Crops and vegetables cultivated in Gicumbi District

The study site is located in the Northern Province of Rwanda where the selected crops are the following: beans, cassava, maize, potatoes, rice, soybean, and wheat. However, the dominant crops in Gicumbi District are maize, beans, potatoes, and legumes. Furthermore, this district is the main area in the country for cultivating wheat (Miklyaev et al., 2021). Wheat is cultivated in Gicumbi District due to favorable volcanic soils and Buberuka highlands at altitudes of  $\geq 1900\text{m}$  (Miklyaev et al., 2021).

**Figure 5.2 Types of crop farming in Gicumbi District**



Source: Researcher's fieldwork, 2020

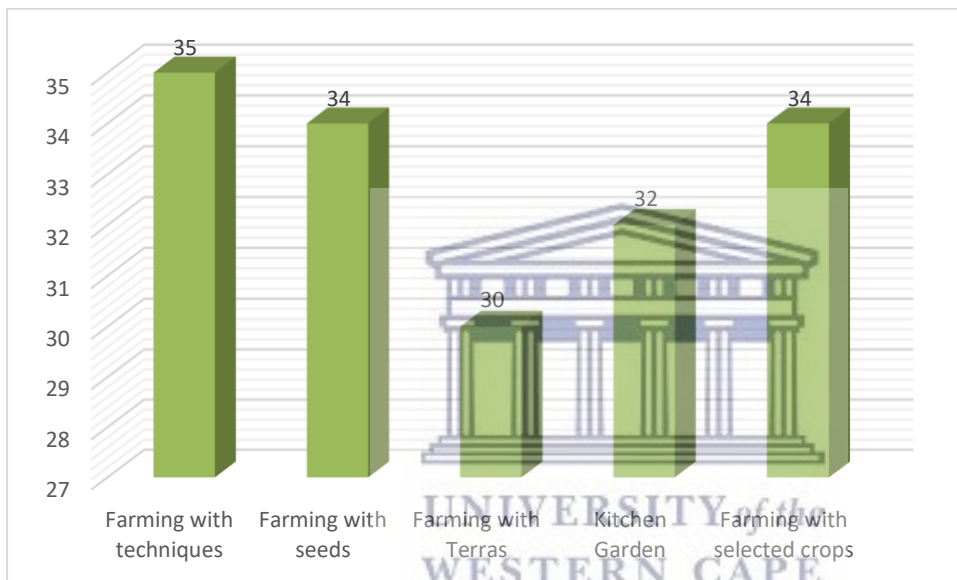
Figure 5.2 above shows how farmers in Gicumbi District cultivate different type of crops. The crops cultivated in the largest quantities by the farmers in Gicumbi District, are maize, followed by beans; however, in this sample rice is grown, but the quantity produced is not yet known. As figure 5.2 indicates, beans are the second most popular crop in this District followed by legumes and potatoes. This affirms what Mutandwa and Kwiringirimana (2015) have alluded to – that maize, beans, and potatoes are grown most frequently and are important crops per land unit in the study area. Note, the table above indicates rice being 0% because participants failed to indicate the amount of rice being grown.



The Crop Intensification Program (CIP) is used to develop efficiencies in agricultural production and to lower the prices of output and inputs. The above understanding means the increase of crop yields with high potential food crops, such as potatoes, beans, maize, cassava, wheat, rice, and soybeans (Conway & Barbie, 1988; Miklyaev et al., 2021; Weatherspoon et al., 2021). In comparison, traditional and modern methods of farming have made a big contribution to agricultural production and have also helped farmers to produce enough food for domestic consumption as well as for the market for extra income (for children’s school fees, medical bills and possibly building a house) (Mugabo et al., 2019).

### 5.3.2 Agricultural methods practices in Gicumbi

**Figure 5.3 Impact of the PSTA on farming and food security in Gicumbi**



Source: Researcher’s fieldwork, 2020

Figure 5.3 above shows the impact of the PSTA on farming and food security in Gicumbi District. The most popular agricultural method is farming with techniques (using fertiliser and irrigation) followed by farming with seeds and farming with selected crops, followed by kitchen gardens (Rogers (1983 Sahin, 2006). This is in agreement with the PSTA, which includes giving farmers the necessary skills to adopt improved farming practices, which ultimately is an investment in their human capital. Furthermore, agricultural transformation policies contribute to poverty reduction and food insecurity reduction as well as to improved standard of living of the population (Del Prete et al., 2019). Moreover, land is the main asset in Gicumbi District, which has a total cultivated land area standing at 54,000 ha, compared to 4% of the national cultivated land area (Del Prete et al., 2019). Approximately 90% of land in

Gicumbi District is protected against erosion, which explains the reason for using terraces to prevent soil erosion (Gicumbi District, 2013).

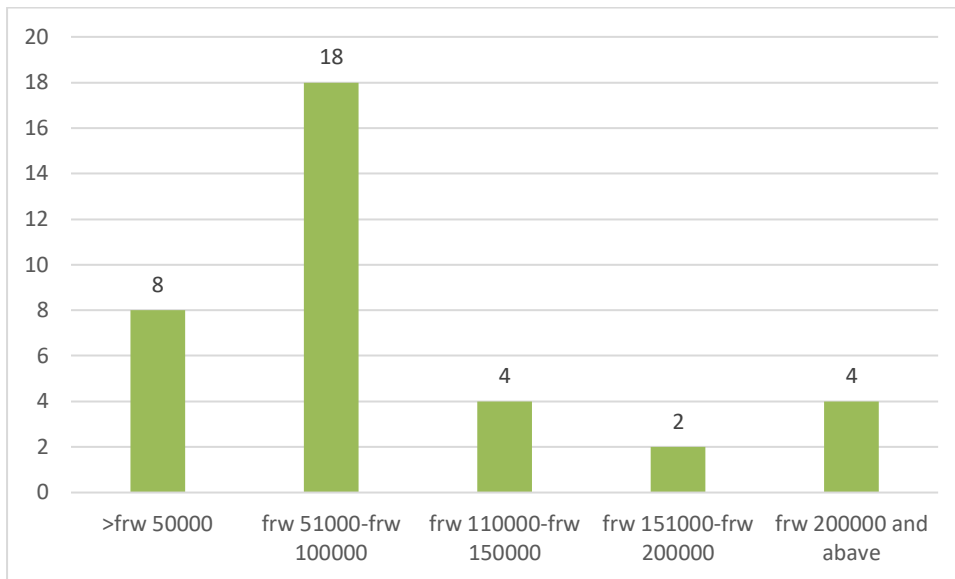
**Table 5.3 Livelihood activities/strategies**

<b>Livelihood Activities</b>	<b>Frequencies</b>
Commerce	1
Livestock	29
Transport	1
Other activities (artisan, craftwork, shoe repairs)	5

Source: Researcher's fieldwork (2020)

Table 5.3 above shows the different livelihood activities that the farmers in Gicumbi District are engaged in, apart from agricultural activities, and include commerce, livestock rearing, and transport, among others. Most farmers who hardly have any grazing areas for cows given by Girinka program are making use of the agricultural transformation policy to improve food security (smallholder farmers). The Girinka program aims to eradicate food insecurity, intensify agricultural production by using organic compost from cows, improve the levels of saving and earnings, increase the number of the meals per day for the population, and improve the possession of domestic animals (Kayumba, 2020; Ngamije, 2018; Nilsson et al., 2017). In addition, livestock farming helps the farmers to produce milk and meat for their daily nutrition and to manufacture beverages (Hagabirema and Kung'u, 2020). Moreover, the study shows that most of the farmer households in the sample practice crop-livestock integration, followed by artisans or craft workers, and shoe repairers, to help the rural household families in the study area to get the additional income, besides agricultural activities.

**Figure 5.4 Livelihood Activities, income, and farming techniques**



Source: Researcher's fieldwork, 2020

Figure 5.4 illustrates the estimated total average annual income that the respondents derive from their involvement in agricultural production in Gicumbi District. The findings show that the largest number of farmers earned from farming an income ranging between frw 50,000 and 150,000 (\$110.34 to \$150.47). The national poverty line in Rwanda stood at \$1.90 in 2016 according World Bank (2017). The figures suggest that the income of farmers is higher than the national poverty line projected in 2016. Though, the annual household agriculture-related income in Gicumbi District is low when compared with the national average income (about \$900), there is a significant improvement in household income (Nsabimana et al., 2020; Bizoza and Simons, 2019). The Rwandan government aims for the country to progress to middle-income status by 2035 and high-income status by 2050 through its National Strategies Transformation (NST1) which also aims to achieve the Sustainable Development Goals (SDGs) (World Bank, 2019). However, this is an indication that families involved in agriculture can pay the school fees for the children, access adequate housing and food, and make some savings for their families' day-to-day expenses (Hagabirema and Kung'u, 2020).

#### **5.4 Farmers' adoption of agricultural transformation practices in Gicumbi District**

The researcher asked the 36 respondents individually if they had experienced a positive change in agricultural production in the course of practicing the agricultural policy of the PSTA initiated by the government of Rwanda. They answered 'Yes' without thinking twice and without hesitating. According to the respondents, there was also proof that the agricultural

activity resulted in more income generated for the household to spend. This, therefore, implies improved family well-being, reduced vulnerability, improved food security and a sustainable income. One of the participants narrated that the new agricultural transformation policies have helped him to sustain his household income (Nkurikiye et al., 2018). When asked about the practical reality of the new agricultural transformation policies in terms of increasing their household income, one of the policy advisors had this to say:

After using agricultural transformation (PSTA) policies, the quantity of agricultural production was [more] improved than before. And the number of people who [were] faced with food malnutrition was reduced. PSTA policies provides farmers with sustainable land management skills, input provision and irrigation, crop and livestock intensification through zero grazing, yield increase of staple food crops such Irish potatoes, maize and beans, which are vital to increase rural incomes (Agronomist 3, December 14, 2020).

The above findings are an indication that farmers in Gicumbi District adopted the transformation agricultural practices after the policy was introduced, especially the farming techniques (for example, irrigation) impacted positively on the increase of food production. Meanwhile, Rogers (1983) points out use of new innovations in farming techniques adopted increases agricultural production through technical, social and institutional interventions. While the SLF does not indicate the traditional farming practices, the findings above show that farmers have adopted new approaches as provided by the PSTA to increase food production (Tao and Wall, 2009). In addition, the findings show that the training provided by MINAGRI, as investment in the farmers' human capital, helped with skills that aided and improved crop productivity and achieved more sustainable livelihoods. As seen from the SLF, human capital was key to farmers – it improved productivity (labor, skills, knowledge, experiences, physical capability), particularly after adopting new farming techniques, it helped them to successfully make use of different livelihoods(financial capital, natural capital) strategies (Krantz, 2001; Ashley and Carney, 1999; Bebbington, 1999; Farrington et al., 1999; Scoones, 1998).

The findings are also in line with what Bizimana et al. (2012) affirm, that before the introduction of the transformation policies, food production in Rwanda averaged 0.6 ha. Therefore, the skills training provided by MINAGRI to farmers, has made an important contribution to the increase in their human capital, which is why they improved their crop

productivity and achieved more sustainable livelihoods (Bebbington, 1999; Bizimana et al., 2012).

The income obtained from the sale of agricultural products helps them to afford other family needs, for example, school fees and health bills. During the overall focus group interview with six farmers from the three selected sectors, they indicated that the farming techniques (PSTA) adopted by farmers helped them implement the policy guidelines and one respondent had this to say:

We give thanks to our government, for the contribution in this activity, as it made a great change in our lives. Now we get enough agricultural production, we keep some quantities at home and the rest [goes] to the markets for getting more money to resolve our basic needs. After deciding to practice or implement the agricultural methods and practices outlined by the PSTA, now we can afford to save between 20000frw-100000frw every year (Farmer 7, December 14, 2020).

This above narrative resonates with the (SLF) theoretical framework in which financial capital obtained through credit enabled farmers to accomplish livelihood objectives, for example, utilising cash earned for saving, and buying equipment for irrigation, and buying more livestock (Scoones, 1998). The findings above demonstrate the difference that the new agricultural practices made to food security in these farming households of Gicumbi District.

The findings further indicate that the farmers in the selected area, after getting all the important support, such as training from the policy adviser, and selected seeds and fertiliser through the NKUNGANIRE system, managed to deal with their basic needs on their own and had improved production from the small land. This means that the new agricultural policy helped them to improve their standard of living, and to make progress toward food malnutrition reduction. However, the government provided support in terms of training, monitoring and providing subsidies. As a result, the national agricultural transformation policy has contributed to food production and nutrition within households across the country. Equally important, human capital and finance are needed by the farmers because they need money to buy farm inputs and to extend pay for additional labor if necessary. The farmers also highlighted that when there is increased agricultural income, they can manage to work with the bank by saving their money in bank accounts, and when they work with the bank, they can get loans or credit, which can help them to improve their different small businesses.

### **5.5. Impact of new agricultural practices on food security in Gicumbi District**

The findings show that the majority of the respondents indicated that the different agricultural methods, as provided by PSTA and promoted by MINAGRI, namely kitchen garden, farming with quality seeds, farming with terraces, farming with selected crops and farming with techniques, are critical to their future farming practices. All those methods helped the small-holder farmers to improve their agricultural production, as well as their diets and access to food. Consequently, many of them have kitchen gardens in their homes for fighting food malnutrition, eliminating stunting among children below six years old, and providing their families with vegetables and fruits, which contain fiber, and help them to protect their health against cancer, diabetes and heart disease (Ndimbwa, 2018; Ziga, 2018; Ntaganda et al., 2017). The household farmer highlighted that the kitchen garden improved household consumption of green leafy vegetables, and the little income that comes from the kitchen garden could be used to meet the other household needs, such as buying kitchen oil, body oil, soaps for washing and showering, salt and sugar.

Bizoza (2011) comments on the use of terraces in agriculture, stating that they help to grade steep land in the hillsides into a series of level trenchers so that soil is not washed away. In earlier times, the singers and poets nicknamed Rwanda ‘a country of a thousand hills’. Gicumbi District is a highland area, and that is why the farmers in that area use terraces as a strategy of farming. Terracing played a greater role in agricultural activities, such as the control of erosion or soil loss recovery of soil possession, increased agricultural production, and water and soil control.

Farming with quality seeds is an essential input for agricultural production, which helped the household farmers to improve the quality and quantity of agricultural production as well as food nutrition (Ngango and Hong, 2021; Van den Broek and Byakweli, 2014; Biemond et al., 2013). On the other hand, one of the participants indicated that while quality seeds improved agricultural production, at the same time they improved agricultural income, which helped the farmers meet their basic needs (Farmer 4, December 14, 2020).

Farming with selected crops is a system of agriculture that was established with the Rwandan Government, by selecting seven crops in each Province of the country, However, Gicumbi District selected only four crops out of the seven government designated crops, namely: maize, wheat, beans and potatoes (World Bank, 2015). The objectives are to increase agricultural production in high-potential food crops, ensure food security and self-sufficiency (World Bank,

2015). In agricultural activities, there are many different techniques of farming, including irrigation, which helped the plants to get water of surviving, and to keep soil sufficiently moistened (Heller, 2020).

### **5.6 Impact of new agricultural practices on land consolidation in Gicumbi District**

Due to the land scarcity in Gicumbi District, some farmers are using land consolidation (a legally regulated procedure led by a public authority and used to adjust the property structure in rural areas through a comprehensive reallocation of parcels, coordinated between landowners and users, in order to reduce land fragmentation, facilitate farm enlargement and/or achieve other public goods) as one of the agricultural policies. Meanwhile, a group of five farmers used the land consolidation on 10 hectares, and their agricultural production was higher than before. One household farmer reported thus:

We thank our government for the implementation of land consolidation as a part of poverty and food insecurity reduction. At the moment, together we grow potatoes on approximately 10 hectares of land and we make more benefit (production has doubled) than before when we were growing potatoes individually (Farmer 6, December 14, 2020).

The above narration is a clear indication that the implementation of land consolidation as part of the PSTA program has helped farmers to produce more food for both consumption and for the market. The inputs from respondents are in line with the SLA, whereby natural capital (land) has played a significant role in the livelihood of farmers in Gicumbi District (Krantz, 2001; Ashley and Carney, 1999; Bebbington, 1999; Scoones, 1998). Additionally, the PSTAII envisages the implementation of the land use consolidation policy with a view of protecting farmers against soil erosion, promoting irrigation and utilising extensive fertile marshland for agriculture to improve productivity (MINAGRI, 2009). Furthermore, the findings are in harmony with the principle of social capital, as shown in the SLA. Thus, farmers in Gicumbi District made use of the social organisation (norms and networks) to coordinate their farming actions to improve the life strategies (Olivier, 2015). Social capital, according to Krantz (2001) contributes to the quantity and the quality of resources, especially when people use their social relations to improve their livelihoods through land consolidation, as the findings have shown in this study.

Another farmer who used land consolidation in this area, explained that:

After adopting land consolidation implemented by MINAGRI, now I keep some of my agricultural produce in my stock at home and I send the rest to market, and the money I get from my agricultural production helps me to work with the bank and to resolve our basic needs (Farmer 2, December 15, 2020).

This indicates that the Crop Intensification Program (CIP) and the Strategic Plan for Agricultural Transformation (PSTA) may have helped farmers to gain efficient production. In addition, the government encouraged the smallholder farmers to consolidate their landholding in order to improve their agricultural production (Miklyayev et al., 2021). Additionally, land use consolidation has intended to boost crop yields at high levels within household farms. This study does not show that the Girinka Program played a critical role in agricultural activity within Gicumbi District, but it suggests that this is possible. Most of the families and households in that area own a cow, which is the source of milk products (butter, yogurt, and cheese), food and fertilizer. Another household farmer indicated that:

Thanks to the government for providing the support in the Girinka program (one cow per family). Now we can get milk and meat in our meals, and we get the manure as fertilizer in our farms (Farmer 5, December 14, 2020).

It is worth noting that the Girinka program (its aim is to give to every poor family one cow that will help the poor families to increase their crop production by using manure, increase their income and their nutrition at the household level and country wide) is part of the PSTA. Thus, this study demonstrated that the Girinka program helped the household farmers to reduce food insecurity and to improve agricultural production. The Girinka program alleviates poverty through dairy cattle farming, reduction of soil erosion through the planting of trees and grasses, improving livelihoods through increased quantity and quality of milk consumption, producing income, increased agricultural production through the use of quality manure as fertiliser and soil quality. Hence, one of the Policy Advisors affirmed that:

The agricultural transformation policy has brought greater changes in food security production, because we work together with the smallholder farmers daily. We encourage them to have Kitchen Gardens so that they can get green leafy vegetables and fruits [as part of] their meals. We help them to get the selected seeds and fertilisers at cheap prices and on credit through Smart phone NKUNGANIRE (Agronomist 2, December, 18, 2020).



The above findings show that because of the agricultural transformation policies such as PSTA, some farmers managed to get sufficient quantity and quality of agricultural production as well as helping them to eat healthily and reduce the high level of malnutrition rates in that area. As discussed earlier (AMIS-Rwanda, 2010; MINAGRI, 2004; 2013), the farmers in Gicumbi District were growing crops such as sweet potatoes, yam, and taro (plant of arum family which has edible starchy corns and edible fleshy leaves) in addition to the Irish potato crop. In terms of the implementation of the agricultural policy of PSTA, crop yield improved, especially Irish potatoes, maize, beans, wheat, and vegetables. Furthermore, a policy advisor (Agronomist) visits the farmers on their farms every month to evaluate how farmers are taking action based on what they learned in training. In addition, a policy advisor from the sector level is connected to the farmers on the district level for getting agricultural services, including seeds and fertiliser distributed by using the smartphone NKUNGANIRE. This shows that there is a top-down approach to agricultural activities (MINAGRI, 2013). One of the participants commented on the impact of these policies:

We encouraged the farmers to have a kitchen garden in their homes where they produced fruits and green leafy vegetables. They have also a cow through the GIRINKA Program where they get milk in their morning's porridge (Agronomist 1, December 20, 2020).

While the farmers applied the new agricultural transformation policies, they managed to enhance their production, within limited land. Resultantly, their standard of living has changed, they managed to get enough healthy foods, and their agricultural income has improved. When the researcher asked the farmers how many times they eat per day, and if they balanced their diet through their meals, one farmer responded that:

In my family we eat two times per day, and we manage to eat healthy food with vegetables from our kitchen garden and food with proteins, and also, we get milk through the Girinka program (Farmer 10, December 20, 2020).

The researcher asked the policy advisors, how the new agricultural transformation policy helped them to fight food malnutrition. One of the policy advisors explained that:

When we compare, before and after using the new agricultural policy, the level of food insecurity was reduced at the great level, and because of the *Akagoroba k'ababyeyi* program (where women in the same area sit together in the evening and teach each other

how to prepare healthy food), now the family household knows how to cook healthy food (Agronomist 3, December 17, 2020).

However, program such as Akagoroba k'ababyeyi" shows that women play a huge role, not only by teaching each other about preparing healthy food, but as active participants in farming activities. In this light, the findings reflect the main component of the agricultural transformation policy, which is about sustained productivity growth in the agricultural sector as a key component of a country's path out of poverty. The findings in this study demonstrate that Rwanda's agriculture has in recent years been widely regarded as a success story by small holder farmers and this bears further evidence of the effectiveness of its government to bring about sustained socio-economic progress.

The findings further show that the farmers somehow expected to get all kinds of food in their own farms. They received some income through agricultural production, which helps them to buy what they do not have, including sugar, kitchen oil, and salt, and the Girinka program helps them to get milk. Generally, most of the households interviewed highlighted that after applying the new agricultural transformation policies-PSTA, they can regularly afford meat, vegetables and fruits as part of their meals, and they have access to milk. Participants further indicated that the quality of meals in their households has significantly changed in terms of quality. Thus, land consolidation helped to manage and get the much needed food, including protein in all their meals. One of the participants who is a farmer in the study area, remarked that for breakfast, they could now afford porridge with milk, while for lunch and supper, they eat food with vegetables and meat (Farmer 1, December 14, 2020).

## **5.7 Rural agriculture and sustainable livelihoods**

In this section, the study presents a qualitative analysis of rural agriculture and sustainable livelihoods practiced by the farmers in Gicumbi District. The analysis is made by considering how household farmer participants manage the challenges and difficulties faced in agricultural activity; the vulnerability context of the farmers; livelihood assets and farmer participants; transforming the structure and process; livelihood strategies adopted by the farmers; and the livelihoods outcomes.

### **5.7.1 Vulnerability context of the farmers**

The vulnerability context refers to farmers being frequently exposed to pest and disease outbreaks and extreme weather events (particularly floods, soil erosion), which cause significant crop and income losses and exacerbate food insecurity. Farmers in the study site are

impacted by different dimensions of vulnerability like limited financial support, poverty and challenges with agricultural production.

Participants pointed out the different challenges faced by the farmers in agricultural activities such as diseases and pests, water scarcity and drought, insufficient improved seeds and intense long-lasting precipitation and floods. All of these challenges that affect agricultural production have a bearing on low crop production (Muzhinji and Ntuli, 2021). One of the participants indicated that:

Two years ago, we had low potato production in this area which was caused by the drought, irregular rain and prolonged dry season, but government tried to assist some households with food assistance (Agronomist 1, December 20, 2020).

To reduce their exposure to economic stressors and shocks, rural households rely on agriculture as their primary source of income. According to Willoughby and Forsythe (2012), smallholder farmers in Rwanda engage in agricultural activities to reduce vulnerability following the genocide during 1994. A household's vulnerability is also decreased through boosting of its assets. Rural agriculture enables the farmers to acquire financial capital, which is among the greatest multipurpose livelihood assets. Financial capital achieved through this activity can be used to develop the other livelihood assets, including physical capital (e.g. building a house) and human capital (e.g. attending school). All of those factors can assist poverty reduction within the household.

### **5.7.2 Effects of agricultural transformation policy on livelihood assets of smallholder farmers**

Rural agricultural activities are linked to the availability of livelihood assets. The practice of these activities develops the livelihood asset base of a farming household. Engaging in rural agriculture is directly connected to having natural capital, including land. This is also connected to having physical capital, including water and materials for farming, like irrigation equipment. One of the participants remarked that the lack of the machinery for farming irrigation is one of the hindering aspects of practicing agriculture during the dry season. One of the participants said that:

It is impossible to improve agricultural production during the dry season when I do not have adequate equipment for irrigation, because it is very hard to put the water on the

crops with our traditional tools, especially in the high hills area (Agronomist 4, December 16, 2020).

The absence of equipment for irrigation becomes one of the challenges faced by the farmers in Gicumbi District, and this can limit the increase of agricultural income, agricultural productivity and livelihood diversification. Additionally, the shortage of water – an element of physical capital – has affected agricultural production.

The findings of this research show that the relationships and networks among agronomists, farmers, and associations in Gicumbi District, facilitated the acquisition of new information and knowledge of how to cook healthy foods, to improve agricultural production and how to deal with the diseases and pests which affect their crops. When the participants were asked how they work with the NGOs, one of the farmers indicated that:

We meet together with the help of NGOs and we are taught how to use kitchen gardens, and to cook meals with vegetables from our garden, how to use pesticides in our crops in time of diseases and pests, and we have a meeting again with our neighbors during the evening, where we get knowledge of how to eat healthily (Farmer 3, December 18, 2020).

This shows that it is very important to have social capital in the quest for being a good rural farmer. The availability of this capital is much needed before the engagement in these activities. Social capital is also wired by trust, as seen from the example in the Ukraine, where the local government trust the farmers and provide them with loans, inputs, and trading opportunities (Wolz et al., 2010). The same applies in Gicumbi District, where the government supplies the household farmers with inputs and fertiliser by providing credit through the NKUNGANIRE system.

The NKUNGANIRE system help small holder famers to buy goods at low prices and repay the loans in the long term. The program has also helped farmers to access farm inputs and knowledge regarding financial capital. Most of the participants in this study did not have any kind of external support, but depend on their agriculture-related income. When the farmers finance themselves, they have limited access to credit from banks and hence the limited land cultivation (Salau and Attah, 2012). Lack of external financial support is a big challenge within rural farmer households, because financial capital is needed to improve their agricultural activities. The average level of income attained by the farmers in this research study, ranged from US\$110 to US\$150, which is the result of different livelihood strategies. Rural

agricultural activities play a very big role in increasing financial capital within a farming household (Salau and Attah, 2012).

Lack of knowledge is also a big challenge of the farmers. Skills and knowledge form a vital part of human capital, which is very essential to the success of agricultural transformation policies. Increased human capital through health and well-being is a big motivation for the farmers to practice agricultural activities within their households. One of the participants said that he engaged in the kitchen garden practice to acquire a balanced diet and nutrients from the green leafy vegetables and fruits (Farmer 1, 2020).

### **5.7.3 Transforming the structures and processes**

The policies, institutions, legislation and organisations that shape livelihoods are recognised as transformation structures and processes in the Sustainable Livelihoods Approach and are very important in managing the agricultural activities. The policy advisors (Agronomists) in Gicumbi District provide advice regarding the supplies, inputs and training to the household farmers. There is good cooperation between the farmers and the policy advisors, with government implementing and executing the agricultural policies adopted by the farmers. When the policy advisor was asked if the agricultural transformation policy in Gicumbi District was leading to a prospering agricultural sector, he answered as follows:

We work with the farmers; we trained them how to implement the transformation and the structures and processes of new policies, which are about changing institutions, legislation and organisations. In this way, we help them to get inputs, fertiliser and the pesticide during the crop diseases – at cheap prices, and we encourage them to follow the regulations about the policies (Agronomist 2, December 28, 2020).

While the above inputs are not directly about the transformation of the structures and processes, they demonstrate how MINAGRI trained or unskilled farmers to implement the PSTA. The farmers in Gicumbi District obtain the training and technical support from the policy advisors (Agronomists) (Malan, 2015). However, there is a lack of financial support to the farmers which can lead to the failure of the Transformation Structure Processes (TSPs). To fund this activity, greater commitment to contributing toward sustainable rural household development is needed. While land, as natural capital (SLA) is vital, other issues such as fertilisers and pesticide are equally important to small holder farmers so that they may improve food production and control pests from damaging their crops.

#### **5.7.4. Livelihood strategies adopted by the farmers**

Farmers engage and adopt different livelihood strategies in order to achieve their livelihood objectives (Galhena et al., 2013). The household farmers similarly use different strategies to react to the threat and risk of malnutrition and also to the shortage of food that they face in their daily lives (Farmer 9, December 11, 2020). This is borne out by the fact that 99% of research participants chose to grow their own food as a food security coping strategy. In this regard, the literature confirms that practicing agricultural activities is a viable option to reduce the vulnerability context of smallholder farmers. The findings of this section correspond to the quantitative research analysis in the previous chapter. These results are connected to the study objectives which aimed to recognise the livelihoods strategies used by the household farmers in reducing poverty and improving food security. These farmers engage in agricultural activities – one of the different livelihood strategies practiced in Gicumbi District. All of those livelihood strategies helped them to get additional income, especially during the climate change. A farmer participant indicated that:

For me, it is a form of employment and source of food. You know well that in time of climate change, we are faced with low productivity in agricultural activities. And someone like me who is old, I engage in other activities like selling clothes and I also do livestock [farming] where I get milk and meat to feed my family household (Farmer 9, December 11, 2020).

The agricultural sector provides an opportunity of getting sources of food supplies, at global and local levels, as the source of income in many countries, especially developing countries (Praburaj et al., 2018). However, the Rwandan household farmers encountered various challenges, including intense and long-lasting precipitation and floods, water scarcity and drought, high cost of land and livestock maintenance, high cost of transport, high cost of land and labor, diseases and pests, which affected crops and livestock. All these issues negatively affected the potato production in Gicumbi District, resulting in loss of income and food insecurity (Manishimwe et al., 2019). The loss of income for example, has led to poverty and financial vulnerability, particularly since money had been invested in labor, seeds, and farm inputs. Moreover, the scarcity of water is also a threat to agricultural productivity, specifically for crops such as legumes grown in marshlands and which require water for effective yields (Mutuyimana, 2015).

## **5.8 Improved livelihood assets and well-being of smallholder farmers**

Income influences households' decisions to pursue durable goals. Dhanaraj et al. (2018) point out that household income is influenced by many other variables, such as balancing and prioritising needs and wants, like getting a mobile telephone, or paying for electricity and water in the home. One female participant remarked that:

After using new agricultural transformation policies, the conflict is less about money between her and her partner. The husband does not complain again about not having money (Farmer 8, December 29, 2020).

The researcher observed that women contribute greatly to household development through income they get from agricultural production.

## **5.9 Chapter summary**

This chapter analysed the data from the study results and findings from the fieldwork obtained by the researcher. The chapter discussed and evaluated the impact of the agricultural transformation policy on food security in Gicumbi District, in Rwanda's Northern Province, based on the objectives and the aims of this study as presented by respondents. The evidence from the quantitative and the qualitative data shows that, despite the challenges experienced by farmers, the agricultural sector in Gicumbi District has made a significant contribution to household livelihood strategies, especially to the supportive food nutrition systems through the kitchen garden initiative, which improved the households' standard of living. The highest number of respondents were in the age group 41–50. The chapter has discussed key descriptions of Gicumbi farmers- the socio-demographical information, their assets, livelihood strategies. The chapter has also discussed agricultural policies in Rwanda and farming techniques and impact these have on livelihoods and poverty. The next chapter presents detailed recommendations and conclusion of the study.

## **CHAPTER 6: SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION**

### **6.1 Introduction**

In chapter one, the researcher formulated four research objectives, namely: (a) to assess the impact of the agricultural transformation policy concerning food security on smallholder farmers in Gicumbi District; (b) to examine the implementation process of the agricultural transformation policy with regard to food insecurity eradication in Gicumbi District; (c) to examine the effect of the agricultural transformation policy on the livelihood assets of smallholder farmers in Gicumbi District.

The last chapter presents a summary of the findings, recommendations and the conclusion of the research. Its purpose is to re-examine the research questions and research objectives of the study, as presented in chapters one and five. Finally, this research presents a summary of the findings interrelated with the research objectives.

### **6.2 Summary of findings**

This section reflects on key findings through the discussions and the results of the research offered in chapter five. The analysis examined how agricultural transformation policy have transformed the livelihoods of smallholder farmers and their families in Gicumbi District. In response to the research objectives, a mixed-method research approach was used, grounded on the Sustainable Livelihoods theoretical framework.

From the analysis of the cost of production, income generated from the agricultural sector, as shown in the findings, smallholder farmers experienced increased income. The information from the qualitative semi-structured interviews showed that the farmers use the profits on food, medical insurance (income from agriculture is used to pay medical bills), clothes, houses, school fees of their children, and buying electronic communication gadgets such mobile phones (Lubwama and Niyoyiremera, 2020). In addition, engagement in the agricultural sector is the main economic activity, which brings about a positive impact on household income status within the rural area (Nilsson, 2019). Most of the respondents indicated that the new agricultural transformation policy increased agricultural production, and this activity improves the well-being of the smallholder farmer households in Gicumbi District because this actively provides income, which is used for household expenses. Importantly, it contributed to the



reduction of food insecurity, as farmers retained some of the produce for household consumption.

The farmer households in Gicumbi District face different challenges, including intense and long-lasting precipitation and floods, water scarcity and drought, high cost of land, livestock and transport, diseases and pests affecting crops and livestock, insufficiency of improved seeds, low market prices and reluctance by bankers and investors to lend money to small-scale farmers. All these challenges can affect agricultural production (Muzhinji and Ntuli, 2021; FAO, 2018). It is noteworthy that most farmers could not expand their livelihoods activities, as many desired for these activities to grow into big businesses. The participants indicated that they wished that the government would provide them with machines for irrigation during the summer time and also made an appeal for the regularisation of the market prices for their agricultural produce.

### **6.3 Recommendations**

After exploring the impact of the new agricultural transformation policy on food security among smallholder farmers in Gicumbi District, in Northern Province, Rwanda as a case study area, this study puts forward recommendation for the Rwandan government, interested stakeholders, and NGOs.

#### **6.3.1 Recommendations to the Rwandan Government**

- ❖ The Government of Rwanda should provide farmers with irrigation tools during the summer season, to enable them to produce food (and improve food security) throughout the year, to mitigate the challenges of food insecurity.
- ❖ The government in its PSTA program should encourage the young people to be engaged in agricultural activities since it is an important livelihood asset, not only for food security but also for income generation and employment.

#### **6.3.2 Assessing the role of NGOs in driving agricultural activities in Gicumbi District**

- ❖ NGOs should assist and provide ways that allow smallholder farmers to take part in agricultural activity to obtain the credits that these activities develop the lives and livelihoods of farmers and their families.
- ❖ Farmers need training and workshops facilitated by NGOs to enable them to improve their skills that they already have in this livelihood activity. Workshops should help the farmers with innovation within agricultural activity, diversifying their livelihood options, to allow them to save on various costs. Most of the farmers learn from the

others when they meet together, and it helps them to prepare healthy meal options from their produce. Education to smallholder farmers should help to enhance rural agricultural activities, and will assist them to address issues of unemployment rate, poverty and food insecurity, decreased income, as the smallholders will use these skills to develop themselves and their relatives.

#### **6.4 Conclusion**

Food security has long been a major concern of households in developing countries, including Rwanda. The transformation of the agricultural sector, farming systems and appropriate agricultural policies have been proved largely by the literature to be integral components of reducing chronic poverty and food insecurity. This has generated focused interventions of transforming the agricultural sector from subsistence farming to a market-oriented sector in different developing countries, such as Rwanda. In this instance, Rwanda has remarkably recognised the widespread economic growth associated with the majority of increased investments in the agricultural sector since the last two decades. The study of assessing the impact of the agricultural transformation policy on food security was conducted in Gicumbi District, Northern Province of Rwanda. It demonstrates the significant effect of agricultural transformation policies for improving agricultural productivity and reducing food insecurity and poverty. These enhance the livelihoods of households, especially in rural areas. A lot of work has to be initiated by the government, multilateral institutions, non-governmental organisations and farmers to provide their support in improving the agricultural sector and eradicating food insecurity and poverty.

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## APPENDICES

### Appendix A: Telephone questionnaire survey for farmers



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## TELEPHONE QUESTIONNAIRE SURVEY: FARMERS

The aim of this study is to explore the impact of agricultural transformation policy on food security in Gicumbi District.

The questions refer to your socio-economic and demographic characteristics, capabilities, livelihoods and challenges experienced in accessing food nutrition. Please note that your information will be kept confidential and should you wish to withdraw at any time, you have the right to do so.

### SECTION A: DEMOGRAPHIC INFORMATION

Please tick only the answer that applies to you.

#### 1. Address

Province:

District:

Sector:

Cell:

Village:

#### 2. Date of birth (Age):

#### 3. Gender

Male (1)	
Female (2)	

#### 4. Marital status

Single/Never married (1)		Divorced (4)	
Married (2)		Widowed (5)	
Living with partner (3)		Separated (6)	

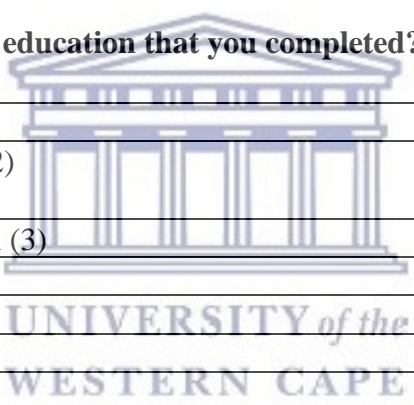
#### 5. How many members stay together in the house?

Stay alone (1)		3-4 (3)	
1-2 (2)		5 and above (4)	

### SECTION B: EDUCATION

#### 6. What is the highest level of education that you completed?

Pre-primary school (1)	
Primary school education (2)	
Secondary school education (3)	
College education (4)	
University (5)	
Others (specify) (6)	



#### 7. What type of crops you use in your farm?

Crops	Yes (1)	No (2)
Rice		
Irish potatoes		
Maize		
Wheat		
Beans		
Others (specify)		



**8. Of the agricultural transformation policies that the government uses, which one did you use in your agriculture?**

<b>Agricultural transformation policies</b>	<b>Yes (1)</b>	<b>No (2)</b>
Farming with techniques		
Farming with selected seeds		
Farming in terraces		
Farming with specialized crops		
Kitchen garden		
Others(specify)		

**9. Quantity of your productions per year?**

>500kgs (1)	
5100kgs-1000kgs (2)	
1100kgs-1500kgs (3)	
1510kgs-2000kgs (4)	
<2100kgs (5)	

**10. What is your income?**

>Frws 50000 (1)	
Frws 51000-frws100000 (2)	
Frws 110000-frws150000 (3)	
Frws 151000-frws200000 (4)	
<Frws 210000 (5)	

**11. What are the other livelihoods activities practised to improve nutrition in your household?**

Commerce (1)	
Cattle farming or others (2)	
Transport (3)	
Funds (4)	
Others (Specify) (5)	

## Appendix B: Telephone interview schedule: Farmers



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### Telephone interview schedule: Farmers

1. Are you aware of government's agricultural transformation policies?
2. If yes, how did they help you to fight food insecurity or malnutrition?
3. How often do you see an Agronomist in your area regarding giving you some advice on agricultural practice?
4. What are the agricultural policies that government use to fight food insecurity/hunger or poverty?
5. What are the agricultural policies that are implemented by NGOs?
6. What contribution of Government is given and what is required?
7. If no, where and how much did you spend on fertilizer and pesticides?
8. What are the types of equipment that you use for agriculture?
9. How many people are employed by you?
10. What are the changes that you experienced in agricultural productivity when practicing the new agricultural transformation policies in your household?
11. Are there any farming associations in this sector?
12. Did you work with any farming association?
13. What strategies do you use to overcome food malnutrition?
14. Does your income cover the basic needs required by your household, such as sufficient daily access to food, housing, education and health? Please specify.
15. How many times do you eat per day?
16. What are the challenges that you meet in your agricultural activities?

## Appendix C: Ibibazo ku bushakashatsi kuri Telefoni: Abahinzi



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## **IBIBAZO KUBUSHAKASHATSI KURI TELEFONI: ABAHINZI**

Hitamo igisubizo kimwe mubibazo byabajijwe.

### **IGIKA A: IMITERERE RUSANGE**

Amazina:

#### **1. Aho Utuye**

- Intara:
- Akarere:
- Umurenge:
- Akagali:
- Umudugudu:



#### **2. Italiki y'amavuko (Imyaka):**

#### **3. Igitsina**

Gabo (1)	
Gore (2)	

#### 4. Irangamimerere

Ingaragu (1)	
Arubatse (2)	
Yatandukanye nuwo bashakanye (3)	
Umupfakazi (4)	

#### 5. Abagize urugo

Uba wenyine (1)		3-4 (3)	
1-2 (2)		5 kuzamura (4)	

#### IGIKA B: UBUREZI

#### 6. Ni ikihe cyiciro cyawe cyanyuma cy'amashuri warangije?

Amashuri y'inshuke (1)	
Amashuri abanza (2)	
Icyiciro rusange (tronc commun) (3)	
Icyiciro cya 2 cy'isumbuye (4)	
Amashuri makuru na kaminuza (5)	
Ayandi (Sobanura) (6)	

## IGIKA C: UBUKUNGU

### 7. Ni ubuhe bwoko bwibihingwa mukunze guhinga?

Ibihingwa	Yego (1)	Oya (2)
Umuceri		
Ibirayi		
Ibigoli		
Ingano		
Ibishyimbo		
Ibindi bihingwa(sobanura)		

### 8. Mu ngamba z'ubuhinzi Leta yabagejejeho muri uyu murenge nizihe ubasha gukoresha?

Gahunda mpinduramatwara mubuhinzi	Yego (1)	Oya (2)
Guhinga hakoreshejwe tekinike za kijyambere		
Gukoresha imbuto z'indobanure		
Guhinga mu materasi ndinganire		
Guhinga igihingwa cyatoranijwe mu Karere		
Akarima k'igikoni		
Izindi (sobanura)		

### 9. Ingano y'umusaruro ukomora ku buhinzi bwawe mu mwaka?

>Kgs 500 (1)	
Kgs 5100-kgs 1000 (2)	
Kgs 1100-kgs1500 (3)	
Kgs 1510-kgs2000 (4)	
<Kgs 2100 kgs (5)	

**11. Mu buhinzi bwanyu mugereranije bubinjiriza agaciro kangana gute mu kwezi?**

>Frw 50000 (1)	
Frw 51000-frw100000 (2)	
Frw 110000-frw1500000 (3)	
Frw 151000-frw200000 (4)	
<Frw 210000 (5)	

  
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 WESTERN CAPE

**12. Ni ibihe bindi bikorwa bitari ubuhinzi bikongerera imirire myiza murugo?**

Ubucuruzi (1)	
Ubworozi (2)	
Ubwikorezi (transport) (3)	
Inkunga (4)	
Indi mirimo (5)	

1. Ese waba uzi ingamba nshya mpinduramatwara mu buhinzi zashyizweho na Leta y'u Rwanda?
2. Niba ari yego, nigute zigufasha mukurwanya imirire mibi?
3. Ni kangaha abakangurambaga b'ubuhinzi (abagronome) babageraho mu kubagira inama no kubakurikirana mu gushyirwa mu bikorwa ingamba zubuhinzi?

4. Nizihe politiki z'ubuhinzi Leta ikoresha mu kurwanya imirire mibi, inzara n'ubukene?
5. Nizihe politiki z'ubuhinzi zishyirwa mu bikorwa n'imiryango itegamiye kuri Leta (Abikorera ku giti cyabo n'imiryango idaterwa inkunga na Leta)?
6. Mu buhinzi bwanyu, Leta ibafashamo iki, ese bisaba kuba wujuje ibihe byangombwa?
7. Niba ntabufasha bwa Leta mubona, ese mugurirahe imbuto nifumbire? Ese bibatwara amafranga angahe?
8. Nubuhe bwoko bwibikoresho muhingisha? (Amasuka, imashini etc.)
9. Ese mubuhinzi bwawe, ukenera abakozi bangahe?
10. Ni izihe mpinduka wabonye nyuma yo gukoresha ingamba nshya mpinduramatwara mubuhinzi bwawe?
11. Ese hari amakoperative y'ubuhinzi muri uno murenge mutuyemo?
12. Hari koperative y'ubuhinzi mwaba mukorana?
13. Ni ubuhe buryo ukoresha mukurwanya imirire mibi?
14. Ese ubasha gukemura ibibazo byingenzi mumuryango wawe? Urugero: nko kubahaza mumirire, inzu yo guturamo, kubabonera amafranga yishuri, kubabonera ubwishyingizi mukwivuza?
15. Ese urya kangaha kumunsi?
16. Nizihe mbogamizi uhara nazo mugikorwa cyawe cy'ubuhinzi?



## Appendix D: Interview schedule for Policy Advisor in Gicumbi District



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### Interview Schedule

1. Describe your relationship with farmers?
2. What is the situation of food insecurity in Gicumbi District?
3. What are the programs that have been put in place to fight against food insecurity in Gicumbi District?
4. Did these programs succeed or fail?
5. What are the reasons for success or failure?
6. What are the interventions of NGOs in fighting food insecurity in Gicumbi District?
7. To which extent have agricultural programs in Gicumbi District reduced food malnutrition?
8. How can agricultural policy be used to improve the situation of food security in this area?
9. As Policy Advisor, do you provide any support to the farmers such as fertilizer and pesticides?
10. In your view, what do you think are the reasons for food insecurity?
11. What do you think the government can do to meet the objectives for households and the community to be more food secure?
12. What role do you think NGOs can play to deal with food insecurity in households?