ADOPTION OF SURVIVAL STRATEGIES BY AGRO-SMALL AND MEDIUM ENTERPRISES IN A CHALLENGING RURAL ENVIRONMENT IN ZIMBABWE

By

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DECLARATION

I, Dumisani Shoko, hereby declare that this dissertation for Masters in Rural Development (MRDV) submitted to the Institute for Rural Development at the University of Venda has not been submitted previously for any degree at this or another university. It is original in design and in execution, and all reference material contained therein has been duly acknowledged.

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ABSTRACT

There is worldwide consensus among policy makers, economists and business experts that Small and Medium Enterprises (SMEs) contribute substantially to aggregate economic growth. Agro-SMEs in particular, are regarded as the engines of economic growth and catalysts of socio-economic transformation in many countries. However, the resilience of agro-SMEs is increasingly becoming questionable due to a number of challenges which include, economic recession and climate change. Economic recession and climate change pose formidable challenges to the survival and growth of agro-SMEs. These complex challenges and barriers compell agro-SMEs to adopt survival strategies in order to remain operational. Strategies that can appropriately enhance the resilience of agro-SMEs to shocks and how best to implement them, are still unknown. Thus, this case study investigated the survival strategies that were adopted by agro-SMEs in Kwekwe District of Zimbabwe in response to economic recession and climate change induced-stress between the year 2000 and 2010. All the agro-SMEs established before 2005, that survived the 2000-2010 challenging operating environment and were still operational during the time of the research, constituted the study population. Purposive sampling in the form of total population sampling was used. The main data collection tools that were used to gather data to answer the objectives of the study are appreciative inquiry, using key informant interviews and questionnaire survey; preference ranking using matrix scores; data mining of records kept by agro-SMEs government publications, journals and related books; and comparative scaling. The Statistical Package for Social Sciences (SPSS) was used to analyse the data. Thematic content analysis, frequency distribution analysis, measures of central tendency and the Binary Logistic Regression Model were used to analyse specific objectives of the study. Results show that a variety of strategies are available for adoption by agro-SMEs operating in a challenging environment. Adoption rates and preferences varied from one strategy to the other. Contribution of these strategies towards agro-SME survival also varied from no contribution at all to marginal to significant or very significant contribution.The study's results provide compelling scientific information that will act as a guideline on the strategies that can be adopted in challenging operating environments. This will also assist in the creation of a better platform for the implementation of improved agro-SME development strategies.

Key words: adoption, survival strategies, agro-SMEs, economic recession, climate change

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To my husband, Edmore and daughter, Peace Nokutenda.

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ABBREVIATIONS AND ACRONYMS

AEDI	Africa Economic Development Institute
AEZ	Agro-Ecological Zones
AFC	Agricultural Finance Cooperation
Agritex	Department of Agriculture, Technical and Extension Services
Agro-SME	Agro-Small and Medium Enterprise
CEEP	Centre of Environmental Economics and Policy
CGCZ	Credit Guarantee Company of Zimbabwe
CSC	Cold Storage Commission
CZI	Confederation of Zimbabwe Industries
DBS	Department of Business Innovation and Skills
DPIPWE	Department of Primary Industry, Parks, Water and Environment
DTI	Department of Trade and Industry
ESAP	Economic Structural Adjustment Program
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GEM	Global Entrepreneurship Monitor
GMB	Grain Marketing Board
GNP	Gross National Product
GoZ	Government of Zimbabwe
HPI	Human Poverty Index
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
IPCC	Intergovernmental Panel for Climate Change
IRIN	Integrated Regional Information Network
ITC	International Trade Centre
LSE	Large Scale Enterprises
LPG	Liquid Petroleum Gas
MSME	Micro Small and Medium Enterprises
NBER	National Bureau of Economic Research

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NGO	Non-Governmental Organisations
NOCZIM	National Oil Company of Zimbabwe
OECD	Organization for Economic Cooperation Development
OPV	Open Pollinated Varieties
RBZ	Reserve Bank of Zimbabwe
ROSCAs	Rotating Savings and Credit Association
SADC	Southern African Development Community
SEDCO	Small Enterprises Development Cooperation
SHDF	Self Help Development Foundation
SME	Small and Medium Enterprise
SMME	Small, Medium and Micro Enterprises
SPSS	Scientific Package for Social Scientists
UNCSD	United Nations Commission on Sustainable Development
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VAT	Value Added Tax
VCCZ	Venture Capital Company of Zimbabwe
WFP	World Food Program
ZESA	Zimbabwe Electricity Supply Authority
ZFU	Zimbabwe Farmer's Union
ZIMPREST	Zimbabwe Program for Economic and Social Transformation
ZIMRA	Zimbabwe Revenue Authority

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CHAPTER 1 INTRODUCTION

1.1 Background

Small and Medium Enterprises (SMEs) were initially regarded as inferior, unproductive and incompatible with modern industrial development. Nonetheless, it has been noted that SMEs play an integral role in the development of industries in peripheral regions of both developed and developing countries (Sibanda, 2005). This has drawn attention among a number of policy makers, economists, business experts and politicians, who seem to converge on the idea that SMEs make a substantial contribution to aggregate economic growth in many countries (Mahembe, 2011; Saeed, 2002; Wiebe, 2002).

Small and Medium Enterprises have emerged as one of the engines of economic and social development throughout the world. Altenburg and Eckhardt (2006) point out that SME development directly and indirectly trigger poverty reduction through employment creation, income generation, training and provision of goods and services to those in marginal areas. Furthermore, SMEs indirectly contribute to poverty reduction through enhancing countries' productivity and overall economic growth.

The value of the SME sector is recognised worldwide irrespective of the economy's developmental stage (Ayyagari, Beck and Demirguc-Kunt, 2005; Altenburg and Eckhardt, 2006; Mahembe, 2011). Evidence indicate that, in high income countries SMEs contribute over 65 % of total employment and more than 55 % of Gross Domestic Product (GDP). Small and Medium Enterprise contribution to total employment and GDP in middle income countries are estimated to be 55 % and 39 %, respectively. In low-income countries SMEs contribute much more to total employment (70 %) and GDP (60 %).

In Britain for example, 54.1 % of the working population is employed in SMEs (Department of Trade and Industry (DTI), 2000). Similarly, some economies in Asia are highly dependent on the pace and productivity of SMEs. For instance, in China SMEs employ 78 % of the working population (World Bank, 2007). In Ghana SMEs create about 85 % of employment (Abor and Quartey, 2010). In South Africa, SMEs provide 61 % of employment (Berry *et al.*, 2002). In Zimbabwe, the SME sector accounts for about 90 % of the country's employment (Kachembere, 2011). In terms of GDP, SMEs contribute 30 % in Pakistan (World Bank, 2007), 70 % in Ghana (Abor and Quartey, 2010) and between 52 % and 57 % in South Africa (Berry *et al.*, 2002).

Such contribution to employment creation and GDP is enhanced by the heterogeneity of SMEs (OECD, 2004). They are involved in the primary and secondary production of goods and services, general trade, and they vary in scale and operations and employ varied means of production (Sibanda, 2005). Of particular interest to this study are SMEs that produce and sell agricultural commodities in Zimbabwe, commonly refered to as agro-SMEs. Onwumere (2008) described agro-SMEs as the engines of growth and catalysts of socio-economic transformation of any country. This means that agro-SMEs are the

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Bari (2008) reveals that agro-SMEs integrate agricultural products with the industrial sector. This signifies that agro-SMEs also play a significant role in industrial development by acting as a launching pad for agro-SMEs' participation into global markets (United Nations Commission for Sustainable Development (UNCSD), 2008). The agro-SME sector achieves this by promoting technical innovation and entrepreneurship through presenting a platform where new ideas can be tested and improved. Thus, with a competitive agro-SME sector, where value addition, improved product safety, improved nutrition, improved quality and efficient business practices are considered a priority, access to lucrative global markets can be facilitated.

Despite the potential contribution of agro-SMEs to socio-economic development as highlighted above they continue to face obstacles and/ or challenges in the environments where they operate (European Commission, 2009). The most common challenges include limited or no access to credit, poor infrastructure, lack of effective institutional structures and restricted resources, leading to reduced access to technologies among others (Mhazo, Mvumi, Nazare and Nyakudya, 2012). For example, Zimbabwe's economic recession and climate change constrain the ability of agro-SMEs to effectively produce and market their products. Mhazo, *et al*. (2012) identified constraints that hinder development of agro-SMEs in Zimbabwe. The economic recession suffered between 2000 and 2010 was a major constraint that resulted in limited access to credit facilities, lack of foreign currency, hyperinflation, high input costs, lower expenditures, reduced aggregate demand, reduced production, highly demoralised workforce and job cuts amongst others (Confederation of Zimbabwe (CZI), 2008; Gumbe and Kaseke, 2011; Tsware, 2011). The economic recession posed enormous challenges for the agro-SME sector in Zimbabwe and greatly threatened their survival during the 2000-2010 period.

Agro-SMEs are also very sensitive to climate change. The increased frequency of droughts and floods and shorter drier growing seasons as well as shifting rainfall patterns compounded the economic challenges faced by Zimbabwean agro-SMEs between 2000 and 2010 period (Chigwada, 2005; Murray, 2006; McDevitt, 2009). Mudzonga and Chigwada (2009) argue that, the compounded nature of the situation adversely affected agro-SMEs' production processes and also hindered their development.

It is crucial that agro-SMEs operating under challenging environments adopt survival strategies to remain operational. As Meena, Prasad and Singh (2009) reveal, the adoption of survival strategies helps to improve agro-SME productivity in situations where resources are limited. Furthermore, various survival strategies can be adopted by agro-SMEs to accelerate the drive towards development (Adekoya and Babaleye, 2009). It is also important for agro-SMEs to consider the fact that business success results from embracing the whole package of the available survival strategy options (Bowen *et al.*, 2009) as this assists agro-SMEs to remain resilient in challenging operating environments.

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Using Zimbabwe as a case study, this research investigates and analyses the survival strategies adopted by agro-SMEs in a challenging operating environment. The research shows the importance of agro-SMEs and advises policy makers to prioritise them so that countries can also rely on them during periods of economic meltdown. In the same context, and using Zimbabwe as reference, the research also shows how agro-SMEs can also adapt to climatic changes.

1.2 Statement of the Research Problem

Zimbabwe experienced a historic economic recession compounded by severe climate change between the year 2000 and 2010 (Mapedza *et al.,* 2009; Mhazo *et al.,* 2012). During this period the business environment was plagued by many challenges. Agro-SMEs, due to their flexibility, adaptability and responsiveness to changes in the environment, managed to survive and remained operational by adopting certain survival strategies (RBZ, 2009). They managed to negotiate their way through the risky environment and became the missing middle link where the Large Scale Commercial sector had failed to operate in the prevailing business environment (Kauffman, 2005; Muza, 2012).

However, not much is known about the nature of the survival strategy options that the agro-SMEs in Zimbabwe adopted during the 2000 to 2010 period. Furthermore, there is no adequate scientifically generated information on how the survival strategies were implemented and whether they had a significant contribution towards survival or not. This shows that there is a gap in knowledge on the apparent survival strategies that an agro-SME can adopt in order to survive under challenging operating environments. Several authors support this view and argue that, research effort on agro-SMEs especially in relation to their resilience to economic recession and climate change, can best be regarded as limited, isolated and is yet to receive the level of research-based support it deserves (Bowen *et al*., 2009; Mhazo *et al.,* 2012).

Available literature reveals that past research has been mainly focused on SMEs in general, operating under difficult and/ or harsh economic environments alone (Gumbe and Kaseke, 2011). Rarely have researchers included the influence of climate change, which is very important in agro-SME growth and development. Indeed, challenges faced by SMEs in general do not adequately address those that are agro-based. Furthermore, Sibanda (2005) is of the view that past research studies on SMEs have been confined to the intermediate urban centres and have not been able to capture situations in small urban centres and rural areas. Therefore, this study seeks to contribute to the knowledge gap by investigating the adoption of survival strategies by agro-SMEs under the dual impact of economic recession and climate change in rural areas of the Kwekwe District of Zimbabwe between 2000 and 2010.

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1.3 Justification of the Study

This study considered the severe economic and climatic conditions experienced in Zimbabwe over the 2000 – 2010 period. A challenging operating environment emerged compelling agro-SMEs to adopt some survival strategies, possibly making them business models, especially for the largely marginalised rural areas. Large Scale Enterprises (LSEs) involved in agriculture in Zimbabwe which include Agri-Foods, Cairns Foods Company, Dairy Marketing Board and Colcom scaled down operations, reduced production and some even closed down (Chipangura and Kaseke, 2012). Meanwhile, agro-SMEs were proliferating in small rural towns such as the Kwekwe District (Sibanda, 2005 and Mhazo *et al.,* 2012).

Agro-SMEs indeed constituted the missing middle link and became an option when LSEs failed to meet demand (Kauffmann, 2005; Sibanda, 2005). Harvie (2004) and The Reserve Bank of Zimbabwe (RBZ) (2009) support this view and argue that the agro-SMEs' high level of adaptability made it possible for them to survive in such a tough operating environment hence they became an appropriate business model to promote rural development during the 2000-2010 period. Today, the agro-SME sector in Zimbabwe is still the major producer of goods and services, as most large scale companies are still facing financial problems (Tsikirayi, Muchenje and Katsidzwa, 2013).

This study provides evidence of the beneficial effects of the adopted strategies in order to increase adoption rates among other agro-SMEs operating in challenging environments. This would contribute to the growth and development of agro-SMEs in Zimbabwe and other emerging economies. This study also sought to fill the existing gap in knowledge about the agro-SME sector in general and its uniqueness from other SMEs. This was intended to extend the body of knowlegde and reliable information about the agro-SME sector for effective policy reviews. This might enhance the visibility of the agro-SME sector and remove the stereotypes associated with them. The study also sought to pay particular attention to the climate change dimension in relation to agro-SMEs which past research focus has been neglecting.

The study was carried out in the largely rural Kwekwe District because the District experienced the effects of both economic recession and climate change. Furthermore, the District has agro-SMEs which survived these effects and were still operational during the time of the study. Since most rural areas, are almost the same in terms of development, the findings were intended to be replicated to other rural areas and also add value to location specific scholarly research. The overall findings of this study would help develop more viable policies and strategies that might lead to an improved agro-SME sector in particular.

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1.4 Research Objectives

1.4.1 Main Objective

The main objective of this research was to investigate the survival strategies that agro-SMEs in Zimbabwe's Kwekwe District adopted between 2000 and 2010 in response to the economic recession and climate change-induced stress.

1.4.2 Specific Objectives

The specific objectives of this research were to:

a. determine the characteristics of agro-SMEs that survived the challenging environment;
b. examine the survival strategies that agro-SMEs adopted amidst economic recession;
c. examine the survival strategies that agro-SMEs adopted amidst climate change-induced stress; and
d. determine how the adopted strategies contributed towards the survival of the agro-SMEs.

1.5 Operational Definitions of Key Terms and Concepts

Small and Medium Enterprises (SMEs) – a business entity is classified as an SME if it meets either the specified number of permanent employees or annual sales turnover. Some countries and/ or organisations classify a business entity as an SME if it meets a specified value of fixed assets. In Zimbabwe, the definition of SMEs varies from one organisation to another. For example the Micro, Small and Medium Enterprise (MSME) Policy and Strategy Framework (2008) defines SMEs as entities that are registered in terms of their legal status and employing anywhere between 6 and 100 workers. The Small Enterprises Development Corporation (SEDCO) (2010) defines an SME as a firm that has less than 100 employees and a maximum annual sales turnover of US$80 000. The Ministry of SMEs (2000) defines an SME as an organization that employs not more than 50 people and acts as a registered entity.

Agro-SMEs refer to those entities involved in either one or more of the manufacturing of agricultural raw materials or farm supplies, production, processing, distribution or marketing of agricultural commodities (Napitupulu, 2003; Parimu, Suryaningrat and Prihatini, 2009; Mhazo *et al.,* 2012). This suggests that a full and functional agro-SME sector involves a totality of activities from the manufacturing of raw materials required in the production of agricultural products, their processing, where value addition is paramount, and their marketing and distribution until they reach the final consumer. Some authors' however, leave out the manufacturing of farm supplies, production processes and marketing of the produce. In this case, processing is the major activity that agro-SMEs are concerned with. For example, da Silva, Baker, Shepherd, Jenane and Miranda (2009); Food and Agricultural Organistion (FAO) (2007) defined agro-SMEs as a component of the manufacturing sector where value is added to agricultural raw materials through processing and handling operations.

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In this study, an *Agro-SME* refers to a business entity, formal or informal, involved in the manufacturing of agricultural inputs, production, transformation and marketing of agricultural commodities. It is an organization that employs less than 100 employees and has a fixed total asset value that does not exceed US$70 000.

Rogers (2003) defines *adoption* as the agro-SME decision to use a new survival strategy or practice on a regular basis. This is the definition adopted in this study.

Survival strategy is a management game plan that seeks to strengthen the position of an enterprise (Strickland and Gamble, 2010). In the context of this study, it was also regarded as the way entrepreneurs decide on how their enterprises should operate in the agricultural industry or market (Gumbe and Kaseke, 2011).

Challenging environment in the context of this study refers to a business setting in which economic recession and climate change are happening at the same time. The business setting is extraordinary and unique as it presents extensive problems for the agro-SME sector.

Economic recession is the significant decline in economic activity spread across the economy, lasting more than a few months that negatively affects real GDP, real income, employment, industrial production and wholesale retail sales (National Bureau of Economic Research (NBER) Business Cycle Dating Committee, 2010). In the context of this study, it was taken as one of the dimension of the challenging operating environment and it resulted in complex challenges such as hyperinflation, scacity of inputs, reduced demand, emergence of parallel markets among other challenges.

Climate change refers to fluctuations in the state of the average weather conditions that can be identified by taking into account the mean and/ or the variability of its properties, which persists for an extended period, such as decades or longer (Inter-governmental Panel for Climate Change: IPCC, 2011). The United Nations Framework Convention on Climate Change (UNFCCC) in IPCC (2011) makes reference to a change in climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural variability observed over comparable time periods. In the context of this study, it was the extra dimension of the challenging operating environment and it resulted in challenges such as delayed onset of rains, unpredictable and varying rainfall, shorter, drier growing seasons among other challenges.

1.6 Organisation of the Disssertation

This dissertation has seven chapters. Chapter 1 introduces the study. Included in this chapter are the background and rationale of the study, statement of the research problem, justification and rationale of the study, objectives and operational definitions of key concepts and terms.

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Chapter 2 reviews related literature that links agro-SME survival in the context of economic recession and climate change. Central to this are issues pertaining to the adoption of survival strategies by the agro-SMEs. A synthesis of the literature on this subject is used to define the conceptual framework of the proposed study. At the end of this chapter, a summary of the review of literature is presented. Chapter 3 describes the research methodology. It includes a description of the study area, research design, sampling procedures as well as data collection and analysis methods and techniques used.

Chapter 4, 5 and 6 analyse the results of the study. Chapter 4 outlines the key characteristics of agro-SMEs in Kwekwe District that survived the challenging operating environment between 2000 and 2010. Chapter 5 examines strategies addressing economic recession challenges whilst Chapter 6 examines the strategies that were adopted in an effort to address climate change related challenges. The adopted strategies are listed and their characteristics explained. Chapters 5 and 6 also present, discuss and analyse the results relating to adoption rates and preference ranks attached to specific strategies. Finally, Chapter 7 outlines the research findings, conclusions and recommendations.

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2.1 Introduction

Immense consideration is given to agro-SMEs due to the widely acclaimed fact that they are a major source of aggregate socio-economic growth. This chapter defines and outlines an agro-SME and its unique characteristics. It also reviews literature on the challenges faced by agro-SMEs at country level, with a special focus on Zimbabwe. It also discusses the experiences encountered by agro-SMEs as a result of economic recession and climate change in Zimbabwe between the years 2000 and 2010 and the implications thereof. In addition, the chapter examines factors affecting the adoption of survival strategies in challenging environments and considered important aspects required for the creation of enabling environments for agro-SME establishment, growth and survival. A theoretical framework for the study is also given. The researcher argued that, there is need for adoption of survival strategies among agro-SMEs operating in challenging environments to ensure greater establishment, growth and survival.

2.2 Characteristics, Functions and Classification of Agro-SMEs

An agro-SME is a business entity, formal or informal, involved in the manufacturing of agricultural inputs, production, transformation and marketing of agricultural commodities. In this study it refers to an organization that employs less than 100 employees and has a fixed total asset value that does not exceed US$70 000. Agro-SMEs are characterised by a number of features and have a wide range of functions.

Bari (2008) point out that a major characteristic of agro-SMEs is that they are usually located near or in rural areas. Therefore, they are a major provider of employment for the skilled and unskilled rural youths and women. Wilkinson and Rocha (2008) argue that the agro-SME sector records high levels of female labour amounting to as much as 90% in some developing nations. As a result, imperical literature has argued that the agro-SME sector is an effective instrument in alleviating poverty and providing economic development in rural areas, (Napitupulu, 2003 and International Fund for Agricultural Development: IFAD, 2012; Mhazo *et al.* (2012). Another major characteristic is that agro-SMEs use relatively lower investment costs. This is so because they use manual labour rather than advanced machinery and locally produced agricultural products as inputs rather than imported inputs (Napitupulu, 2003; Bari, 2008).

The agro-SME sector also intergrates agricultural products with the industrial sector (Bari, 2008). In this way agro-SMEs act as a launching pad for integration into global markets. It is postulated that the agro-SME sector has the ability to identify and explore export market opportunities, especially with value addition processes that improves safety and quality of agricultural products (UNCSD, 2008). Greater integration of the value chain can also be achieved through vertical relationships that improve product flow through contract farming, out-grower schemes and coordinated financing and payment (International Trade Centre: ITC, 2006).

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The agro-SME sector has been identified as the greatest seedbed of innovation and entrepreneurship (Alternburg and Eckhardt, 2006). It promotes innovation and entrepreneurship by presenting a platform for new ideas to be tested. Agro-SMEs take advantage of their specificities and innovation to respond to the needs and expectations of the society (Bari, 2008; Parimu *et al.*, 2009; Molina, 2010).

Most agro-SMEs deal with products that have unique characteristics. These characteristics include seasonality, perishability and variability (Parimu *et al.*, 2009), hence the need for processing. The processing of agricultural commodities involves physically and/or chemically transforming agricultural commodities into food and fiber items (Bari, 2008). Processing thus revolves around the application of scientific principles for the preservation or modification of food to make high quality, and safe and appealing products for the consumer (Procter *et al.,* 2000). Processing helps in addressing perishability; increases shelf life, quality and nutrition; improves handling; overcomes seasonal gluts, and offsets seasonal shortages.

As explained in the preceeding paragraphs, agro-SMEs have unique characteristics and functions which makes them exceptional from other SMEs. This explains why immense consideration is given to the agro-SME sector. The agro-SME sector is however, composed of different entities and different authors and organisations have different approaches in classifying them. Thus, Agro-Small and Medium Enterprises are composed of a range of entities (FAO, 2007; Onwumwere, 2008; Molina, 2010). They cut across various industries and constitute the aggregation of many commodity subsectors such as grain, dairy and oilseeds among others (World Bank, 2003). They include farm firms, fisheries, piggeries, poultries, horticulture, dairies, grinding mills, butcheries, bakeries, stock feed processors and other related firms (RBZ, 2009; Mhazo *et al.,* 2012). Agro-SMEs can be domestic or foreign, public, private or a mix. They can be a cooperation or cooperatives, family based entities or single proprietorships governed by a varied set of rules. Finally, their technologies and specialties also vary from one entity to the other.

Different approaches and dimensions have been used to classify agro-SMEs. FAO (2007) explained one dimension where an agro-SME is either a food or non-food agro-SME. Food agro-SMEs are characterised by the use of simple and natural preservation techniques in processing perishable products for preservation. On the other hand non-food agro-SMEs use high degree processing methods.

Another approach that has been used in classifying agro-SMEs is whether an agro-SME is upstream or downstream (FAO, 2007). Upstream agro-SMEs are those involved in the initial processing of the agricultural commodities such as rice or flour milling, cotton ginning, oil pressing and leather tanning. Downstream agro-SMEs are those that undertake further manufacturing operations on intermediate products made from agriculture, forestry and fisheries such as bread and biscuit making, nodule making, textile spinning, paper production, clothing and footwear manufacturing.

Mhazo *et al.* (2012) classified agro-SMEs on the basis of the processing activities existing at a particular operation. In this criteria, agro-SMEs are involved in either one or both of the two major categories;

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primary and secondary processing operations. Primary agro-SMEs only transform the commodities into slightly different forms, prior to storage, marketing or further processing. Activities involve crop drying, shelling, threshing, cleaning, grading and packaging. Secondary agro-SMEs are involved in transforming agricultural products in a bid to increase their nutritional or market value. Examples include milling grain into flour, grinding ground nuts into peanut butter, pressing oil out of vegetable seeds, pressing juice from fruit among others.

Over and above all these classification approaches, agro-SMEs in Zimbabwe were regarded as inferior and not compatible with economic development as in any other developing country. However, there was a paradigm shift of perspective when the LSEs failed to come up with a meaningful contribution to socio-economic development and poverty alleviation, especially in rural areas of Zimbabwe. As a result, an immense consideration was given towards the development of the agro-SME sector. However, despite all this, agro-SMEs in Zimbabwe were confronted by a wide range of challenges that negatively impacted on their operations. Of particular interest is the economic recession and climate change experienced from 2000 to 2010 which compelled agro-SMEs to adopt some survival strategies in order to remain operational.

2.3 Surviving Economic Recession and Climate Change

Agro-SMEs in Zimbabwe faced a challenging operating environment due to economic recession and climate change over the period 2000 and 2010. This had serious implications on their operations and impacted negatively on their profits. They were complelled to adopt survival strategies in order to resist the adverse effects of the challenging operating environment.

2.3.1 Economic Recession

The National Bureau of Economic Research (NBER) Business Cycle Dating Committee (2010) defined an economic recession as a significant decline in economic activity spread across the economy, lasting more than a few months, which negatively affects real GDP, real income, employment, industrial production and wholesale retail sales. It has been noted that economic recessions are rare and when they occur they are brief. However, this was not the case with the economic recession in Zimbabwe, which can best be described as "extra ordinary". The Zimbabwe Institue (2007) descibed the country's economic performance between the period in question as disastrous.

This recession was attributed to a combination of disruptions in the agricultural sector as well as capital and global capital's reactions which had mutually reinforcing effects on macroeconomics (Chinoona, 2010). For example, the farm invasions of 2000 destroyed the once robust agricultural sector as most of the productive white commercial farmers were driven out of the farms (Beseda and Moyo, 2008). These farm invasions caused the isolation of the country from the international community which consequently led to termination of international aid (Coomer and Gstrauthaler, 2011; Gumbe and Kaseke, 2011). Other major consequences of the disruptions in the agricultural sector was the decline in the output of major

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crops such as maize and tobacco which resulted in lower trade thereby affecting output in other sectors (Zimbabwe Institute, 2007).

Deep seated economic problems started to show as the GDP was fluctuating in the negative (Chinoona, 2010). Real GDP continued to decline from 2001 to 2008 when it reached negative14.5%. Consumer Price Inflation (CPI) rose exponentially from 2000 and climaxed at 56 billion per cent in 2008. As the economy continued to contract in real terms, the value of the Zimbabwean dollar declined severely to the extent that it was no longer considered as a valuable currency globaly. Clemence and Moss (2005) note that the Zimbabwean dollar lost 99% of its value. Chinoona (2010) attributed all this to currency speculation which spawned inflation. Zimbabwe became the first country to experience hyperinflation in the 21st century (Hanke, 2008). The government tried to control inflation by introducing price controls (Coomer and Gstraunthaler, 2011), but this resulted in ensued shortages of basic goods.

Poverty levels rose as a result of the poor economic performance (Chinoona, 2010). The hyperinflationary environment pushed more Zimbabweans into poverty as people's savings were severely eroded (Hanke, 2008). Half of the country's population faced food shortages (Clemence and Moss, 2005). The Human Poverty Index (HPI) increased from 24% in 1995 to 33% in 2003. There was an unprecedented impoverishment within formal employment and unemployment levels rose astronomically. Unemployment levels reached 63% in 2003 (GoZ, 2009). As hyperinflation continued to destroy the economy, millions were forced to emigrate. Up to a quarter of the population fled the country leading to a massive brain drain (Clemence and Moss, 2005; Africa Economic Development Institute (AEDI), 2009; Gumbe and Kaseke, 2011).

The environment discussed above characterised the conditions in which agro-SMEs in Zimbabwe were operating between the years 2000 and 2010. This challenging environment was marked by difficulties in accessing credit facilities; power outages; high costs and shortages of inputs, such as fuel, seed and fertilizer; foreign currency shortages; crumbling infrastructure; and marketing and pricing controls (Mudzonga and Chigwada, 2009). These conditions had significant implications on the establishment, growth and survival of agro-SMEs in Zimbabwe.

2.3.2 Implications of the Economic Recession on Agro-SMEs

The economic recession in Zimbabwe had some serious implications on the operations of agro-SMEs. Chimhowu (2009) points out that the crisis caused a severe decline in Zimbabwean agriculture, a major component of the agro-SME sector. Zimbabwe struggled with the highest inflation of over a 231 million per cent as of July 2008 (Besada and Moyo, 2008). The hyperinflationary environment gravely affected returns on agro-SMEs (Chimhowu, 2009). Gumbe and Kaseke (2011) point out that the hyperinflationary environment experienced in Zimbabwe presented huge challenges, especially cost controls. The prices of raw materials rose substantially over a very short period of time and there was no guarantee of supply. Most agro-SMEs preferred holding on to their produce than exchange them for money due to the

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effect of inflation, thus resulting in shifts in cropping patterns (Chimhowu, 2009; Dekker and Kinsey, 2011).

The economic recession also created problems in the financial sector. Access to loans became difficult due to strict collateral requirements. The Zimbabwe Farmers Union (ZFU) accused Agribank of attracting stringent requirements on loans making it difficult for farmers to borrow. Slow disbursements coupled with high interest rates and high transaction costs slowed down the production processes. Malaba (2005) reported that Agribank was perceived to have poor customer care and service delivery which also negatively affected accessibility of loans.

The increased marketing and price controls on inputs and outputs changed the agro-SME landscape in Zimbabwe dramatically (Dekker and Kinsey, 2011). Agro-SMEs were forced to sell their products to parastatals such as Cold Storage Commission (CSC) and Grain Marketing Board (GMB) only. Integrated Regional Information Network (IRIN) (2007) reported that CSC was given the sole mandate to slaughter cattle and distribute meat directly to butchers. Price control monitors forced agro-SMEs involved in the production of meat to sell meat products to the CSC at prices well below market prices. In a similar scenario, agro-SMEs involved in cereal production were forced to sell their grain to the GMB at prices well below the prevailing market prices (IRIN, 2007).

Prices offered by these parastatals did not match the production costs that the agro-SMEs would have incurred in the production of the commodities. The unattractive producer prices resulted in little incentive to produce crops such as maize, the staple crop, thereby increasing food insecurity in Zimbabwe. Agro-SMEs were faced with lack of alternative marketing channels and the presence of price controls with delayed static procurement prices in an environment of hyperinflation, thus making it difficult for them to prepare for the next season (Mudzonga and Chigwada, 2009).

By offering favourable conditions for the newly resettled farmers, the government unintentionally provided an opportunity for parallel markets to develop (Dekker and Kinsey, 2011). These parrallel markets sold inputs at prices beyond the reach of many people, which made it difficult for agro-SMEs to secure inputs which, like any other goods, were scarce (Tsware, 2011). At the same time, governmental assistance was not enough to cater for the high demand of inputs by agro-SMEs and subsistence and commercial farmers.

A thriving parallel market for fuel, a major input in agriculture, mushroomed in Harare (New Zimbabwe, 2009). Private producers and the National Oil Company of Zimbabwe (NOCZIM) could not meet the demand for fuel due to lack of foreign currency needed to import adequate fule supllies. This forced agro-SMEs to secure inputs such as seed, fertilizer and fuel on these markets at very expensive prices which further eroded revenues. This challenging economic situation was worsened by the changing climatic conditions during the 2000-2010 period.

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2.3.3 Climate Change

Several definitions have been given for climate change and they differ in breath and focus. In simple terms, climate change is the long term shift in weather patterns in a specific region or globally. Intergovernmental Panel for Climate Change (IPCC) (2011) defines climate change as the change in the state of weather that can be identified by changes in the mean and/or variability of its properties that persists for an extended period typically decades or longer. The IPCC further explains that climate change may be due to natural internal and external processes or persistent anthropogenic changes in the composition of the atmosphere.

However, other organisations have a different perspective. The United Nations Framework Convention on Climate Change (UNFCCC) states that climate change is a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere in addition to natural climate variability observed over comparable time periods. The UNFCCC thus makes a distinction between climate change attributable to human activities that alter the atmospheric composition and climate variability attributable to natural causes.

Leading scientists believe that climate change results in increased surface temperatures, changes in precipitation, longer and more severe droughts, extreme weather events such as cyclones, expansion of subtropical deserts, drops in agricultural yields and a spread of vector borne diseases among others. These problems are serious and have severe impacts on vulnerable developing countries. Zimbabwe has not been spared from climate change. The IPCC models, for example, show that climate change in Zimbabwe largely results in less rainfall (Mapedza *et al.*, 2009). The decline is attributed to the El Nino effect (Mason, 2001; Giannini, 2008; Mazzeo, 2011). Thus, it is clear that climate change is happening in Zimbabwe.

2.3.4 Evidence of Climate Change in Zimbabwe

Climate change is a reality in Zimbabwe and local climatologists have since documented some evidence that shows its trajectories in the country during the period between 2000 and 2010. Zimbabwe has been shown to be vulnerable to climate change principally through shifting rainfall patterns and extreme events (Chigwada, 2005). Rainfall patterns were characterised by erratic distribution of rainfall that were highly volatile and varying (Mano and Nhemachena, 2007). This was noted in various parts of the country between the years 2000 and 2010.

Seasons were characterised by long dry spells whose frequency also increased (Chikodzi and Mutowo, 2012). Sporadic showers were also a characteristic in many parts of the country while in some areas heavy downpours followed by long dry spells were also noted (Red Cross Society, 2010). The onset of rains has been delaying by 33 days over the past decade (2000-2010) (Red Cross Society, 2010). The rainfall season even started late and ended early, thus suggesting climate change (Chikodzi and Mutowo, 2012)

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Between the years 2000 and 2010 there was a noticeable increase in the frequency of climatic shocks such as droughts and floods in Zimbabwe (Shewmake, 2008, Christoplos, 2009). Murray (2006) points out that Southern African developing countries, Zimbabwe included, were experiencing shorter, drier growing seasons, and possibly more frequent droughts. Increased incidents of droughts, as well as increased temperatures and localized flooding have proved to be a particular problem in Zimbabwe during the 2000 -2010 period (McDevitt, 2009).

Droughts and floods became a common problem in Zimbabwe between 2000 and 2010 (Gwimbi, 2009, Mazzeo, 2011). Zimbabwe experienced an increased frequency of droughts from the year 2000. Droughts were experienced during the 2001/2, 2002/3, 2004/5, 2006/7 and 2007/8 seasons (Prevention Web, 2012). The seasons were characterised by insufficient rains, prolonged dry spells and patchy rains (Schillinger, 2003). Sometimes seasons were characterised by dry spells during the first half of the season and then followed by heavy rainfall which led to floods in the second half of the season (Schillinger, 2003).

Russell (2008) observed that there was an increased frequency of tropical cyclones with a high intensity that were experienced in Zimbabwe between 2000 and 2010. Cyclone-induced flooding that occurred between 2000 and 2010 included Tropical Cyclone Eline in 2000 and Tropical Cyclone Japheth in 2003. Tropical Cyclone Eline was characterised by intense storms and Tropical Cyclone Japhet was characterised by strong winds (Gwimbi, 2007, Chikoto and Sadiq, 2012).

The shifting of Agro-Ecological Zones (AEZ) boundaries observed in a study by Mugandani, Wuta, Makarau and Chipindu (2012) strongly points out to evidence of climate change and variability in Zimbabwe. It has been argued that, the current Agro-Ecological regions developed in the 1960s are now ineffective and outdated due to climate change (Chikodzi and Mutowo, 2012). Other researchers reiterate this and point out that the AEZs have shifted drastically due to the devastating effects of climate change.

According to the research by Mugandani *et al* (2012), significant changes have been noted in their sizes, structure and composition. Natural Region 1, 4 and 5 have expanded by 106%, 5.6% and 22.5% respectively, while region 2 and 3 have shrunk by 49% and 13.9% respectively. This implies that the area suitable for cash cropping, region 1, is now bigger but the marginal areas in region 4 and 5 have also increased in extent. Natural region 2 and 3 which are the main food producing regions have shrunk. There is a strong likelihood that climate change will make Natural Region 4 a non-maize producing area.

The physical effects of climate change, such as changes in temperature patterns, precipitation and extreme weather conditions, have implications for both managed and unmanaged ecosystems, human health, industrial processes, transportation, energy supply and demand, and infrastructure (Sussman and Freed, 2008). Other implications include direct influence on effectiveness and efficiency of production processes, the cost of operations, maintenance activities, quality of products and consequently the demand. This was also the case with agro-SMEs in Zimbabwe during the decade

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under consideration in this study. There were serious implications on their operations, establishment and survival.

2.3.5 Implications of Climate Change on Agro-SMEs

Climate change experienced in Zimbabwe between 2000 and 2010 had serious implications on the agro-SME sector in Zimbabwe. Agro-SMEs in Zimbabwe were confronted with an array of challenges. Sussman and Freed (2008) listed some of the challenges that agro-SMEs faced as a result of extreme weather events and long term weather trends. These include interruptions in operations, effect on reliability of supply, reduced quality of products, and physical risks to water supply and raw materials. Other challenges included greater risk of animal infection, damage to transportation and irrigation infrastructure, difficulties in accessing land during floods or extreme rain conditions, exposure of workforce to increased risk of diseases and destruction of farm buildings by extremes of wind.

Those agro-SMEs involved in the production of agricultural commodities were the ones most affected by climate change over the past decade in Zimbabwe. The subsequent flooding caused serious damage to the agro-SME sector and to the country's roads, bridges and utility lines fell prone to damage and destruction (Agritex, USAID, World Food Programme (WFP) and FAO, 2000). With the country's roads destroyed it became difficult for agro-SMEs to access markets.

Both Tropical Cyclones that occurred in Zimbabwe ravaged parts of the country. High winds, torrential rains and severe flooding left a trail of destruction and heavy loss of life. Large areas of agricultural land were submerged together with livestock and farming implements. For instance, more than 70 000 hectares of agricultural land and thousands of tonnes of stored food were destroyed during Tropical Cyclone Japhet (Gwimbi, 2007).

Disease outbreaks such as malaria were quite common during occurrences of both floods (Gwimbi, 2007). Increased flooding facilitated the breeding of mosquitoes leading to an outbreak of malaria in most parts of the country (Nkomo, Nyong and Kulindwa, 2006, Shumba, 2000). This negatively affected the labour force available for agro-SMEs. Both Tropical Cyclones also affected animal health (Nkomo *et al.*, 2006). Tsetse fly, a major livestock pest which is associated with sub humid conditions took its toll during that period. Incidences of plant diseases, such as the spread of the Grey Leaf Spot to other provinces over the country, also increased (Agitex, USAID, WFP and FAO, 2000).

The continuously wet conditions hampered operations such as weeding, chemical spraying and harvesting (Agritex, USAID, WFP and FAO, 2000). Most agro-SMEs experiences poor product quality was experienced by. For example, poor cotton lint quality, maize cob rots, tobacco barn rots, sprouting of groundnuts and other grains were some of the problems suffered (Agritex, USAID, WFP and FAO, 2000).

Serious droughts or a consecutive series of droughts can be a disaster triggering agent that exacerbates social and economic problems (Nkomo *et al.,* 2006). McDevitt (2009) pointed out that climate change

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poses a particular challenge for food production. Prolonged droughts and increases in temperature can seriously reduce crop yields, especially that of maize, the staple crop in Zimbabwe. Maize production declined significantly between the year 2000 and 2010. Although various reasons are attributed to this decline, one of the major reasons is the recurring droughts experienced over the same period.

Net farm revenue has shown to be highly sensitive to changes in climate. An increase in temperature would result in a decrease in net farm revenue by 31% and a decrease in precipitation would result in a decrease in net farm revenue by 27% (Centre of Environmental Economics and Policy (CEEP), 2006). The primary effects include low levels of production, decline in river flows leading to reduced hydro-electric power generation, declining availability of arable land, reduced availability of domestic water which has health implications (Nkomo *et al.,* 2006; Gwimbi, 2009). Agro-SMEs also encounter large losses from livestock rearing as a result of reduced quantity and quality of grazing as grasslands become deserts.

Droughts also impact on the social and human capital. A study carried out by Gwimbi (2009) shows that there was a high incidence of children dropping out from school and migration from the rural areas in search of greener pastues in towns, cities or beyond boaders of the productive age group, which leads to brain drain and labour shortages. Secondary effects of drought include reduction in industrial output which may lead to inflation, lay-off labour and increased unemployment. These factors result in high demand and expenditure, as well as reduced savings and a lower GDP. The compounded effect of economic recession and climate change presents the need for agro-SMEs to adopt survival strategies in order to stay afloat and remain in business.

2.4 Rationale for Adopting Survival Strategies in Challenging Environments

It is human nature to struggle in harsh environments against imminent collapse or failure (Onyenekawa, 2010). Some agro-SMEs even run aground in less than 10 years of operation but some manage to stay afloat through the adoption of certain survival strategies (Bowen *et al.*, 2009; Gumbe and Kaseke, 2011). Adoption of survival strategies comes in handy as an instrument or tool for surviving difficult operating environments. Challenging operating environments do not confront a static world. Agro-entrepreneurs respond to changes in the natural and economic environments by adopting survival strategies. This enables them to improve their profits and strengthen their positions.

Past research has revealed that adopting survival strategies provides a partial softening of the effects of challenging environments (Gumbe and Kaseke, 2011). Under such circumstances, adoption of survival strategies is an important component of any response. Of central interest is the potential of these survival strategies to offset many of the anticipated negative effects of these challenging operating environments (Burke and Nobel, 2010). Adoption of survival strategies makes agro-SMEs better off through enabling them to withstand the pressures posed by any challenge.

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Adoption of survival strategies plays an important role in improving productivity and the welfare of limited resource entrepreneurs, especially in low income countries. Furthermore, the adoption of survival strategies assists in the eradication of poverty in rural areas (Meena *et al.,* 2009). von Braun (2008) pointed out that the adoption of survival strategies on a large scale has had high and positive social payoffs. This shows that adoption of survival strategies is important among agro-SMEs operating in challenging environments.

Many studies have shown that numerous opportunities are to be realised after adoption of survival strategies. However, there is need to understand the types and forms of survival strategies that are possible, feasible and likely among agro-SMEs. Attention should also be given to the implementation procedures to facilitate their adoption. This brings in the issue of barriers to adoption of survival strategies among agro-SMEs operating in challenging environments.

Adoption of survival strategies is influenced by the physical environment and socio-economic environment factors that include agro-ecological conditions, age of the entrepreneur, level of education, how to knowledge, source of information and entrepreneur's attitude towards the strategy (Rogers, 2003). Kroma (2003) noted that there is a wide gap between survival strategy options and their adoption by agro-SMEs. The adoption of sustainable survival strategies among agro-SMEs is determined by certain attributes and these include relative advantage, compatibility and observability (Meena *et al.*, 2009).

Agro-ecological conditions determine the rate of adoption of survival strategies (Cavane, 2009). High levels of adoption of survival strategies are found among those in regions with high rainfall (Hintze, Renkow and Sain, 2003). Agro-ecological zones have been affected by climate change in Zimbabwe. For instance, areas in agro-ecological regions 3 and 4 that used to be suitable for cropping are now experiencing desert conditions and are no longer suitable for cropping (Russell, 2011; Mugandani *et al.*, 2012) owing to low levels of adoption of survival strategies in those areas.

The level of education and knowledge enhances the decision-making and adoption of survival strategies (Cavane, 2009). Those who have adequate knowledge of a survival strategy are likely to adopt it (Abebaw and Belay, 2001, Rogers, 2003). Generally, agro-entrepreneurs lack knowledge, training and appropriate managerial skills to manage some strategies (Mudimu, 2003). Attitudes also determine the adoption of survival strategies. Adopters tend to hold positive attitudes towards a strategy (Chilonda and Van Huylenbroeck, 2001). However, with the brain drain that has been experienced in Zimbabwe during the period under review, many youths and educated people (potential adopters) migrated to neighbouring countries or even further for better opportunities (Dekker and Kinsey, 2011). The country was left with the elderly and less literate people who are reluctant to adopt new survival strategies.

Sources of information, including extension services, enhance adoption of survival strategies (Abebaw and Belay, 2001). The probability of adoption of strategies has been shown to be higher to those who would have learnt about the strategy from extension services than those who would have learnt from

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neighbours (Cavane, 2009). However, extension services in Zimbabwe have been negatively affected by the hardships experienced by the country. Apart from transport problems to reach the agro-SMEs, the department faces a lack of extension workers due to the brain drain.

Agro-Small and Medium Enterprises have a low asset base and little access to well-developed insurance and credit markets; they are financially ill equipped to deal with weather shocks or any other economic challenges (Hess and Richter, 2002). Agro-entrepreneurs tend to be risk averse under such conditions as was the situation in Zimbabwe. The majority of the entrepreneurs did not have adequate working capital to finance their operations since there were no commercial lending schemes and were considered a high risk group due to low equity positions and lack of collateral (Mudimu, 2003).

Low levels of technology and limited information on input/ output markets, climate change and other relevant information exacerbate agro-SMEs' inability to adapt to challenging environments, especially in Zimbabwe, thereby affecting agro-SMEs' adoption of survival strategies (Parry *et al.*, 2007; Gbetibouo, 2009; Mannak, 2009). Many agro-SMEs have done little to adapt to the changing circumstances from climate change (Parry *et al.*, 2000) and economic recession. Literature on African agro-SMEs involved in farming suggests that limited information about climate change and lack of access to institutions dealing with climate change strongly impede their ability to adapt (Gbetibouo, 2009).

Adoption of survival strategies in challenging environments can be mitigated by a myriad of risks and uncertainties that exist in such environments. Evidence shows that, complex challenges and barriers undermine agro-SMEs' willingness and ability to adopt survival strategies (Parry *et al.*, 2007). However, business success is a consequence of embracing the whole package of strategies (Bowen *et al.*, 2009). It is therefore essential to ensure that enabling environments for adoption of survival strategies are created in order to ensure greater establishment, growth and survival of agro-SMEs.

Creating a pro-productivity environment and a supportive policy framework are key prerequisites for a successful agro-SME sector (United Nations Commission on Sustainable Development: UNCSD, 2008). Prudent and sound macro-economic policies offer a predictable and healthy business environment for agro-SMEs, which is a crucial factor in determining business decisions (OECD, 2004). Macro-economic stability is necessary for agro-SMEs to invest and expand (UNCSD, 2008; DBS, 2010).

United Nations Commission on Sustainable Development (2008) came up with four essential macro-economic policies that governments should consider in creating an enabling environment for agro-SMEs. Firstly, governments need to come up with stabilisation policies aimed at minimising macro-economic shocks to ensure macro-economic stability. Secondly, allocation policies should balance the structure of expenditures on important components of a competitive agro-SME sector, such as education, infrastructure, research and development. Thirdly, redistribution policies should prioritise education and human resource development to provide the skill base necessary for a competitive agro-SME sector. Fouth and finally , demand policies should support consumption where necessary.

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Governments should invest in core public goods for the agro-SME sector, especially research and development, infrastructure and education (Byerlee, Diao and Jackson, 2005). With the exception of Asia, most countries have not given agriculture and rural development high priority in their national government strategies. Lopez (2004) estimates that increasing the share of public expenditures allocated to agriculture in Latin America could lead to an increase in the growth rate of agricultural production per capita of 0.23%, whereas the increase will only be 0.06% under the allocations at the time of the estimation.

A conducive micro-economic environment is characterised by simplified legal and regulatory frameworks where governments should ensure reduced regulatory burdens to ensure easy entry of agro-SMEs into the formal economy (OECD, 2004; DBS, 2010; Diallo, 2012). Good governance and an absence of corruption are also key issues to consider in creating a conducive environment for agro-SMEs. Another key requirement for an enabling environment for the development of agro-SMEs is peace and stability (OECD, 2004). Studies have shown that war and crime are the main deterrents to private investment. Policies and programs need to emphasise the provision of investment in suitable infrastructure for agro-SMEs (Nainggolan, 2003). Governments also need policies to ensure an abundance of flexibly skilled and healthy labour force through the provision of training facilities such as training centers, colleges and universities.

An efficient financial system is an important component of economic development. Finance is critical for starting, maintaining and growing an agro-SME (DBS, 2010; Diallo, 2012). Governments should commit to getting banks to lend agro-SMEs, remove obstacles to access to finance, promote other sources of business finance and ensure that commercial banks, micro credit institutions, community groups and business development services work together (Kauffmann, 2005). Dialogue and partnerships between the stakeholders in the sector are also essential (OECD, 2004). Therefore, sector specific policies that strengthen links between agro-SMEs, smallholder farmers, cooperatives and other market intermediaries, such as traders, processors or transporters, are also essential (UNCSD, 2008).

On the climate change front, governments need to enhance agro-SMEs' adaptive capacity. The adaptive capacity will depend on the ability of the agro-SME sector as a whole to act collectively (Chevallier, 2011). Adaptation strategies require resources such as financial capital, social capital, human resources and natural resources. A good management of these resources will enhance the adaptive capacity and encourage autonomous adoption among agro-SMEs.

Forecasting and distribution of information about seasonal forecasts on time should be considered a priority in trying to create enabling environments for agro-SMEs. This would enable agro-entrepreneurs to make more informed decisions and adapt to climate change (Nhemachena and Hassan, 2007). Governments should ensure that adequately trained staff, funded meteorological and climate change units be responsible for disseminating such information (Chevallier, 2011). Effective media can also play a crucial role where there is a large and widely dispersed population.

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The removal of constraints facing agro-SMEs is a daunting task calling for a holistic agro-SME support (OECD, 2004). In other words an enabling environment for agro-SME development depends on the ability of the government to implement sound policies. It also depends on the capability of stakeholders to develop enabling business environments and the ability of agro-SMEs to implement competitive operating practices and business strategies. The developing strategy must be integrated into the broader national development strategy and /or poverty reduction and growth strategies of any country (OECD, 2004).

2.5 Theoretical Framework of the Study

The survival of agro-SMEs is not only dependent on natural elements such as climatic conditions but also socio-economic and institutional factors (Nashimura, 2003). A stable economy and a predictable climatic situation poses less operational challenges for agro-SMEs. However, economies are in reality, never stable for a long time and climate is increasingly becoming unpredictable. An economic downturn in Zimbabwe beginning the year 2000 created a challenging economic environment for agro-SMEs. The difficulties brought by the challenging economic environment were aggravated by a more pronounced change in climate during the same period.

The theoretical framework for this study is that, although there are other factors that influence the environment in which agro-SMEs operate in, the significant factors for this study are economic and climatic factors with a scenario where the economy is unstable (recession) and on the other hand climate is unpredictable (climate change). Such an operating environment creates challenges for the agro-SMEs which trigger the need to adopt survival strategies in order for them to stay afloat. If agro-SMEs adopt survival strategies and implement them in a rightful manner, a better establishment, growth and survival of agro-SMEs will be achieved. However, if they do not adopt any survival strategies in such a challenging environment they are bound to fail.

2.6 Summary

The literature review indicates that, agro-SMEs are increasingly facing challenging operating environments. This is evidenced by experiences from global, regional and country level with a special focus on Zimbabwe. Furthermore, the review shows that challenging environments reduce the rate of adoption of survival strategies among agro-SMEs. The review also reveals that the onus lies with the policy makers and stakeholders to ensure that enabling environments are created for greater establishment, growth and survival of agro-SMEs.

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3.1 Introduction

This research investigated the survival strategy options adopted by agro-SMEs in Kwekwe District during the economically turbulent and climatically unpredictable environment between the year 2000 and 2010. The findings of this research are meant to act as a guide for prospective agro-entrepreneurs in Zimbabwe and other developing and emerging economies experiencing similar challenging operating environments. This chapter presents the study area and its justification for the research. This is followed by an account of the research design, description of the population and sampling procedure. Data collection tools, data analysis techniques and ethical considerations for this research are also outlined in this chapter. A summary closes the chapter.

3.2 Description of the Study Area

The study was carried out in the Kwekwe District, situated in the Midlands Province of Zimbabwe (Figure 3.1). The Midlands Province lies in the central part of the country and is one of the ten provinces in Zimbabwe. The capital for the Midlands Province is Gweru, which is 67km south of Kwekwe District. The Kwekwe District lies on the A5 main road and is roughly equidistant from Harare, the capital city of Zimbabwe, to the north east, and Bulawayo the second largest city to the south west.

The district is located in Zimbabwe's Highveld at an altitude of about 1220m above sea level. It is found in the tropical climatic zone, but because of its high altitude, it is modified to a warm temperate climate. Kwekwe is rich in minerals including gold and iron ore. Most people derive their livelihoods from farming and mining. It lies in Natural Region 3 of Zimbabwe's five Agro-Ecological Zones. The region is a semi-intensive farming region with moderate rainfall averaging between 500-750mm and experiences severe mid-season dry spells and high temperatures (Gambiza and Nyama, 2000).

Farming systems in the region are based on both livestock rearing and cropping supplemented by irrigation (Gambiza and Nyama, 2000). Cropping is based on drought tolerant crops and livestock farming is semi-intensive and based on fodder crops (FAO, 2000). The area has agro-SMEs that survived during the economically turbulent and climatically uncertain period from 2000 to 2010. Agro-SMEs in Kwekwe operated under a challenging environment as a result of the economic recession and climate change experienced in the country during the period in question. It became imperative to research the strategies adopted by these agro-SMEs to survive such a difficult operating environment.

The study area, as shown in Figure 3.1 is divided into two main areas. These are, commercial and communal areas. The commercial area in this contex is the area meant for productive purposes whilst communal areas are meant for human settlement. The commercial area covers Wards 1 to 5 as shown in Figure 3.1, whilst communal area covers wards 6 to 28. The Agro-SMEs that participated in the study were mainly concentrated in the commercial area. Only a few are located in the communal area. This

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study adopted the following research design in investigating the survival strategies adopted by the agro-SMEs.

3.3 Research Design

The researcher undertook a case study approach to examine the experiences of agro-SMEs which survived the challenging operating environment from 2000 to 2010 using the case of Zimbabwe's Kwekwe District. The period witnessed the worst economic recession and most severe climate change. Although the research took a case study approach, a convergent mixed method research design was employed. Various authors (Cresswell, 2012; Cresswell and Plano Clark, 2011; Teddlie and Tashakkori, 2009) define mixed method research design in various ways. However, they share the same understanding that the mixed method reseach design is a procedure for collecting, analysing and mixing both qualitative and quantitative research methods in a single study. This enhances the understanding and unravelling of a research problem.

The mixed method research design has several approaches that differ with the priority given to each strand and the sequence in which the data will be collected. This research employed a convergent design, also known as concurrent research design or parallel integration approach. This is because equal priority was given to both quantitative and qualitative strands. Likewise, both quantitative and qualitative research designs were conducted separately but concurrently and the data was merged at the point of data analysis and interpretation (Angell and Townsend, 2011). This research design was appropriate for this study because both qualitative and quantitative strands provided a better understanding of the survival strategies adopted by agro-SMEs, their implementation procedures and their contribution towards survival of agro-SMEs. In the same vein, either a qualitative or a quantitative strand alone was not adequate to address the reseach questions. Furthermore, the research utilised both quantitative and qualitative data collection methodologies.

The design allowed validation of results from the separate quantitative and qualitative components of the research which gave an allowance to confirm or corroborate findings within the study (Cresswell, Plano Clark, Gutmann and Hanson, 2003). The approach also served the purpose of increasing breadth and depth of understanding the experiences of agro-SMEs which survived the challenging operating environment between 2000 and 2010 in Kwekwe District. The qualitative data comprised the characteristics of agro-SMEs, survival strategy options and their implementation procedures. The quantitative data included data such as the number of employees and age of agro-entrepreneurs. The assessment of survival strategy options and their implementation procedures qualitatively determined the contribution of the strategies towards survival of agro-SMEs. A statistical descriptive approach was used to determine the important independent variables (survival strategy options) that can lead to higher levels of agro-SME survival when operating under challenging environments. The agro-SMEs for the study were selected as presented in the following section.

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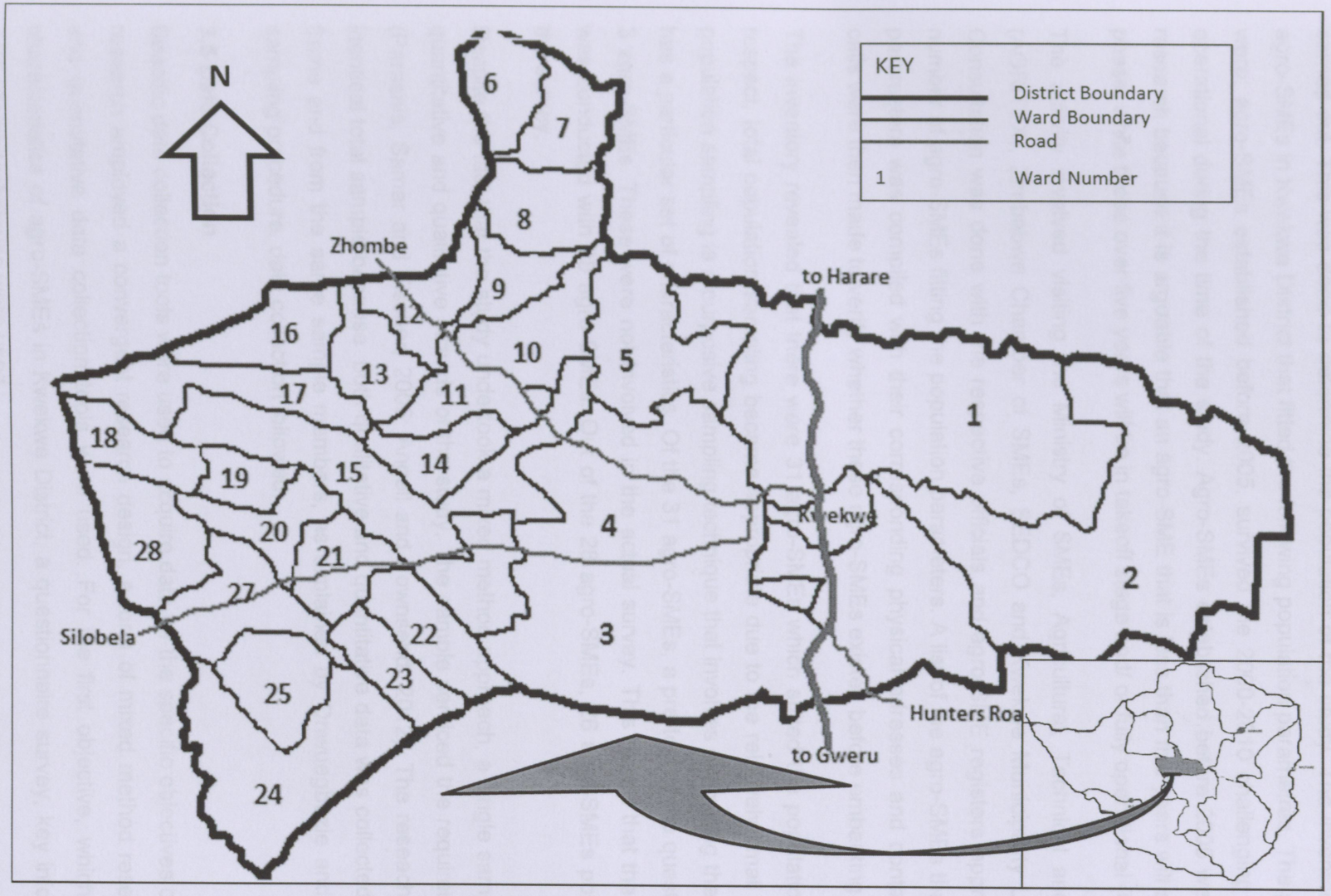


Figure 3.1: Map of Kwekwe (Source: Adapted from the Office for the Coordination of Humanitarian Affairs (OCHA) of the United Nations, 2007)

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3.4 Population and Sampling Procedures

In order to come up with appropriate population and sampling procedures, an agro-SME inventory was carried out. This was done to determine the population of the study. The inventory aimed at identifying agro-SMEs in Kwekwe District that fitted the following population parametres. The population parametres were; agro-SMEs established before 2005, survived the 2000-2010 challenging environment and still operational during the time of the study. Agro-SMEs established before 2005 were considered for this research because it is arguable that an agro-SME that is less than five years will still be in the inception phase, while those over five years will be in takeoff stage and/ or fully operational (Onyenekwa, 2010).

The activity involved visiting the Ministry of SMEs, Agricultural, Technical and Extension Services (AGRITEX), Zimbabwe Chamber of SMEs, SEDCO and Kwekwe Municipality Licencing Department. Consultation was done with the respective officials and agro-SME registers appraised to establish the number of agro-SMEs fitting the population parameters. A list of the agro-SMEs that fitted the population parameters was compiled with their corresponding physical adresses and contact details. Telephone calls were then made to verify whether these agro-SMEs existed before embarking on the visits.

The inventory revealed that there were 31 agro-SMEs which suited the population parameters. In that respect, total population sampling became appropriate due to the relatively small population size. Total population sampling is a purposive sampling technique that involves examining the entire population that has a particular set of characteristics. Of the 31 agro-SMEs, a pre-test of the questionnaire was done on 3 agro-SMEs. These were not involved in the actual survey. This meant that the questionnaire survey was conducted with 28 agro-SMEs. Out of the 28 agro-SMEs, 26 agro-SMEs positively participated in the survey.

Despite the fact that the study undertook a mixed method approach, a single sample was used for both quantitative and qualitative strands of the study. The sample serviced the requirements of both strands (Parasnis, Samar and Fischer, 2005; Angell and Townsend, 2012). The reseacher used a concurrent identical total sample because both qualitative and quantitative data was collected within the same time frame and from the same sample members, as explained by Onwuegbuzie and Collins (2007). After sampling procedure, data collection followed.

3.5 Data Collection

Specific data collection tools were used to acquire data for the specific objectives of the study. Since the research employed a convergent research design, a form of mixed method research, both qualitative and quantitative data collection tools were used. For the first objective, which is to determine the characteristics of agro-SMEs in Kwekwe District, a questionnaire survey, key informant interviews and data mining techniques were used.

The questionnaire was pre-tested prior to the actual data collection to check its ability to gather the required information. The pre-test was done on three agro-SMEs in the district. The pre-test identified

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some disparities and adjustments were done based on the suggestions and recommendations from the pre-test. One major disparity identified was that there was a set of agro-SMEs involved in processing, transportation or marketing. These are not directly affected by challenges posed by climate change. This meant some of the questions asked were not relevant to some agro-SMEs. These were asked to state "not applicable" as their response in such circumstances.

The questionnaire, as shown in Appendix A, contained both open and close ended questions and collected both qualitative and quantitative primary data. The questionnaire had four sections. Section A sought the demographic characteristics of the owner. Section B solicited for information on the characteristics of the agro-SMEs. Section C enquired for information on the survival stategies adopted against economic recession, their implementation procedures and the extent to which the adopted strategies contributed towards the survival of the agro-SME. Section D sought information on the survival strategies adopted to mitigate challenges posed by climate change, their implementation procedures as well as the extent to which the adopted strategies contributed towards the survival of the agro-SME.

The questionnaire survey was conducted between June and August 2013. The researcher engaged AGRITEX extension personnel working in the respective areas where the selected agro-SMEs were located. An enumerator training session was conducted prior to the survey. The questionnaire survey was conducted with the owners or managers of the agro-SMEs as the respondents. The questionnaire survey gathered data such as the main activities undertaken, date of establishment, type of enterprise, as well as number and type of employees.

Key informant interviews were also done with officials from the Ministry of SMEs to acquire information about the minimum requirements for an agro-SME to be registered. The interviews were semi-structured and were done on a one to one basis. An interview guide was prepared before hand and the questions were asked orally as the researcher recorded the respondent's answers. The reseacher solicited for information such as the minimum number and type of employees. Data mining was also done to enhance reliability of the information from the questionnaire survey and key informant interviews. This was done by consulting secondary data sources such as government reports and policy documents on regulations and requirements for agro-SME registration, and journals as well as related books.

Questions (i) in Section C and D of the questionnaire (see Appendix A) concentrated on collecting data to achieve the second and third objectives. The respondents were asked to tick the strategy(ies) they adopted to mitigate a specific challenge from a list of strategies available. Each list included the "other" option which allowed the respondents to write down any other strategies they adopted that may have been overlooked by the reseacher. They were then asked to specify the strategy. The questionnaire survey obtained qualitative data on strategies adopted by agro-SMEs amidst economic recession and climate change.

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To complement the data obtained from the questionnaire survey, a participatory technique in the form of preference ranking and martix scoring was done with the owners or managers of the agro-SMEs. Various strategies were compared in accordance with different qualities that were valued by the agro-entrepreneurs. The strategies were placed in an order ranging from those that were more preferred and to those strategies that were less preferred. The activity was done to indicate the relative importance attached by agro-entreprenuers to a list of strategies perceived to mitigate economic recession and climate change. The activity helped the researcher to explore the owners' or managers' perceptions and criteria as well as to understand their choices in decision making.

The reseacher sent out 28 invitations and got 13 positive responses. The activity was carried out with those 13 agro-entreprenuers. A discussion forum was convened by the reseacher, where the agro-entreprenuers were asked to identify the strategies to mitigate the listed challenges posed by economic recession and climate change. This was followed by a discussion of the costs, benefits, appropriate implementation procedures and any other issues sorrounding each identified strategy. This was done to enable the agro-entreprenuer to make informed decisions regarding their preferences.

The identified strategies for specific challenges were written down on cards and given to the entreprenuer to assign a rank on the strategies according to their preferences from the most important to the least important. This was done for all the listed challenges. The researcher then took the task to assign the scores on the preferences made by the agro-entreprenuers. Total scores were then calculated for each strategy to come up with a rank of what the entreprenuers percieved to be the most important strategy up to the least important strategy.

Questions (ii) in Section C and D of the questionnaire solicited information to address both second and third objectives. The questionnaire, as shown in Appendix A, had open endend questions which asked how the strategies adopted were implemented. This enabled the researcher to acquire data on the implementation procedures of the strategies adopted. In some cases demonstrations were done to express the actual processes. The researcher gathered qualitative data on the implementation procedures that were employed. Attention was given to the nature of implementation; whether it was reactionary or precautionary or whether it was incremental or transformational. Attention was also given to the specific steps followed in implementing the survival strategies.

For the fourth objective, questions (iii) in Sections C and D of the questionnaire and comparative scaling using the constant sum scaling technique were used to acquire data that helped assess the contribution of strategies adopted towards the survival of agro-SMEs. Close ended questions concerning the contribution of adopted strategies towards survival of the agro-SME were asked. Scaled responses were created which gave a measure of how an adopted strategy contributed towards the survival of the agro-SME. Attention was given to whether there was no contribution at all or whether the contribution was marginal, significant or very significant. After data collection data management and analysis followed.

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3.6 Data Management and Analysis

After data collection, the responses from the questionnaire were inspected to establish whether proper and complete data had been acquired. The data was coded and entered on to the Statistical Package for Social Sciences (SPSS) data file. Specific data analysis methods were employed to achieve specific objectives of the study.

For the first objective, several data analysis tools were used to determine the characteristics of agro-SMEs that survived the challenging operating environment. Two main categories were under focus, these are agro-entrepreneur characteristics and operational characteristics of the agro-SME. Agro-entrepreneur characteristics that were focused on include the gender, age and highest educational qualifications of the agro-entrepreneur. The Agro-SME operational characteristics that were focused on include the date of establishment, number and type of employees, type of enterprise, main activities being carried out and activity class.

To analyse data regarding gender of the agro-entrepreneur, 8 codes were created. These are 1 = Male, 2 = Female, 3 = Co-ownership Male and Female, 4 =Co-ownership Males, 5 = Co-ownership Females, 6 = Partnership Males, 7 = Partnership Females, 8 = Partnerships males and females. Co- ownership and partnership codes were created after the realisation that in some cases the agro-SME was owned by more than one person. Thus, co-ownership codes were created for agro-SMEs owned by two people whilst partnership codes were created for agro-SMEs owned by more than two people. A frequency distribution analysis was then used to determine the frequencies of each of the 8 classes and these were expressed as a percentage.

Data regarding the age of the agro-entrepreneurs was also analysed using a frequency distribution analysis. Five age groups were created and coded as follows: 1 = 21-30, 2 = 31-40, 3 = 41-50, 4 = 51-60, 5 >60. Frequencies were determined for each class and percentages were also calculated. To analyse data regarding the highest educational qualifications of the agro-entrepreneurs, 4 classes were created which were thus coded 1 = Juniour Certificate, 2 = O' Level, 3 = A' level and 4 = Tertiary education. Likewise, frequenies were used and corresponding percentages were computed.

Data regarding the number and type of employees hired was analysed using measures of central tendency. The minimum and maximum number for permanent and seasonal employees hired by agro-SMEs was computed. Data from key informants from the Ministry of SMEs was then analysed to determine the minimum and maximum number of workers required for an agro-SME to gain agro-SME status. The results were compared to determine how they varied. Also data regarding the type of employees hired by agro-SMEs and the Ministry of SMEs standards requirements were compared to determine how they varied.

A frequency distribution analysis of the main activities undertaken by agro-SMEs was carried out using relative frequencies. In this case, 8 classes were created which were thus coded 1 = Mixed farming, 2 = Cropping, 3 = Peanut butter processing, 4 = Juice extraction, 5 = Milling , 6 = Dairy, 7 = Horticulture, 8 =

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Restaurant. Relative frequencies for each class were identified. The same process was done for activity class as well as type of enterprise. For activity class, 3 classes were created which were coded 1 = Primary production, 2 = Processing and 3 = Tertiaty production. For the type of enterprise, the four classes were coded 1 = Private entity, 2 = Family business 3 = Cooperative, 4 = Institutional.

The frequency distribution analysis of the second and third objectives used relative frequencies and content analysis to determine the survival strategies that were adopted by agro-SMEs amidst economic recession and climate change. A content analysis of the responses given regarding implementation procedures was used to scrutinise and correlate the implementation method and survival strategy adopted. This clarified the survival strategy adopted.

Likert scales were developed to determine the strength of the adoption rates. Four scales expressed as a percentage were created. These were 1- 24% = very low uptake, 25-49% = low uptake, 50-74% = high uptake and 75-100% = high uptake. Data collected through preference ranking was analysed using the frequency distribution analysis method. Total scores were computed and relative frequencies for each class identified. Preference ranks were then assigned to the strategies. Strategies with the highest scores were ranked the best strategies. This was done to enable comparison of the results from the two activities (the questionnaire survey and preference ranking) to determine whether adoption was influenced by preferences or whether it was just for mere survival purposes.

Content analysis was also employed to establish how the adopted survival strategies were implemented. This involved a detailed analysis of responses given by the agro-SME owners. The responses came in textual form and were scrutinised to determine the methodology followed in the implementation of the survival strategy. The scrutiny focused on the specific steps followed in implementing the survival strategy. The researcher looked for specific themes emerging from the responses and also what agro-entreprenuers did most in implementing the adopted strategies. Emphasis was also on how these responses were related to each other.

It was also important to establish whether the strategy was adopted as a reaction (ex-post strategies) to the induced stress from the challenging environment or as a precaution (ex-ante strategies) to the imminent threats. There was also a focus on whether the implementation was transformational or incremental. Therefore, categories were created to identify where specific responses suited.

For the fourth objective, a comparative scaling technique and Binary Logistic Regression Model was used to determine the contribution of the adopted strategies towards survival of the agro-SMEs. Four scales were created for the comparative scaling technique using constant sum scaling. These were no contribution, marginal contribution, significant contribution and very significant contribution. A frequency distribution analysis was used to determine the number of agro-SMEs that adopted specific strategies and how the strategies contributed towards the survival of agro-SMEs per scale, and this was expressed as a percentage.

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Binary logistic regression was carried out to statistically validate the results. It was used to determine the contribution of survival strategy options towards agro-SME survival. The Binary Logistic Regression Model is a statistical method for analysing one or more explanatory (independent) variables that determine an outcome (dependent variable) which is binary or dichotomous (has two possible outcomes) (MedCalc, 2011).

In this study the independent variables were the survival strategy options adopted by agro-SMEs. The dependent variable was the contribution of the adopted strategies towards agro-SME survival. This dependent variable is dichotomous i.e. positive contribution or negative contribution. Positive contribution was coded as 1 and negative contribution was coded 0. Positive contribution included reponses which indicated significant and very significant contribution. Negative contribution included no contribution and marginal contribution. This is because marginal contribution was deemed not worth recommending as an option for adoption under challenging operating environments. The goal was to find the best fitting model to describe the relationship between the survival or failure of an agro-SME (dichotomous characteristic) and a set of survival strategies adopted (independent variables).

Therefore, the following Binary Logistic formula was used:

$$P = a + b_1x_1 + b_2x_2 + b_3x_3 + \cdots + b_nx_n$$

Where

P = Contribution of adopted strategy towards agro-SME survival

a = constant

b = coefficient of survival strategy option(s)

x = survival strategy

In this research the Binary logistic analysis enabled the researcher to:

i. Determine the contribution of adopted strategies towards agro-SME survival.

ii. Determine statistically, the survival strategy options with a significant effect on the survival of agro-SMEs operating under challenging environments.

Binary logistic regression was run twice for a set of survival strategies adopted to address a specific challenge. Firstly, it was run with the strategies only as the independent variables or predictors affecting contribution towards agro-SME survival. In this case, the assumption was that other factors that may affect the success or failure of the strategies were being held constant. However, in reality strategies do not work in isolation. Their success or failure is affected by other factors such as socio-demographic

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characteristics of agro-entrepreneurs and agro-SME characteristics. The researcher therefore saw it fit to adopt the results of the analysis that considered other related factors.

Since the dependent variable in the Binary logistic model assumes exactly two possible outcomes, this study took a negative contribution denoted as "0" and positive contribution denoted as "1" in the analysis. No contribution and marginal contribution was interpreted as a negative contribution whereas significant and very significant were interpreted as positive contributions.

To assess and interpret the results of the model, the researcher used four tools. These are classification tables, model Chi-square, Negelkerke R^2 and the Wald statistic. Model correctness was assessed using results from classification tables. Step 0 classification tables carry a "constant only model" whereas Step 1 classification tables carry the "full model" with all the independent variables (survival strategies). The constant only model (H_0) was compared with the full model (H_1) to determine whether the latter model was more appropriate.

The model Chi-square was used to evaluate model fit and significance. The Model chi-square gave the overall significance of the model. Two hypotheses were tested these were H_0 and H_1.

H_0 is the adopted strategies do not have a significant effect.

H_1 is the adopted strategies have a significant effect.

Acceptance or rejection of the hypotheses depended on the chi-square test p value. A significant p value ($p \leq 0.05$) meant that the adopted strategies did not have a significant effect on the survival of the agro-SME. Therefore, H_1 was rejected. An insignificant p value ($p > 0.05$) means the adopted strategies had a significant effect on the survival of the agro-SME. Therefore, H_1 was accepted.

The Nagelkerke R^2 and the Wald test gave model strength and relative contribution of each adopted strategy, respectively. The higher the Negelkerke R^2 value the stronger the model. The Wald statistic was assessed using the B values and p values. The B values showed the direction of contribution of specific survival strategies on agro-SME survival. Positive B values meant that agro-SMEs, which did not adopt a particular strategy, had a higher probability of survival than those who adopted it. On the other hand, negative B values meant that agro-SMEs, which adopted that particular strategy, had a higher probability of survival than those, which did not. The significance of these results however, was determined by the p values. Significant results were signified by a p value less than 0.05 ($p < 0.05$), whilst insignificant results were signified by a p value greater than 0.05 ($p > 0.05$).

In a nutshell, the objectives, research questions, variables, data collection tools, the target group and data analysis methods are summerised in the research matrix in Table 3.1.

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Table 3.1: Research Matrix

Objective	Research Questions	Variables	Data Collection Tools	Target Group	Data Analysis Method
1. To determine the characteristics of agro- SMEs in Kwekwe District.	a) What are the demoghaphic characteristics of the owner?	Gender, Age, Highest educational qualification	1. Questionnaire survey	Owner/ Manager	Frequency distribution analysis (relative frequencies)
	b) What are the main activities being carried out?	Main activities undertaken			Frequency distribution analysis
	c) How many permanent/ seasonal workers do you have?	No. of permanent/ seasonal employees			Measures of central tendency Minimum and maximum mumbers)
	d) Which type of enterprise do you run?	Type of enterprise			Frequency disribution analysis (relative frequancies)
	e) In which activity class does your agro-SME fall under?	Activity class			Content analysis
	f) What is the minimum number of permanent/sesonal employees required for an enterprise to gain agro-SME status?	Minimum number of permanent/ seasonal empoloyees required for an agro-SME to gain agro-SME status	1. Key informant interviews 2. Data mining (policy documents,journals, related books)	Officials from Kwekwe Municipality Licensing Department, SEDCO, AGRITEX, Minisrty of SMEs	Content analysis, Measures of central tendency (Minimum and maximum number required for an agro-SME to gain status)
2. To examine the survival strategies adopted by agro-SMEs amidst economic recession.	a) Which strategies were adopted to mitigate the challenges posed by economic recession?	Strategies adopted amidst economic recession.	1. Questionnaire survey	Owner/ Manager	Frequency distribution analysis (relative frequencies) and content analysis
	b) Which strategies were prefered most and why?	Most prefered strategies	1. Preference ranking and matrix scoring		
	c) How were the strategies adopted implemented?	Nature of implementation; Mode of implementation; Specific steps followed in implementing the strategy	1. Questionnaire survey		
3. To examine the survival strategies adopted by agro-SMEs amidst climate change-induced stress.	a) Which strategies were adopted to mitigate the challenges posed by climate change?	Strategies adopted amidst climate change.	1. Questionnaire survey	Owner/ Manager	Frequency distribution analysis (relative frequencies) and content analysis
	b) Which strategies were prefered most and why?	Most prefered strategies	1. Preference ranking and matrix scoring		
	c) How were the strategies adopted implemented?	Nature of implementation; Mode of implementation; Specific steps followed in implementing the strategy	1. Questionnaire survey		
4. To determine how each strategy contributed towards the survival of agro- SMEs operating under a challenging environment.	a) How did the strategies adopted contribute towards the survival of the agro-SME?	Relationship between coping strategy and survival of agro-SMEs	1. Questionnaire survey 2.Comparative scaling	Owner/ Manager	Content analysis and Binary Logistic Regression Model

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3.7 Ethical Considerations

The researcher communicated the aims and purpose of the study, the implications, and possible risks for involvement in the study to the respondents. This was done in order to uphold research ethics, ensure conformity to the ethical requirements and secure informed consent. Approval to undertake the study was sought and granted from the University of Venda's Research Ethics Committee (see Appendix B). Permission and approval for conducting the study was sought from the leaders of the District, in particular the District Administrator (see Appendix C).

The researcher also assured the respondents that their participation would not predispose them to any foreseeable forms of harm or danger. The respondents were informed of the fact that they had the right to withdraw from the study at any time. Doing so would not expose them to any form of prejudice or criticism. In addition, honesty and professionalism was adhered to throughout the research process.

3.8 Summary

The research study investigated the survival strategies adopted by agro-SMEs in Kwekwe during a challenging operating environment. A total population sampling technique was adopted, which allowed the researcher to investigate all the agro-SMEs that survived the challenging period from 2000 to 2010 who were still operational at the time of the research. The questionnaire, as the main data collection tool, was complemented with participatory techniques in the form of preference ranking and comparative scaling. The main respondents were agro-SMEs owners or managers. Frequency distribution analysis, matrix scoring and binary logistic regression were used for data analysis. Strict ethical considerations were adhered to throughout the research.

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CHAPTER 4 CHARACTERISTICS OF AGRO-SMES THAT SURVIVED THE CHALLENGING ENVIRONMENT

4.1 Introduction

This chapter examines the general characteristics of agro-SMEs that survived the challenging operating environment in the Kwekwe District. It focuses on data collected through Section A of the questionnaire (see Appendix A) regarding the characteristics of agro-SMEs. It focused on the socio-demographic characteristics of agro-entrepreneurs and characteristics of agro-SMEs. The data collected served the purpose of determining the characteristics of agro-SMEs that survived the challenging operating environment between 2000 and 2010 in Kwekwe District. These characteristics were considered in this study because they have a bearing on the contribution of adopted strategies towards agro-SME survival.

The researcher used frequency distribution analysis, measures of central tendency, content analysis of policy documents, journals, related books and responses from key informant interviews to summarise and analyse the data. Following this introduction is a socio-demographic profile of agro-entrepreneurs. After this, the researcher highlights the operational characteristics of the agro-SMEs. A summary concludes this chapter.

4.2 Socio-demographic Characteristics of Agro-entrepreneurs

The socio-demographic characteristics under focus in this research were the gender, age and educational qualifications of the agro-entrepreneurs. Consideration was given to these socio-demographic characteristics because they offer interesting aspects of the agro-entrepreneurship attributes that can survive challenging operating environments. Table 4.1 summarises the socio-demographic characteristics of agro-entrepreneurs whose agro-SMEs managed to survive the challenging operating environment from 2000 to 2010 in Kwekwe.

4.2.1 Gender Dynamics of Agro-SME Ownership

As shown in Table 4.1, gender composition among agro-SMEs that survived the challenging operating environment showed interesting dynamics. The gender of owners varied from one agro-SME to the other. In some instances, both males and females jointly owned an agro-SME in the form of either a co-ownership or a partnership. Co-ownership in this context was taken to mean two people jointly owning an agro-SME. A partnership on the other hand, was taken to mean an agro-SME jointly owned by more than two people. On the other extreme was an institutional agro-SME, which is shown as "not applicable" in the results table.

The gender distribution of agro-entrepreneurs in Kwekwe District showed that agro-SMEs owned by males dominated the agro-industry in challenging operating environments. Males solely owned half of the agro-SMEs that survived the challenging environment in Kwekwe District. Out of the 26 agro-SMEs that survived, females solely owned 15.4%. This illustrates some gender imbalances and demonstrates

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that women are lagging behind when it comes to ownership of agro-SMEs that can survive in challenging operating environments. It reflects trends found in past studies (e.g. Sibanda, 2005) that have been carried out on the agro-SME sector. These gender imbalances might be explained by the fact that in the traditional African patriarchal society, women do not take leadership positions. Men assume most leadership positions and often occupy top positions and direct most businesses. Efforts have been made to encourage women entrepreneurs in Zimbabwe. Programs such as Gender Dimension, which encourages and support women entrepreneurs, have been passed but imbalances still exist (Kwidini, 2007). Apart from that, running a successful agro-SME in a challenging environment requires more time and effort. Women entrepreneurs might have found it difficult to balance their time between taking care of the family and running the business, hence a very small proportion was owned by females.

Results further indicated that co-ownership is common among agro-SMEs that can survive challenging environments. Cross gender co-ownership had the highest frequency whereas co-ownership between males only had the least frequency. Many of the cross gender co-owners indicated that they were married. In most of these spousal ownership cases, husbands were engaged in off-farm employment elsewhere leaving the agro-SMEs' tasks to the wives. This has some implications on division of labour since women are left behind to do all the hard work associated to the agro-SME whilst men are absent.

Results from the survey indicated that partnerships were also practiced among agro-SMEs operating in challenging environments. These partnerships came out in three forms, which include male partnerships, female partnerships and both male and female partnerships. The results show that all partnerships had the same frequency. The most common form of these partnerships was cooperatives whereby two or more people jointly owned an agro-SME. Demographic gender is claimed to indirectly affect entrepreneurial intention. However, some authors like Levesque and Minniti (2006) and Criaco (2012) argue that demographic age offers important insights on entrepreneurial behaviour and decision-making and this is the subject of the next topic.

4.2.2 Age Profile of Agro-entrepreneurs

Results from the survey, as shown in Table 4.1, showed that a larger proportion of the agro-entrepreneurs (46.2%) were in the 41-50 age group. More than 60% of the agro-entrepreneurs were between 41 and 60 years, thus revealing that older age groups dominated agro-entrepreneurship in challenging operating environments. Most people see agro-entrepreneurship as a pensioner job and a trade that one takes up after they retire. This might explain why the older age groups dominated the surveyed agro-SMEs.

Youths, defined as anyone between 15 and 40, constituted a low percentage of 26.9%. Past studies have proved that youths perceive agriculture as an industry that has the ability to offer big income, however, their acceptance towards agriculture is negative (Hassan, Shaffril and Samah, 2012). This might explain why a small proportion of agro-SME owners in Kwekwe were in the 21-40 age group.

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Past research (Levesque and Minniti, 2006) has revealed that demographic age is a triggering factor of entrepreneurial behaviour. It is a crucial characteristic in the thought decision-making process. In a research carried out by Criaco (2012) it was concluded that age is negatively related to entrepreneurial intention. Younger individuals showed higher intention than their older counter parts. Results from this survey, as shown in Table 4.1, tend to differ from the findings by Criaco (2012). This might be related to the fact that most Zimbabweans complete tertiary education around 22 or 23 years. Some even finish beyond 23 years due to some unforeseen circumstances. Some even finish in their late 20s or early 30s. After tertiary education, the major task is to find employment before thinking of entrepreneurship. After getting employment, some usually think of starting families. There is also a need to take some time building up the capital to start up the agro-SME. All these tasks delays agro-entrepreneurial intentions. All these factors explain why a small proportion of agro-SME owners were in the 21-40 age group. In as much as demographic age is crucial in determining entrepreneurial intentions, educational levels of agro-entrepreneurs has a bearing on the overall success of an agro-SME especially in challenging environments.

4.2.3 Highest Educational Level of Agro-entrepreneurs

Several studies, such as Marten (2005) and Zindiye (2008) that have been carried out to determine the success of small businesses concluded that the educational level of an owner is related to the success of a business. The agro-SMEs that were run by people with higher educational qualifications survived a historical challenging operating environment. The survival can be attributed to the educational levels of their owners, among other factors. Figure 4.1 below shows the results from the survey.

The results, as presented in Table 4.1 below, show that the agro-entrepreneurs who participated in the survey had at least acquired a Junior Certificate. A larger proportion of more than 55% of the agro-entrepreneurs had a tertiary level educational qualification. This is in agreement with Zindiye's (2008) argument that education increases the likelihood of identifying good business opportunities and the chances of business success. This is also in agreement with a study on the success of small businesses carried out in Canada (Marten, 2005). The study concluded that the education of owner is positively related to the success of the business.

Gender, age and educational qualifications showed some interesting aspects of agro-entrepreneurship. Gender dynamics among other aspects, showed some imbalances between males and females in terms of ownership. Age profiles showed a link between age and entrepreneurial intention. Educational qualifications indicated that agro-SMEs owned by people who have acquired at least a Junior certificate stood a better chance of survival in challenging operating environments. However, it is not sufficient to consider demographic characteristics of owners alone in profiling the characteristics of agro-SMEs that can survive challenging environments. In order to come up with an adequate profile, it was important to consider the operational characteristics of agro-SMEs.

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Table 4.1: Socio-demographic Characteristics of Agro-SME Owners

	Frequency	Percentage
Gender		
Males	13	50
Females	4	15.4
Males and Females Co-ownership	4	15.4
Males Co-ownership	1	3.8
Partnership males	1	3.8
Partnership females	1	3.8
Partnership males and females	1	3.8
Not applicable	1	3.8
Age		
21-30	1	3.8
31-40	6	23.1
41-50	12	46.2
51-60	4	15.4
>60	2	7.7
Not applicable	1	3.8
Educational qualifications		
Junior Certificate	1	3.8
O' Level	5	19.3
A' Level	4	15.4
Tertiary	15	57.7
Not applicable	1	3.8

Key: Not applicable = Institutional agro-SME

Source: Author's Data Computation (2014)

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4.3 Characteristics of Agro-SMEs

The characteristics of Agro-SME considered in this research included the number of employees and employee type, type of enterprise, major activities carried out and activity class. The number of employee and employee type was used to assess any deviations from the Ministry of SMEs' standards. The other three characteristics, which are type of enterprise, major activities carried out and activity class, were meant to categorise agro-SMEs accordingly. Agro-SMEs were categorised into four main types, which are private entities, family based, cooperatives and institutions. Agro-SMEs were also categorised according to the major activities they carried out such as mixed farming, peanut butter processing, horticulture and juice extraction. Agro-SMEs were categorised according to their activity classes, which included primary production, processing and tertiary. These operational characteristics are shown in Table 4.2.

4.3.1 Number of Employees and Employee type

Results, as shown in Table 4.2, revealed that there are some variations in employment thresholds between the Ministry of SMEs' standards and agro-SME standards. Agro-SMEs that survived the challenging environment indicated that they employed a minimum number of seven employees and a maximum of 115, while the Ministry of SMEs' standard stipulated that an agro-SME should employ a minimum of 5 people and a maximum of 75 people.

Results also showed that agro-SMEs employed two types of employees; these are permanent and seasonal, whereas the Ministry of SMEs indicated that they only consider permanent employees. Seasonal employees serve an enormous role in challenging operating environments. Most agro-SMEs are confronted with inconsistent cash flows during harsh economic and ever-changing climatic conditions. Seasonal employees thus come in handy under such circumstances to cover for labour peak demands only.

These variations indicate that the Ministry of SMEs' stipulation of what agro-SMEs are is at variance with the practices of agro-SMEs operating in challenging environments. There were some discrepancies between what was happening on the ground and what the Ministry of SMEs viewed as standard. This may reflect the possibility that what the Ministry of SMEs stipulated is not practical in challenging environments. The stipulated standards can only work in a stable economy that also has a predictable climate. There is need therefore, for the Ministry of SMEs to revisit these aspects taking into account challenging operating environments.

4.3.2 Type of Enterprise

To establish the type of enterprise, agro-SMEs were categorised under four main categories. These categories are private entities, family owned businesses, cooperatives and institutional agro-SMEs. Table 4.2 below shows the results. These indicate that, more than 69% of the agro-SMEs were private

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entities. In this case, these results may signify that private entities have a better chance of surviving challenging environments than any other type of enterprise. A private entity in this research is an agro-SME that is not owned by the government. Private entities constituted a large proportion presumably because most of them owned the premises they were operating on. Either they had offer letters in terms of those agro-SMEs who were into farming or had title deeds to the land they were using.

Family businesses constituted only 19% of the agro-SMEs. In this research, family businesses were those agro-SMEs in which two or more members of the family were involved and the majority of ownership or control lied within the family. Family businesses are the oldest form of businesses. Today family owned businesses are recognised as important and dynamic participants in most economies, thus they offer practical solutions in challenging environments.

Cooperatives constituted only 7% of the agro-SMEs. In the context of this research, cooperatives are organisations owned and run jointly by its members who share the profits or benefits. Cooperatives are said to be flexible business models and as such pose a significant ability to withstand challenging environments. They can be set up in different ways using different legal structures depending on what works for the members. The cooperatives that participated in this survey were set up through the Ministry of Gender and Women Affairs and the Ministry of Youth. They were required to provide a proposal and were then provided with the start-up capital for the enterprise.

Institutional agro-SMEs constituted the least percentage from the survey. These were taken to be agro-SMEs established and devoted to the promotion of a particular cause or program especially one of a public, educational or charitable character. The institutional agro-SME that participated in this research was a College of Agriculture, which produced and sold agricultural products for extra income to run the day-to-day needs of the college.

4.3.3 Main Activities

Activities carried out by agro-SMEs varied from one agro-SME to the other. The results are shown in Table 4.2. They indicate that agro-SMEs that survived the challenging environment practised a wide range of activities. A large proportion of the agro-SMEs (50%) indicated that they carried out mixed farming as a major activity. The research applied the generally understood meaning of mixed farming. In that manner, mixed farming meant the integration and management of cropping and livestock production in a closed unit. Most agro-entrepreneurs who carried out this activity indicated that they chose mixed farming in order to spread risk during the economically harsh and unpredictable climate experienced during the period in question.

Advantages of mixed farming in challenging environments outweigh the disadvantages. The pros of this kind of practice include minimising or spreading risk, efficient use of resources and recycling or reutilising resources. The major disadvantage of mixed farming is reduced economies of scale, as resources will be divided over several activities.

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Cropping constituted 26.9% of the agro-SMEs. In the context of this research, cropping referred to the production of crops only. The variety of crops produced was not considered important in the study. However, the major crops grown included soya beans, wheat, maize, sorghum and millet. Agro-entrepreneurs who carried out cropping indicated that they were aware of the unfavourable climatic conditions that could hinder their activities. However, this did not discourage them. They found ways to mitigate the effects of these climate extremes in order to produce efficiently.

Peanut butter processing constituted a small proportion, only 3.8%, of the agro-SMEs. Peanut butter processing involves the production of peanut butter from groundnuts. The process involves pre-cleaning, shelling, grading, roasting, blanching, grinding, cooling and packaging. The butter is used as a spread on bread, nutritional and taste additive to porridge, as a sauce for relish and can be added to cooked cereals like rice. Peanut butter processing technologies have been introduced over the past years. This has seen an increasing number of women agro-entrepreneurs expanding. However, successful peanut butter processors in the Kwekwe District are very few as signified by the small proportion of enterprises found in the research. This might be related to the fact that the technologies used are expensive and often incompatible for the small and medium scale agro-entrepreneurs.

Juice extraction is a process, which starts with fruit selection followed by the extraction of juice. The juice is sieved before preservatives and other ingredients are added. The mixture is then boiled, pasteurised and packaged. The activity constituted a small proportion of only 3.8% of the agro-SMEs. This may be attributed to the fact that juice extraction is relatively a new phenomenon among agro-SMEs since the production of juices was largely concentrated on the large-scale commercial farms.

Although the manufacturing of fruit juice is considered a relatively simple process, the reason why it was carried out by a few participants can be attributed to the higher cost of machinery such as juice extractor and pasteuriser, which are required and are again often imported. Considering the challenging environment, characterised by lack of foreign currency, it might have been difficult for agro-entrepreneurs to venture into juice extraction. Furthermore, the small proportion of agro-SMEs involved in juice extraction can also be attributed to the fact that Kwekwe is not a favourable area for fruit production. Kwekwe is located in Natural Region 3, where the climatic conditions are not favourable for fruit production. Agro-entrepreneurs therefore needed to source the fruits from other areas outside Kwekwe, which might have posed a challenge for those who wanted to venture in juice extraction.

Maize milling also constituted only 3.8% of the agro-SMEs that survived the challenging environment. Maize milling entails the production of mealie-meal from maize. The small proportion can be attributed to the fact that maize as a staple crop is plagued with highly controlled and centralised distribution, storage and milling facilities hence it was difficult to penetrate the maize milling industry. Policies to develop competitive small and medium scale milling facilities are apparently neglected hence the small proportion of agro-SMEs involved in maize milling.

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The results show that a small proportion of 3.8% of agro-SMEs in Kwekwe practiced dairy farming. Dairy farming is the production of milk, and processing of milk into milk products such as yoghurt, cheese, drinks and pasteurised milk. The dairy industry in Zimbabwe was largely dominated by large-scale commercial farmers. Smallholder dairy producers face viability problems and most of them do not stay in business for a longer period. This might explain the relatively small proportion of agro-SMEs involved in the dairy industry in Kwekwe.

Horticulture involves the production of fruits, flowers and vegetables. Horticulture has many advantages. For example, the yield per unit area is high as compared to crops, which means higher returns per unit area. It also provides raw materials for industries like canning among others. However, the perishability of horticultural produce poses challenges to agro-SMEs. This means that the produce requires quick disposal after harvest or effective cold storage facilities and preservation techniques. Results from the survey show that a small proportion of only 3.8% of the agro-SMEs were involved in horticulture.

The restaurant industry in the scope of this study refers to those agro-SMEs involved in the processing or value addition (mainly cooking) of agricultural products such as mealie meal, beef, chicken, potatoes, vegetables and marketing of the products. Results also show that a small proportion of only 3.8% of agro-SMEs were involved in the restaurant industry. The restaurant industry plays a vital role in the value chain of the agro-industry. It is one of the main targeted markets of those agro-SMEs involved in production of agricultural commodities. It is important to note that the activities discussed above fall into different activity classes and this is the next topic of discussion.

4.3.4 Activity Class

Three activity classes emerged as shown in Table 4.2. These are primary production, processing and hybrid. Primary production, in this research referred to on farm production activities of crops, livestock, fruits, vegetables, milk among others. The processing g activity class in this study is on farm or off farm activities that add value to agricultural products. Any agro-SME that is involved in milling, peanut butter processing, oil pressing, and juice extraction fell under this activity class. Hybrid activity class in the context of this research included those agro-SMEs involved in activities that included both primary production and processing. These agro-SMEs carried out two or more actives from primary production and processing classes. Table 4.2 below shows the results from the survey.

Thirty per cent of the agro-SMEs fell in the primary production activity class. It is quite a significant proportion, which shows that there is still a significant potential in the agricultural production sector. There is no doubt that the country can retain its status as the breadbasket of Africa should there be a favourable political and economic climate and the full utilisation of Zimbabwe's enviable resources. These factors coupled with processing activities will pave way for intergration into global markets.

Results as shown in Table 4.2 illustrate that only 15.4% fell in the processing activity class. A relatively small proportion fell under this class possibly because the processing of commercial agricultural

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products has been a preserve of the large-scale corporate companies. Agro-processing is relatively a new phenomenon among agro-SMEs. Agro-SMEs are still constrained by a variety of factors such as lack of capital, lack of knowledge among other factors, hence the small proportion.

The hybrid activity class constituted more than 53% of the surveyed agro-SMEs. A larger proportion fell into this activity class possibly because they saw the need to spread risk by venturing into multiple activities under the challenging environment. This may suggest the possibility that agro-SMEs have the potential to multi-task on the same premises.

These operational characteristics of agro-SMEs influence the success or failure of adopted strategies towards agro-SME survival. As it shall be revealed in Chapters 5 and 6 agro-SME characteristics influenced the probability of success or failure of some strategies, to some extent.

4.4 Summary

One of the objectives of this study was to determine the characteristics of agro-SMEs who survived the challenging operating environment in the Kwekwe District. A number of variables were considered to effectively profile the characteristics of agro-SMEs in Kwekwe District. The variables included gender dynamics of ownership, age profile of owners, educational qualifications, main activities undertaken, type of enterprise, number of employees and employee type. Data was collected using a questionnaire survey, key informant interviews and data mining. Data was analysed using SPSS where frequency distribution analysis, measures of central tendency was used. Content analysis was also used to analyse some of the data. Results were presented in tables.

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Table 4.2: Characteristics of Agro-SMEs

No. and type of employees	Ministry of SME standard		No. hired by agro-SMEs	
	Minimum	Maximum	Minimum	Maximum
No. of employees	5	75	7	115
No. of permanent employees	5	75	4	102
No. of seasonal employees	nil	nil	0	70
	Frequency		Percentage	
Type of enterprise				
Private entity	18		69.2	
Cooperative	2		7.7	
Family business	5		19.2	
Institutional	1		3.8	
Main activities				
Mixed farming	13		50	
Cropping	7		26.9	
Peanut butter processing	1		3.8	
Juice extraction	1		3.8	
Milling	1		3.8	
Dairy	1		3.8	
Horticulture	1		3.8	
Restaurant	1		3.8	
Activity class				
Primary production	8		30.8	
Processing	4		15.4	
Tertiary	14		53.8	

Source: Authors' Data Computation (2014)

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5.1 Introduction

This chapter focuses on survival strategies adopted against economic recession by agro-SMEs in the Kwekwe District during the challenging operating environment between 2000 and 2010. During this period, Zimbabwe experienced a harsh economic environment, which affected all sectors of the economy, including the agro-SME sector. The harsh economic environment brought about many challenges for the agro-SME sector. These challenges included hyperinflation, scarcity of inputs, lack of foreign currency, difficulties in accessing loans, increased pricing and marketing controls, emergence of parallel markets, unpleasant labour related issues, and reduced demand for products and services.

The chapter presents, analyses and interprets the results from the questionnaire and preference ranking. It gives a profile of the survival strategy options adopted by agro-SMEs in the Kwekwe District, against economic recession challenges and their actual contribution towards agro-SME survival. The survival strategy options were grouped into two groups. These are, strategies addressing input related challenges only and strategies addressing both input and output related challenges. The survival strategy options are well stated, explained and their implementation procedures clarified. Results from the questionnaire were compared with results from preference ranking to cross-examine the results from both activities.

The Likert scales were used to determine adoption rates and preference ranks. Results from the questionnaire show strategy adoption rates in percentages. Therefore, four scales were adopted. These are 1 - 24% representing very low uptake, 25 - 49% representing low uptake, 50 - 74% showed high uptake and 75 - 100% depicted very high uptake. For preference ranking, four scales were also used and these are most preferred, preferred, fairly preferred and least preferred. However, these varied from one challenge to another. Therefore, the Likert scale ranges were specified for each challenge (see the key on the results tables).

The results from comparative scaling done during the questionnaire survey were used to determine the actual contribution of the adopted strategies towards agro-SME survival. The contribution of individual strategies was measured on a Likert scale as marginal, significant and very significant. Frequency distribution analysis was used to determine the number of agro-SMEs that adopted specific strategies. Contribution towards survival was measured as a percentage, showing the proportion of agro-SMEs per scale, that is, marginal, significant and very significant. Table 5.1 and Table 5.3 show adoption rates, preference ranks and actual contribution of individual strategies towards agro-SME survival.

This chapter also statistically assess and discusses the contribution of these adopted strategies towards the survival of agro-SMEs. Binary logistic regression analysis was then conducted to statistically assess the contribution of individual strategies towards agro-SME survival using the survival strategy options as predictors. The analysis involved determining fitting models for the dependent variable (contribution

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towards agro-SME survival) and the independent variables or predictors (survival strategies). This was done for all the challenges faced during the challenging operating environment between 2000 and 2010.

Binary Logistic Regression was run twice. Firstly, it was run with the strategies only as the independent variables or predictors contributing towards agro-SME survival, assuming all the other factors were constant. However, in reality strategies do not work in isolation. They are affected by other factors such as socio-demographic characteristics of agro-entrepreneurs as well as operational characteristics of agro-SMEs. This study adopted results of the analysis that incorporated other related factors. Results of the analysis are shown in Table 5.2 and Table 5.4.

The contribution towards agro-SME survival is dichotomous i.e. it carries two possible outcomes. These are negative contribution towards agro-SME survival denoted as "0" and positive contribution towards agro-SME survival denoted as "1" in the analysis. The Binary logistic statistical analysis involved assessing model correctness using results from classification tables. Step 0 classification tables carry a "constant only model" whereas Step 1 classification tables carry the "full model" with all the independent variables (survival strategies). The constant only model (H_0) was compared with the full model (H_1) to determine whether the latter model was more appropriate.

Inferential statistical tests were used to evaluate model fit and significance. Model Chi-square gave the overall significance of the model. Two hypotheses were tested these were H_0 and H_1.

H_0 is the adopted strategies do not have a significant effect.

H_1 is the adopted strategies have a significant effect.

Acceptance or rejection of the hypotheses depended on the Chi-square test p value. A significant p value ($p \leq 0.05$) meant that the adopted strategies did not have a significant contribution towards survival of the agro-SME. Therefore, in that case H_1 was rejected. An insignificant p value ($p > 0.05$) meant the adopted strategies had a significant contribution towards survival of the agro-SME. Therefore, H_1 was accepted

The Nagelkerke R^2 and the Wald test were used to evaluate model strength and relative contribution of each adopted strategy, respectively. The higher the Negelkerke R^2 value the stronger the model. Wald statistic was assessed using the B values and p values. The B values showed the direction of contribution of specific survival strategies towards agro-SME survival. Positive B values meant that agro-SMEs, which did not adopt a particular strategy, had a higher probability of survival than those who adopted it. On the other hand, negative B values meant that agro-SMEs, which adopted that particular strategy, had a higher probability of survival than those, which did not. The significance of these results however, was determined by the p values. Significant results were signified by a p value less than 0.05 ($p < 0.05$) whilst insignificant results were signified by a p value greater than 0.05 ($p > 0.05$).

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5.2 Strategies Addressing Input Related Challenges

5.2.1 Strategies Addressing Scarcity of Inputs

The scarce inputs that are referred to here were fuel, electricity, water, fertilizer, seed and chemicals. The scarcity of these inputs posed multiple and complex problems for the agro-SMEs. The strategies adopted against scarcity of inputs fell under conservation, involvement in clusters, cooperatives, professional bodies, use of alternatives, changes in business patterns and contract farming. Table 5.1 shows the strategies adopted by agro-SMEs, the adoption rates as a percentage, preference ranks and actual contribution of survival strategies towards agro-SME survival.

5.2.1.1 Conservation

Agro-SMEs indicated that they prioritised conservation when they were confronted with the scarcity of inputs required for production. They mentioned that they adopted the concept of reduce, reuse, recycle as well as conservation agriculture. Some of the conservation techniques employed by agro-entrepreneurs include minimising water wastage and energy consumption.

The respondents mentioned several ways that were used to minimise water wastage during irrigation. Agro-entrepreneurs mentioned that they resorted to irrigating during the early hours of the day to reduce water lost to evaporation since there will be low temperatures and since wind does not blow hard in the mornings. They also used short but several cycles e.g. 2 to 3 short cycles than a single long cycle. Agro-entrepreneurs mentioned that they surveyed the location of sprinklers and removed tall grasses, ground cover and shrubs, which blocked water from sprinklers and caused uneven watering and water wastage. They also ensured that there were no leaks and if any, they were repaired immediately. Some agro-entrepreneurs mentioned that they adopted alternative irrigation methods that minimised water wastage such as drip irrigation.

Out of the 21 agro-entrepreneurs who practised irrigation, 95% conserved water by minimising wastage during irrigation as much as possible by practising the simple techniques explained above. The strategy was ranked the 6th preferred strategy out of the 13 strategies. Fifty-eight per cent of the agro-SMEs indicated that the strategy had a significant contribution towards the survival of agro-SME. Results show a very high uptake and that the strategy was preferred. Minimising water wastage, as a strategy is an immediate solution to scarce water resources. This might explain the very high uptake. The fact that most of the implementation procedures require the initiative of the agro-entrepreneur and that external forces affect them marginally may be the reason why it was preferred. Results indicate the possibility that agro-entrepreneurs were well informed as to how they can conserve water on their premises.

Agro-SMEs also indicated that they practised conservation through minimising energy consumption in activities such as dairy, irrigation, lighting, ventilation and water heating on farms. In the restaurant industry, electricity is used for cooking, refrigeration and keeping food warm. In the milling industry, it is used for grinding and refining processes. In peanut butter processing it is used for shelling, grinding and

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cooling. Hence, the agro-entrepreneurs indicated that they were concerned with reducing energy consumption on their premises.

Some of the mentioned ways included the use of natural ventilation systems in place of mechanical systems. A natural ventilation system has reduced operational costs compared to mechanical ventilation. It has fewer concerns related to loss of ventilation in cases of power failure. It also results in reduced lighting costs during the day due to increased levels of natural light. A natural ventilation system was used by those agro-SMEs involved in animal production, cropping and dairy. In animal production, natural ventilation was used in fowl runs for poultry and pigsties for piggery to maintain healthy animals. Natural ventilation in cropping was used in barns and storage facilities. Agro-entrepreneurs indicated that they also used natural ventilation in dairy to minimise electrical usage. Other agro-entrepreneurs mentioned that they minimised energy consumption in lighting by switching off all lights during the day whereby they would maximise the use of natural lighting. Furthermore, they ensured reduced energy consumption by using energy efficient bulbs.

The strategy had a 100% uptake rate. All agro-entrepreneurs indicated that they used at least one of the above strategies in order to minimise energy consumption on their premises. The results show that the strategy had a very high rate of uptake. In the preference ranking, it was ranked the 5th preferred strategy. The strategy fell in the preferred zone. However, despite the fact that the strategy had a very high uptake and was preferred, a large proportion (58%) of the agro-SMEs indicated that it only contributed marginally towards agro-SME survival. Although minimising energy consumption can go a long way in conserving energy, the high costs of electricity and its scarcity might have negatively affected agro-SME survival.

5.2.1.2 Involvement in Cooperatives, Clusters or Professional Bodies

In cases where there is scarcity of inputs, involvement in cooperatives, clusters or professional bodies becomes necessary as it helps to share ideas and proffer solutions towards a common problem. Agro-entrepreneurs indicated that they joined at least a cooperative, cluster or professional body in order to curb some of the challenges posed by scarcity of inputs. As it is said, there is power in numbers, these cooperatives enabled them to lobby those in influential positions, speak with one voice and be heard and to pool their resources. Some of the ideas that came up through these joint ventures included setting up some funds to acquire stand-by electrical generators to use in cases of emergency.

Lobbying with those in political power put agro-entrepreneurs at an advantage. Politicians are influential, so agro-entrepreneurs appealed to the Rural District Council, City Councils, Zimbabwe Electricity Supply Authority (ZESA) through their Councillors and Member of Parliament (MP). They took these as channels to convey their requests to the responsible authorities. Only 46% adopted this strategy, ranked the 9th preferred strategy and 50% of the agro-SMEs indicated that it marginally influenced agro-SME survival. The results show that the strategy had a low uptake, was least preferred and only had a marginal influence. This might be because most people do not consider politicians reliable. However,

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there are cases where they fulfilled their promises hence this should not be dismissed altogether. It is therefore important for agro-entrepreneurs to take the opportunity whenever it presents itself.

Agro-SMEs indicated that they appealed to ZESA and the Zibagwe Rural District Council and Kwekwe City Council to shorten periods of load shedding and water cuts. Speaking with one voice as Onyenekenwa (2010) expresses, would defy the lonesome efforts of a single agro-entrepreneur. Seventy-three per cent of the agro-SMEs adopted this strategy and ranked 3rd among other strategies. Although results show that the strategy had a high rate of uptake and it was among the most preferred strategies, a large proportion (47%) indicated that the strategy contributed marginally towards agro-SME survival.

In an environment where resources are scarce, resource pooling becomes a viable strategy for agro-SMEs. Agro-SMEs pooled resources such as machinery and equipment to increase efficiency. A large proportion of those who adopted the strategy were family based agro-SMEs. The reason might be that it is not economically viable for small enterprises such as family based businesses to purchase expensive farm machinery such as a combine harvester, which may be used irregularly, during harvesting. Instead, agro-entrepreneurs got together and formed a machinery pool to purchase the machinery and equipment for all the members to use. Members also did this to purchase water pumps and electric motors for use during incidences of unscheduled water and power outages.

Only 38% adopted this strategy. However, the strategy was ranked 2nd which shows a disparity. In terms of adoption, the strategy shows a low uptake whereas in preference ranking it was one of the most preferred strategies. Fifty per cent of the agro-SMEs indicated that the strategy only contributed towards survival, marginally. This might be because the strategy is difficult to implement due to issues of trust, possibly in the handling of funds. On the other hand, there is a possibility that agro-entrepreneurs knew that beneficial effects of this strategy outweighed its disadvantages, which explains why it was most preferred.

5.2.1.3 Use of Alternatives

Agro-SMEs mentioned that they resorted to the use of alternatives to address scarcity of inputs. Agro-entrepreneurs have managed to explore new technologies in order to survive scarcity of inputs. The strategies include use of solar energy, electric power generators, Liquid Petroleum Gas (LPG), compost or manure, natural disease pest control, Open Pollinated Varieties (OPVs) and contract farming.

The use of solar energy managed to reduce the need for energy sourced from ZESA and came in handy during load shedding hours, and unscheduled power outages. Sixty-nine per cent of the agro-SMEs adopted this strategy and used the energy for less energy demanding activities such as lighting. The results indicate a high rate of uptake. The strategy was ranked the least preferred strategy. Eighty-three per cent of the agro-SMEs indicated that the strategy only contributed towards agro-SME survival at a marginal scale. The high rate of adoption indicate that agro-entrepreneurs were well informed that this

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strategy. However, since it only contributed towards survival marginally, it might indicate that the strategy is not viable due to solar output variations as well as the high costs involved. It is important to note that variations in solar output make it difficult to use this strategy as the only source of power on a farm, hence it was least preferred.

Agro-entrepreneurs indicated that they used electric power generators as emergency sources of power. Although many indicated their concerns with their high cost, there was a general feeling that electric power generators were a good investment for the prevention of losses during local power failures and power outages. Thirty-eight per cent of the agro-entrepreneurs adopted this strategy indicating a low rate of uptake. In the preference ranking it was ranked the 8th meaning it was fairly preferred. A large proportion of 60% indicated that the strategy only contributed towards survival at a marginal scale. The reason for the low uptake, fair preference and marginal contribution might be that generators are expensive. Furthermore, generators use diesel or petrol fuel, which was scarce during the 2000-2010 period, hence an unfavourable result.

Other agro-entrepreneurs, especially those in the restaurant industry, opted for Liquefied Petroleum Gas (LPG) for water heating and cooking, instead of using electricity, in order to reduce energy consumption. However, this option had some drawbacks. LPG is generally considered dangerous. A few people have knowledge of how it is handled safely. Furthermore, companies that dealt with LPG had either downsized or closed down. LPG was also a scarce during the 2000-2010 period. This might explain the results where only 12% adopted the strategy, which is a very low uptake rate. The strategy was also ranked the 14th out of 14 strategies indicating the least preference. Likewise, all agro-SMEs who adopted it indicated that it had a marginal contribution towards survival.

Agro-entrepreneurs indicated that they used manure and compost in place of fertilizers. Manure and compost are a good source of plant nutrients and organic matter. They are even free if they are made on the farm. Only 30% adopted the strategy and it was ranked the 11th in preference ranking. Sixty-seven per cent of the agro-SMEs indicated that the strategy contributed significantly towards survival of the agro-SME. Although the strategy significantly influenced survival, agro-SMEs might have shunned it because it is difficult to get large quantities of manure or compost for use over large areas of land, hence the low rate of uptake and least preference.

The use of natural disease and pest control was highly adopted against the scarcity of pesticides and chemicals. Agro-entrepreneurs indicated that by adopting this strategy they also enjoyed extra advantages because they are cheaper, safe for people and the environment. The strategy was adopted by 95% of the agro-SMEs showing a very high rate of uptake. The strategy was ranked the 4th in preference ranking showing that it was one of the most preferred strategies. Seventy per cent of the agro-SMEs indicated that the strategy significantly contributed towards agro-SME survival. This might be explained by the fact that there is now increasing awareness among agro-entrepreneurs about the beneficial effects of using natural methods to curb pests and diseases. Furthermore, it is a cheaper

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method of eliminating pests and diseases than using chemicals. The method therefore came in handy during this challenging economic environment.

Some of the activities mentioned included monitoring pests, pest populations and diseases. Maintaining a healthy soil through regular application of organic residues in the form of animal manure and plant remains was another natural method mentioned. Practising crop rotation, intercropping and good hygiene by clearing and disposing debris was also another method used to curb diseases and pests. Agro-entrepreneurs mentioned that they also ploughed when the soil was dry to expose pests to dry out in the sun. These methods are natural and in cases where pesticides and chemicals are scarce, they can be used as an alternative and yield significant results. Environmentalists urge farmers to use natural methods to protect the environment and our health.

Agro-entrepreneurs saw it feasible to use Open Pollinated Varieties (OPVs) in place of hybridised seeds, which were scarce and required fertilizers and chemicals to perform well. Agro-entrepreneurs mentioned that they saved grain from the previous harvest and used them the following season. OPVs have shown that they have potential to be used repeatedly without yield or other qualities diminishing substantially. However, as Langyintuo (2007) indicated farmers need information and training on how best they can utilise them.

Only 38% adopted the strategy and it was ranked the 7th out of the 14 strategies. The results show a low uptake rate and it was fell in the preferred zone. The results show some discord. The low uptake may be because agro-entrepreneurs did not have the OPVs. However, this does not mean that they did not prefer the strategy. They were only limited by the availability of the OPVs hence the disparity. The low uptake may be because agro-entrepreneurs shunned OPVs because they lacked information and training. That is why a larger proportion did not adopt the strategy. Seventy-five per cent of the agro-SMEs who adopted the strategy indicated that it marginally contributed towards agro-SME survival.

Contract farming arrangements are feasible in challenging business environments plagued with scarcity of inputs on the open market and difficulties in accessing loans. Contract farming became a survival strategy option for agro-SMEs in Kwekwe between 2000 and 2010. It helped overcome scarce inputs constraints through the provision of pre-financed inputs. In other words, contract farming provided agro-SMEs a new supply base for inputs. Cotton was the major crop contracted to agro-SMEs in the survey through Cottco and Cargil. A few mentioned barley contracts from Delta beverages, and maize, soya beans and sugar beans contracts from GMB.

Only 38% adopted the strategy and it was ranked the 10th in preference ranking. The strategy had a low rate of uptake and a fair preference respectively. This might be explained by the fact that the selection criterion for getting the contracts was sometimes complex and sometimes not transparent. A larger proportion of agro-entrepreneurs were interested but they could not get the opportunity. Sixty per cent of those who managed to get the contracts indicated that the strategy significantly contributed towards agro-SME survival.

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5.2.1.4 Changes in Business Patterns

Introducing changes in business patterns becomes feasible when one is faced with scarce inputs. Some agro-entrepreneurs indicated that they induced operational changes on activities that required regular supply of the scarce inputs and some mentioned that they introduced overnight shifts.

Agro-entrepreneurs indicated that they induced operational changes on activities that required regular supply of scarce inputs. Agro-entrepreneurs indicated that they either downsized the projects that required a regular supply of the scarce inputs or stopped them altogether. Dairy, piggery and poultry were some of the projects that were downsized or stopped altogether. Piggery requires a higher demand of water. Dairying and poultry are electricity intensive and are much more reliant on electricity than other activities, hence they were downsized.

Eighty-five per cent of the agro-SMEs induced operational changes on activities that required regular supply of the scarce inputs. The strategy came out the first in the preference ranking activity. The strategy had a very high uptake rate and was most preferred at the same time. The high uptake and most preference may indicate the dire need to induce operational changes whenever scarcity of inputs rampages. This agrees with Onyenekenwa's (2010) findings that downsizing becomes a natural response in harsh business operating environments. However, despite the high adoption rate and most preference, 50% of the agro-SMEs indicated that it contributed marginally towards survival. This might be because the strategy had a negative bearing on the ultimate productivity of the agro-SMEs.

Due to the long hours of load shedding, which usually took place in the afternoon, agro-entrepreneurs were forced to introduce overnight shifts in order to keep their targets. There was no fixed time as to when electricity would be cut off or when it would be restored. Therefore, work resumed any time electricity was restored. There was no fixed timetable for work. Ninety-six per cent of the agro-entrepreneurs introduced overnight shifts to cover for the long hours of load shedding. However, the strategy was ranked the 12th in preference ranking and 50% of the agro-SMEs indicated that it marginally contributed towards survival.

The results might be explained by the fact that after agro-entrepreneurs adopted this strategy they encountered some resistance from employees and some operational flaws. The operational flaws included issues of transportation to and from work during the odd hours of the night. The strategy also meant increased costs in wages. It was a feasible option to consider for adoption otherwise, agro-SMEs would have suffered reduced productivity and would not have been able to survive. However, the issues surrounding the strategy as explained had a negative influence on survival.

5.2.1.5 Contribution of Strategies Against Scarcity of Inputs towards Survival – Statistical Analysis

The statistical analysis factored in gender, education and number of years since agro-SME was established and yielded the results shown in Table 5.2. The test revealed that the model with predictors

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is a significantly better model as the model correctly predicts 74.8% of the cases from 73.8% of the constant only model as shown in Table 5.2. Model Chi-square had a value of 40.279, 7 degrees of freedom and a probability p = 0.000 which is significant ($p < 0.05$). This means that the model with predictors improves prediction between positive and negative contribution towards agro-SME survival.

Negelkerke R^2 indicated that the model only explains 41.8% (Table 5.3) of the variation in the dependent variable (contribution towards agro-SME survival). Wald estimates, as shown in Table 5.2, yielded positive B value for changes in business patterns which means that agro-SMEs which did not adopt the strategy increased their chances of survival (recall that 1 = Adopted and 2 = Did not adopt) and these results were significant ($p < 0.05$). The variables that were factored in the analysis, i.e. gender, education and number of years since establishment, were all insignificant ($p > 0.05$).

Changing business patterns meant downsizing, downscaling or stopping activities that required regular scarce inputs altogether. It also meant reducing product quality and often their quantities. In addition, it meant introducing overnight shifts, which received resistance from employees and required agro-SMEs to increase rates of payments. All these had negative implications on the overall profitability of the agro-SME. This therefore explains why those who did not adopt changing business patterns stood a better chance of surviving than those who adopted it.

5.2.2 Strategies Addressing Lack of Foreign Currency

Lack of foreign currency was one of the major problems faced by agro-SMEs in Zimbabwe between the years 2000 and 2010. The scarcity of inputs meant that agro-entrepreneurs needed to import some of these inputs. Furthermore, most of the machinery, equipment and spares used to be imported. However, due to the lack of foreign currency, agro-entrepreneurs had to either replace imported inputs, machinery and spare parts with locally produced ones or source foreign currency on the parallel market or engage in barter trade. Table 5.1 shows the strategies adopted against lack of foreign currency, adoption rate or rate of uptake as a percentage, their corresponding preference ranks and their influence on survival.

5.2.2.1 Substitution with Locally Produced Products

Agro-entrepreneurs found substituting imported raw materials, machines and spare parts with locally produced ones as an option. It became necessary to lower the proportion of foreign raw materials, machines and spare parts in order to save huge cost in foreign exchange. Eighty per cent of the agro-SMEs substituted imports with locally produced raw materials, machines and spare parts. The results show a very high uptake rate. This corresponds to the results from preference ranking where it was ranked the first, which means it had the most preference among other strategies. Sixty-five per cent of the agro-SMEs indicated that the strategy significantly contributed towards survival. A major drawback in adopting this strategy was that the local market was not performing well during this challenging period hence some of the machinery and spare parts could not be found locally hence in such cases agro-SMEs turned to other means of survival.

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5.2.2.2 Source Foreign Currency from the Parallel Market

Sourcing foreign currency from the parallel market was another option in circumstances where importing was unavoidable. Some of the spare parts could not be produced locally especially those for tractors. Since the local equipment industry had collapsed, it was difficult to get some spare parts on the domestic market. It became inevitable to avoid the costs associated with sourcing foreign currency on the parallel market. Thirty-eight per cent of the agro-SMEs indicated that they had to source foreign currency on the parallel market in cases where it was inevitable to import. These results show that the strategy had a low uptake rate. The strategy was ranked the 3rd preferred strategy out of 4 which shows that it was fairly preferred. The low uptake and fair preference may indicate the concern by agro-entrepreneurs of the increased production costs in sourcing foreign currency on the parallel market. However, despite the shortcoming, 80% of the agro-SMEs indicated that the strategy significantly contributed towards survival.

5.2.2.3 Use Own Foreign Currency Savings

This strategy was also adopted when it was inevitable to import. However, this had some bearing on the production costs. Fifty-four per cent of the agro-entrepreneurs used their own foreign currency savings to import the necessary raw materials, spares and machinery. Results show a high uptake rate. The strategy was ranked the 2nd out of 4 strategies, which shows that the strategy was preferred. Sixty-four per cent of the agro-SMEs indicated that the strategy significantly contributed towards survival.

5.2.2.4 Barter Trade

Some agro-entrepreneurs mentioned that they barter traded with those who could afford importing the raw materials, machines and spare parts. Both parties would agree upon the terms of the trade and the transaction would follow. One mentioned transaction where borehole pump was exchanged for five cattle. Only 38% of the agro-SMEs adopted the strategy, which shows a low rate of uptake. The strategy was also ranked the 4th out of 4, which shows least preference. The results may depict the fact that agro-entrepreneurs shunned the strategy because it is out-dated and old-fashioned. Furthermore sometimes the parties involved failed to come up with compatible value terms for the commodities to be exchanged, hence the low uptake and least preference. Despite all the drawbacks associated with the strategy 80% of the agro-SMEs indicated that the strategy significantly contributed towards survival.

5.2.2.5 Contribution of Strategies against Lack of Foreign Currency towards Survival Statistical Analysis

The statistical analysis factored in gender and type of enterprise, which were assumed to have some influence on the listed strategies. The results of the analysis, as shown in Table 5.2., reveal an improvement in percentage correctness of the model from 57% to 79.4%. Therefore, it can be concluded that the model with predictors is a better model. Results also show that Model Chi-square had a value of 38.961, 6 degrees of freedom and a probability $p = 0.000$ which is significant ($p < 0.05$) indicating that the predictors, as a set, reliably distinguished between positive and negative contribution towards agro-SME survival.

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Negelkerke R^2 shows that the model explains only 40.7% of the variation in influence of agro-SME survival. Wald estimates yielded significant results for substituting imports with locally produced products, use of own foreign currency, gender of agro-entrepreneur and type of enterprise ($p < 0.05$). Since substitution of imports with locally produced products was coded; 1 = Adopted and 2 = Did not adopt, a positive B value means that agro-SMEs which did not adopt this strategy increased their chance of survival than those which adopted. Type of enterprise was coded; 1 = Institution, 2 = Family owned, 3 = Cooperative and 4 = Private. A positive B value therefore means that private owned agro-SMEs had a higher chance of survival against lack of foreign currency than the other types of enterprises.

The use of own foreign currency savings was coded; 1 = Adopted and 2 = Did not adopt. A negative B value therefore means that agro-SME which adopted the use of own foreign currency savings had a higher probability of surviving lack of foreign currency than those which did not and these results were statistically significant ($p < 0.05$). Gender was coded; 1 = male, 2 = Female and 3 = Co-owned. A negative B value therefore means that male owned agro-SMEs had a higher probability of surviving lack of foreign currency and these results were also statistically significant ($p < 0.05$).

Substitution of imports with locally produced products was relatively an impractical solution to adopt during the period in question. The local industry had collapsed in virtually all sectors. The required products or inputs were in short supply. Where they could be found they were fetching exorbitant prices, which were beyond the reach of many agro-entrepreneurs. This made it difficult for the agro-SMEs that adopted this strategy to stand a better chance of surviving lack of foreign currency.

Private owned agro-SMEs had a better chance of surviving lack of foreign currency because this challenge requires prompt decision-making, which is difficult to implement in other types of enterprises such as institutions (government owned), family businesses and cooperatives. Furthermore, private owned agro-SMEs usually have back up plans to address any challenges as they come. For example, they usually have foreign currency accounts in other countries that can be used under such circumstances, hence their probability of surviving was higher than any other enterprise.

The use of own foreign currency savings is a logical solution in the face of lack of foreign currency if survival is a priority. Since the local industry had collapsed, agro-SMEs required inputs to keep the business running. In this case using own foreign currency became necessary as one can source the required inputs to keep the business from going aground. This explains why agro-SMEs that adopted this strategy had a higher probability of survival than those that did not. Male owned agro-SMEs had a higher chance of surviving lack of foreign currency because this was a challenge that required extra-ordinary strategies with extra-ordinary implementation procedures. This required the hostility and aggressiveness of the male counterparts hence the higher chance of surviving.

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5.2.3 Strategies Addressing Difficulties in Accessing Loans

Agro-entrepreneurs were faced with difficulties in accessing loans from the formal banking sector during the 2000-2010 period. The onset of the land reform program replaced large-scale commercial agriculture with a new set of farmers who produced at a smaller scale with relatively little capital. This type of entrepreneur was not served well by the formal financial institutions, which comprise the conventionally accepted financial sources e.g. commercial banks and financial houses. The loans offered by these institutions were charged at market related interest rates and required loan guarantees in the form of collateral such as immovable assets, shares, savings and land. As a result, of these conditions agro-SMEs were not eligible for the loans since they were considered a high-risk group in terms of repayment.

Agro-entrepreneurs mentioned that they exploited other avenues such as involvement in cooperatives, self-liquidating loans, the government or NGOs, negotiating friendly terms with suppliers of finance, sale or mortgage of asserts or remittances from family and friends in order to survive the challenging environment. Table 5.1 shows the results from the survey and from the preference ranking activity. It shows adoption rate, preference ranks attached to each strategy and influence on survival. Most of the strategies adopted against difficulties in accessing loans mostly contributed towards survival marginally and significantly. Remittances from abroad significantly contributed survival of about 62% of the agro-SMEs. Strategies adopted contributed towards agro-SME survival at a limited scale in the very significant category.

5.2.3.1 Involvement in Cooperatives

Agro- SMEs formed self-help groups at local community level that offered financial services in the form of savings and credit to the members. Sixty-two per cent of the agro-SMEs adopted this strategy, which shows a high uptake. The strategy was ranked 2nd best, which shows that the strategy was among the most preferred strategies. In both cases, the strategy was highly favourable. This might be because of its simplicity and ability to offer immediate financial solutions to pressing issues that needed attention.

The main form of cooperative mentioned in the survey was the Rotating Savings and Credit Associations (ROSCAs). This type of cooperative, according to Khan and Lightfoot (2005) refers to a group of people who come together and make monthly contributions of a predetermined amount. The total amount is given to one member of the group. The process is repeated every month until all the members receive their share and the cycle restarts. This corresponded to the ROSCAs formed by agro-entrepreneurs. Although they do not offer an absolute solution for the financial gaps faced by agro-entrepreneurs, they play an important part in resolving some of the problems. The main advantage of forming ROSCAs is that they are a simple and flexible financial management system. They involve little or no documentation and provide stable funding over a long term. Issues of trust have been raised by agro-entrepreneurs whereby some have defaulted. In an experimental research carried out by Etang, Fielding and Knowles (2007) if the level of trust is low, ROSCAs are likely to fail.

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Apart from the ROSCAs, agro-entrepreneurs mentioned Self-Help Development Foundation (SHDF). The proceeds of SHDF differed slightly from the ROSCAs in that apart from the savings contributed by members, the institution was also capitalised through loans and grants from donors. Both forms of cooperatives provided an immediate, simple and flexible financial solution to agro-SMEs. However, they were constrained by inadequate resources and were confined to offering only short-term credit.

5.2.3.2 Self-Liquidating Loans

Self-liquidating loans are loans, which can be repaid by the productivity of what the loan was secured to purchase. For example, a loan for dairy cows can be repaid by the income from the sale of the milk. Likewise, a crop production loan can be paid off when the crops are sold. A form of self-liquidating loan mentioned by several agro-entrepreneurs is commodity specific financing. This is an input-credit scheme whereby companies engaged in some agricultural crops have resorted to financing agro-SMEs for a specific crop. The loan will be recovered by the proceeds of the next season's crop. In the survey agro-entrepreneurs mentioned that they received such loans from Cottco.

A very small proportion of only 19% adopted this strategy, which put the strategy in the very low uptake zone. On the other hand, in the preference ranking it came out the 1st preferred strategy putting the strategy in the most preferable zone. Results show a disparity. In the questionnaire survey, the strategy had a very low adoption rate whereas in the preference ranking activity it was highly preferred.

The reason it had a very low adoption rate might lie in the fact that such loans were difficult to come by. The process for acquiring the loans was somehow complex and not very transparent hence the low adoption rate. Furthermore, the period was a difficult operating environment for all sectors including the financiers. Therefore, the loans were sometimes not adequate to cover all the agro-SMEs. On the other hand, the reason why it was highly preferred might lie in the fact that agro-entrepreneurs were well informed on the effectiveness of such loans in challenging operating environments. Although they did not adopt the strategy, they preferred it. This poses one to question whether this does not reflect a donor syndrome among the agro-entrepreneurs.

5.2.3.3 Government or NGOs financing

Some agro-entrepreneurs mentioned that they sought finances from the government and NGOs. The government made efforts to assist agro-SMEs by giving out subsidised credit with interest rates that were lower than those charged for commercial farmers. In some cases, credit was provided through the Agricultural Finance Corporation (AFC), which provided long, medium and short-term credit. Agro-entrepreneurs also mentioned that the Ministry of SMEs, Ministry of Gender and Women Affairs and Ministry of Youth provided them with start-up capital. These ministries have running projects that provide start-up capital to those who would have submitted viable proposals of intended projects. The two cooperatives, which participated in the survey, indicated that they got the start-up capital from the Ministry of Gender and Women Affairs. NGOs such as Care and Oxfarm did not give finances but

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provided agro-entrepreneurs with inputs for specific projects. Some agro-entrepreneurs mentioned that they got inputs for poultry, cattle ranching, groundnuts production and sweet potato production.

Only 30% of the agro-SMEs indicated that they sought finance from the government and NGOs. In preference ranking the strategy was the 3rd preferred strategy. The strategy shows a low uptake rate and it was preferred in preference ranking. The results show a disparity. The low uptake rate from the survey might be explained by the fact that to acquire the finances from the government one needed to submit a viable proposal. Writing a viable proposal requires expertise and may be difficult for most agro-entrepreneurs. Furthermore, the vetting process was thorough and was done at a national level meaning competition was very high. Therefore, a few agro-entrepreneurs managed to get the finances hence the low uptake. On the other hand, despite the fact that the agro-entrepreneurs did not adopt the strategy does not necessarily mean they did not prefer it. Results from preference ranking show that agro-entrepreneurs preferred the strategy. They saw it as a potential solution to address difficulties in accessing loans.

5.2.3.4 Negotiating Friendly Terms with Informal Money Lenders

This strategy was adopted by some agro-entrepreneurs who were faced with shortages of capital but were in dire need to procure some inputs. Informal moneylenders became an alternative source of capital. Informal moneylenders charge higher interest rates. That is where negotiations came in. However, some moneylenders would not give in to the negotiations making the strategy not viable enough for adoption by most agro-entrepreneurs. This explains the very low uptake rate of only 14%. The results correspond with the results from preference ranking where the strategy came out the 5th and least preferred strategy.

5.2.3.5 Sale of Assets

In some cases, agro-entrepreneurs found it necessary to sell some of their acquired assets in order to raise capital or meet immediate cash needs of the agro-SME. Agro-entrepreneurs mentioned that they sometimes sold cattle or old equipment in order to raise the required capital to cover the necessary cash needs. 50% of the agro-SMEs adopted the strategy and the strategy was ranked the 4th among the 6 strategies. In both cases, the strategy fell in the median zone, which may signify that it is a feasible strategy to adopt under challenging environments but may be difficult to implement. Not all agro-entrepreneurs had extra assets to sale. As a result, selling was not a choice but a decision forced by circumstances, hence not an easy one to take. Most assets in an enterprise would be useful. Selling some assets would sometimes impact negatively on the operations of the enterprise, for example, selling cattle would impact drought power.

5.2.3.6 Remittances from Family and Friends

Some agro-entrepreneurs indicated that they sometimes relied on remittances from family and friends abroad or in the cities. Most of the agro-entrepreneurs in the survey had at least a child, sibling or

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relative working in the city or abroad who often supported them financially. Agro-entrepreneurs took advantage of these gifts to cover for immediate business cash needs. Only 31% adopted the strategy and the strategy was ranked the 5th out of 6 strategies. Results show that in both cases the strategy fell in the marginal zone. This may be explained by the fact that although the strategy was handy it was not a very reliable strategy. It is difficult to predict when the gifts would come, the amount to be received and whether it would cover all the cash requirements of the business.

5.2.3.7 Contribution of Strategies against Difficulties in Accessing Loans towards Survival - Statistical Analysis

The statistical analysis factored in gender and age of entrepreneur, number of years since agro-SME establishment, enterprise type and activity class. The results of the analysis, as shown in Table 5.2 indicated that the model with predictors is a better model. This is because the model correctly predicted 73.8% of the cases, which is an improvement from 44.9% correct of the constant only model.

Model Chi-square had a value of 42.229, 11 degrees of freedom and a probability $p = 0.000$ which is significant ($p < 0.05$) and indicates that the predictors as a set reliably distinguished between positive and negative contribution towards agro-SME survival. Negelkerke R^2 however, shows that the model explains only 43.5% of the variation in the outcome variable. Wald estimates yielded significant results for involvement in cooperatives, gender and age of agro-entrepreneur and activity class ($p < 0.05$ in all cases).

Involvement in cooperatives and activity class had positive B values whereas gender and age had negative B values. The results mean that those who did not adopt involvement in cooperatives had a higher probability of surviving difficulties in accessing loans (1 = Adopted, 2 = Did not adopt). A positive B value for activity class means that agro-SMEs involved in tertiary activities had a better chance of surviving difficulties in accessing loans than those involved in primary and processing activities only.(recall that 1 = Primary, 2 = processing, 3 = Tertiary). A negative B value for gender means that male owned agro-SMEs had a higher probability of surviving difficulties in accessing loans than female and co-owned agro-SMEs. A negative B value for age means that agro-SMEs owned by younger agro-entrepreneurs had a higher probability of surviving difficulties in accessing loans than those owned by older agro-entrepreneurs.

Involvement in cooperatives as a strategy has its constraints. The issue of trust usually limits the proper execution of this strategy. As it is, respondents in this study reported some cases where some had defaulted. The issue of the time value of money also comes into play considering the economic situation during the period in question. The value of money could fall at an astronomic level easily. This affected the individual who would receive money last. All these issues impact negatively on the ultimate profits of an agro-SME. Hence, this explains why those who did not adopt this strategy had a higher chance of survival than those who adopted it.

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Agro-SMEs involved in tertiary activities survived difficulties in accessing loans because they could easily make prompt decisions to suit the challenge being faced and always had a backup plan to address challenges that they might come across during their production period. Male owned agro-SMEs survived difficulties in accessing loans better than female and co-owned agro-SMEs because this challenge requires commitment in terms of time. Females generally have many commitments as compared to males. However, the environment required individuals who would commit themselves fully, hence male owned agro-SMEs survived better. Agro-SMEs owned by younger individuals survived better against difficulties in accessing loans because they are often risk takers than their older counterparts. They are ready to explore every alternative available even if the risk seems high and unbearable to ensure survival of their businesses hence the higher probability of survival against difficulties in accessing loans.

5.2.4 Strategies Addressing Labour Issues

Economic conditions during the 2000-2010 period demoralised employees and there was relatively negative labour morale. Most skilled personnel left the country in search for greener pastures. In order to deal with some of these challenges agro-entrepreneurs adopted the strategies shown in Table 5.1. The results show the adoption rates, preference ranks and contribution of the strategies towards agro-SME survival. Most of the strategies that were adopted, as shown in Table 5.1, significantly contributed towards agro-SME survival. The adoption of other forms of payment had the highest proportion of agro-SMEs (70%) in this category. The strategies contributed towards agro-SME survival at a very limited scale in the marginal and very significant categories.

5.2.4.1 Improve staff education and training

The brain drain meant that trained personnel became scarce. Agro-entrepreneurs invested in human capital through improving their staff education by sending them to Technical Colleges and Agricultural Colleges. The strategy was adopted by 46% of the agro-SMEs showing a low rate of uptake. In preference ranking, it was ranked the 4th out of 4 showing that the strategy was least preferred. The results deduce the possibility that agro-entrepreneurs were not prepared to take up the risk of incurring relatively high costs involved in improving staff education and training as well as the risk of losing employees to other organisations after investing in them.

This strategy was mainly adopted by family based and institutional agro-SMEs. This might be because the other categories felt that some individuals would leave for better opportunities elsewhere after they had invested so much in training the individuals. Therefore, family based agro-SMEs saw it fit to invest in a family member rather than any other employee. On the other hand, institutional agro-SMEs would bond the personnel for a period of five years before they could be given their certificate or before they could go and look for employment elsewhere. Instead of sending employees to colleges, other agro-entrepreneurs opted to train their employees on the job. This is called in-house training. This saved large sums of money that would have been used if these employees were sent to a college.

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5.2.4.2 Introduction of motivation programs

A significant proportion of the agro-SMEs introduced motivation programs in order to boost employee morale. Some of the programs included awards given to the employees who would have brought about the highest returns to the agro-SME. Some even introduced shorter payment periods such as weekly or twice a month instead of the traditional once a month. A larger proportion of 69% of the agro-SMEs adopted the strategy showing a high rate of uptake. It was also ranked the 2nd in the preference ranking which shows that it was preferred. This shows that the introduction of motivation programs as a strategy has the potential to boost employee morale leading to increased production.

5.2.4.3 Adoption of other forms of payment

Since the Zimbabwean Dollar had significantly lost its value, agro-entrepreneurs introduced other forms of payment. These included grocery vouchers, foreign currency and fuel coupons. This was done mainly to boost employee morale. A significantly larger proportion of 65% adopted the strategy showing a high rate of uptake. The strategy was the most preferred strategy among others as it was ranked the 1st out of 4. These results signify that agro-entrepreneurs were well aware of the effects of a demoralised workforce if they continued to pay them in local currency hence the high adoption rate and most preference.

5.2.4.4 Staff retention programs

Staff retention programs are measures intended to reduce high staff turnover. These programs included long service awards. Such forms of recognition were intended to make employees feel appreciated and thus making them eager to stay. Agro-entrepreneurs mentioned that they rewarded employees with cattle, cash and sometimes certificates and fully paid holidays.

Fifty-eight per cent of the agro-SMES adopted the strategy showing a high rate of uptake. The strategy was ranked the 3rd preferred strategy among the 4 strategies placing the strategy in the fairly preferred zone. As explained earlier, adopting a strategy does not mean one prefers the strategy. The strategy involves some extra costs and this might be the reason why it was fairly preferred. It was only practical to rather face increased costs than to be confronted with failure. This explains the high rate of uptake and the fair preference.

5.2.4.5 Contribution of Strategies against Unpleasant Labour Related Issues towards Survival – Statistical Analysis

The number of permanent and seasonal employees as well as the activity class is factored into the analysis. Numbers of permanent and seasonal employees were included in the analysis because permanent and seasonal workers constitute the ultimate source of labour in most agro-SMEs. Furthermore, they were the ones mostly affected by the unfolding unpleasant labour issues. Activity class was included in the analysis because some activities required more labour than others and it also determined the type of employees normally hired by an agro-SME.

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Results of the analysis are shown in Table 5.2. The results indicate that the model with predictors is a better one in terms of correctness. This is shown by the percentage correct improvement from 59% to 83.2%. Model Chi-square had a value of 76.331, 7 degrees of freedom and a probability $p = 0.000$ which is significant ($p < 0.05$). This means that the predictors, as a set reliably, distinguished between positive and negative contribution of adopted strategies towards agro-SME survival.

Negelkerke R^2 indicated that the model explains 68% of the variation in the influence of adopted strategies on agro-SME survival. Wald statistic yielded significant results for a number of seasonal employees and activity class ($p < 0.05$ in both cases). Both the number of seasonal employees and activity class had a positive B value. A positive B value for the number of seasonal employees means that agro-SMEs which employed more seasonal employees, had a higher probability of surviving unpleasant labour related issues than those which did not and those which employed permanent employees. This was because the business environment was hard hit by many challenges that affected agro-SMEs' cash flows. Most of the agro-SMEs did not have a consistent cash flow to maintain permanent employees. As a result, employing seasonal employees was a feasible solution as they were only hired during labour peaks and released afterwards.

A positive B value for activity class meant that those involved in primary production stood a better chance of survival than those in secondary and tertiary production (1 = Primary, 2 = Processing, 3 = Tertiary). This is because primary production activities are more compatible with employing seasonal employees than any other activity class.

5.3 Strategies Addressing both Input and Output Challenges

5.3.1 Strategies Addressing Reduced Demand for Products

The demand for products and services in the country was reduced due to the prevailing economic conditions. Local currency had lost its value, foreign currency was difficult to access, a large proportion of the population lived below the poverty datum line. As a result, the potential customers were stripped off their buying power, hence the reduced demand for products and services. Furthermore, the cheap imports from South Africa, Botswana and other neighbouring countries reduced the demand for local products because they were more expensive.

Agro-SMEs adopted some strategies in order to increase demand and to ensure that their products can sell. Twenty-five agro-SMEs indicated that they were affected by this challenge. One agro-SME involved in milling mentioned that they did not experience reduced demand. Considering mealie meal is the staple diet of Zimbabwe, everyone made some effort to provide it on the table, hence the demand was maintained. Table 5.3 shows the results from the questionnaire and the preference ranking. The adopted strategies addressing specific challenges are listed together with their adoption rates, preference ranks and how they contributed towards the survival of agro-SMEs. Strategies adopted against reduced demand of products and services largely contributed significantly towards agro-SME survival. Giving discounts and special offers contributed significantly towards the survival of a larger proportion (80%) of

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agro-SMEs in this category. The strategies influencing SME survival at a very limited scale in the marginal and very significant categories.

5.3.1.1 Discounts or special offers

Some agro-entrepreneurs indicated that they gave out discounts or special offers in a bid to increase demand for their products. This was a calculated strategy where agro-SMEs felt that if they reduced prices below those offered by their competitors they would attract more customers, increase sales volume and eventually increase profits in the long run. Special offers on the other hand, were meant to attract customers. This was usually done on products that were approaching expiry date. Only 20% of the agro-SMEs adopted the strategy and it was ranked the 4th preferred strategy out of the 5 strategies available. The strategy had a very low uptake and a fair preference. This might be because agro-entrepreneurs felt discounts and special offers had a bearing on profit margins, hence the low adoption rate and less preference.

5.3.1.2 Superior customer care

A large proportion of 64% of the agro-SMEs used this strategy to ensure increased demand for their products and services. The strategy was the most preferred. This might be because it was a very simple strategy to implement but highly rewarding. Agro-SMEs mentioned that they offered the best service to their customers. Some agro-SMEs mentioned that they addressed their customers by name to make them feel honoured and appreciated. This is a very simple but very powerful gesture. Other agro-SMEs mentioned that they always treated their customers well. They ensured this by apologising whenever possible. They made sure that although the customer may not always be right, the customer should always win.

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Table 5.1: Adoption Rates, Preference Ranks and Actual Contribution of Strategies towards Survival

a) Input Related Challenges

Strategies	Adoption rate (%)	Preference rank	Actual Contribution of Strategy toward agro-SME survival (%)		
			Marginal	Significant	Very significant
Challenge: Scarcity of inputs					
Minimise energy consumption	100	5	58	27	15
Introduce overnight shifts	96	12	64	32	4
Minimise water wastage in irrigation	95	6	20	55	25
Natural disease and pest control	95	4	0	70	30
Introduce operational changes	85	1	50	41	9
Appeal or speak with one voice	73	3	47	42	11
Use solar energy	69	13	83	17	0
Lobbying	46	9	50	42	8
Resource pooling	38	2	50	40	10
Use electric power generators	38	8	60	30	10
Use open pollinated varieties	38	7	75	25	0
Contract farming	38	10	10	60	30
Use organic manure or compost	30	11	17	67	17
Use liquefied petroleum gas	12	14	100	0	0
Challenge: Lack of foreign currency					
Substitute imported with locally produced	80	1	35	65	0
Use own foreign currency savings	54	2	36	64	0
Source foreign currency from the parallel market	38	3	20	80	0
Barter trade	38	4	20	80	0
Challenge: Difficulties in accessing loans					
Involvement in cooperatives	62	2	55	36	9
Sale/ mortgage of assets	50	4	50	50	0
Remittances from abroad	31	5	38	62	0
Seek finance from government, NGOs	30	3	52	43	5
Self-liquidating loans	19	1	20	60	20
Negotiate friendly terms with informal money lenders	14	5	40	40	20
Challenge: Unpleasant labour related issues					
Introduce motivation programs	69	2	22	61	17
Adoption of other forms of payment	65	1	12	70	18
Staff retention programs	58	3	13	67	20
Improve staff education and training	46	4	33	58	9

Key: Likert scale ranges for preference ranking

- **Scarcity of inputs**: 1 to 4 = most preference, 5 to 7 = preferred, 8 to 11 = fairly preferred, 12 to 14 = least preferred
- **Lack of foreign currency**: 1 = most preferred, 2 = preferred, 3 = fairly preferred, 4 = least preferred.
- **Difficulties in accessing loans**: 1 to 2 = most preferred, 2 to 3 = preferred, 4 to 5 = fairly preferred and 6 = least preferred.
- **Unpleasant labour related issues**: 1 = most preferred, 2 = preferred, 3 = fairly preferred, 4 = least preferred

Source: Author's Data computation (2014)

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Table 5.2 Binary Logistic Regression Analysis Results

a) Input Related Challenges

Challenge	Model correctness		Model significance (Model Chi-Square)			Model strength (Negelkerke R^2)	Relative contribution towards agro-SME survival (Wald Statistic)			
	Step 0	Step 1	Value	df	Sig		Strategy and Agro-SME characteristics	B	Wald	Sig
Scarcity of Inputs	80.8	84.6	12.225	4	0.016	0.601	Conservation	-0.714	1.617	0.204
							Involvement in clusters	0.444	0.612	0.434
							Use alternatives	0.575	0.987	0.320
							Change business patterns	2.332	15.380	0.000
							Educational level of entrepreneur	0.146	0.175	0.675
							Gender of entrepreneur	-0.439	2.964	0.085
							No. of years since establishment	-0.061	1.989	0.158
Lack of foreign currency	57.0	79.4	38.961	6	0.000	0.407	Substitute imported with locally produced	1.071	3.918	0.048
							Source from the parallel market	-0.520	0.905	0.341
							Use own foreign currency savings	-1.231	5.502	0.019
							Barter trade	-0.693	2.263	0.132
							Gender	-1.221	4.634	0.031
							Enterprise	2.065	11.865	0.001
Difficulties in accessing loans	44.9	73.8	42.229	11	0.000	0.435	Involvement in cooperatives	1.641	6.867	0.009
							Self-liquidating loans	0.680	0.450	0.503
							Seek finance from government, NGOs	-0.603	0.552	0.458
							Negotiate with informal money lenders	-0.942	0.910	0.340
							Sale/ mortgage of assets	0.094	0.039	0.844
							Remittances from abroad	0.561	0.748	0.387
							Gender	-1.579	9.157	0.002
							Age	-1.466	10.556	0.001
							Years since agro-SME establishment	0.088	2.548	0.110
							Type of enterprise	1.053	2.773	0.096
							Activity class	1.014	10.558	0.001
Unpleasant labour related issues	73.8	83.2	62.524	7	0.000	0.590	Improve staff education and training	-0.416	0.660	0.417
							Introduce motivation programs	0.439	0.462	0.497
							Adoption of other forms of payment	-27.923	0.000	0.997
							Staff retention programs	25.364	0.000	0.997
							No. of permanent employees	-0.051	0.364	0.546
							No. of seasonal employees	0.185	5.194	0.023
							Activity class	0.851	5.650	0.017

Key: *df = Degrees of freedom; Sig = p value; Cut value = 0.5

Source: Author's Data Computation (2014)

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5.3.1.3 Opening New Markets or Sourcing New Customers

Opening new markets to sourcing new customers was another way used by agro-SMEs to increase demand for products and services. Out of the 25 agro-entrepreneurs who faced reduced demand for their products, 72% adopted this strategy. The strategy was ranked the second best preferred strategy among the five strategies. The strategy showed a high rate of uptake and it was among the preferred strategies. It is important to note that although this strategy is associated with extra costs it is highly yielding. Agro-SMEs noticed the potential that is why the strategy had a high adoption rate and was preferred.

Different ways were used by different agro-SMEs to source new customers. They mentioned that they attended networking events and took any opportunity to promote their products. In some cases, they contacted event organisers and offered to give away their products as gifts, awards or prizes during the event in exchange for having their products promoted. Some agro-SMEs mentioned that they mastered the art of "giving a little to gain a lot". Free product samples were given away and recipients were asked to tell their friends if they were pleased. In some cases, agro-SMEs used pamphlets and distributed in town and locations. Some agro-SMEs even explored the neighbouring towns of Gweru and Kadoma to source for new customers. Some even explored big cities like Harare and Bulawayo.

5.3.1.4 Change or Add the List of Products

Changing or adding the list of your products is another strategy mentioned by agro-SMEs to counter reduced demand for products. Only 28% of the agro-SMEs adopted this strategy. The strategy was ranked the 3rd preferred strategy out of the 5 strategies available. The strategy had a low uptake rate and it was preferred. The small proportion might be explained by the fact that change requires a lot of investment and planning as it may require a complete overhaul of the whole farm or system. Generally, people are afraid to change hence the low uptake rate. However, not adopting a strategy does not necessarily mean that agro-SMEs did not prefer the strategy, hence the disparity in the results from the two activities. Although the agro-SMEs were aware of the high costs involved, they also saw great potential in the strategy to uplift demand for their products.

5.3.1.5 Continuous Improvement of products

In a normal market, improving the quality of products will generally increase its demand. Only 44% of agro-SMEs adopted this strategy. The strategy was also the least preferred strategy among the available strategies. The results show a low rate of uptake and least preference. These results may highlight the effect of the challenging operating environment. During the 2000-2010 period market conditions were abnormal. Furthermore, the strategy comes with extra costs in a bid to improve quality and durability of products. The Agro-SMEs that adopted the strategy mentioned that they improved the product form and packaging to attract the customers. Some also mentioned that they invested in product quality control by introducing the cleaning and grading of products.

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5.3.1.6 Contribution of Strategies against Reduced Demand towards Survival – Statistical Analysis

A statistical analysis using Binary Logistic regression was conducted to determine the statistical contribution of strategies towards survival. The educational level of the entrepreneur was included in the analysis because it plays a significant role in the implementation of the listed strategies. The strategies require logical implementation procedures to prevent the agro-SME from running aground. The number of years since agro-SME's establishment was included in the analysis because it was assumed that, older agro-SME could withstand reduced demand better than younger agro-SMEs.

The results from the analysis are shown in Table 5.4. They indicated that the model with predictors was a better model. This is shown by the percentage improvement from 72% to 73.8%. Model Chi-square had a value of 63.859, 7 degrees of freedom and a probability $p = 0.000$ which is significant ($p < 0.05$). This means that the predictors, as a set, reliably distinguished between the positive and negative contribution of adopted strategies towards agro-SME survival.

Negelkerke R^2 indicated that the model explains 59.9% of the variation in the dependent variable. Wald statistics indicated that superior customer care, opening new markets/ sourcing new customers, changing/ adding list of products, education and number of years since agro-SME establishment were significant variables ($p < 0.05$).

Superior customer care had a negative B value indicating that those agro-SME which adopted the strategy had higher chances of survival than those which did not (1 = Adopted, 2 = Did not adopt). This is because superior customer care only involves treating customers well so that they feel valued and then buy more or come back again. There are relatively very little costs associated with such a strategy. In this case, demand can be increased with little costs, hence agro-SMEs that adopted the strategy stood a better chance of survival.

Opening new markets or sourcing new customers also had a negative B value. This indicated that those who adopted the strategy had a higher probability of surviving reduced product demand (1 = Adopted, 2 = Did not adopt). This is because a successful implementation of this strategy can increase the customer base thereby increasing ultimate demand. Changing or adding the list of products had a positive B value, which means that those agro-SMEs, which did not adopt the strategy, stood a better chance of surviving reduced product demand (1 = Adopted 2 = Did not adopt). This is because changing or adding a product list is associated with high costs. Again, change is difficult to execute, especially in a challenging economy, as was the case during the period in question. Adding a product list means breaking new ground. There will be trials that may fail in the end and that is why those who adopted the strategy had a lesser chance of surviving reduced demand of products.

The number of years since the agro-SME's establishment had a negative B value, which means that younger agro-SMEs had a better chance of surviving reduced product demand than older agro-SMEs.

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This is because younger agro-SMEs were established when the economy was already showing signs of collapse. They were used to the challenging environment than their older counterparts who were established when the economy was flourishing. Such a challenge would come as a shock to those older agro-SMEs than the younger ones who were more familiar with the situation.

5.3.2 Strategies Addressing the Emergence of Parallel Markets

Parallel markets were prevalent in many parts of the country during the 2000-2010 period. Almost every product was found on these markets and these products included alternative cheap imports, which drove prices down. Agricultural products such as mealie-meal, eggs, fruits, meat products such as chicken and sausages, dairy products, and soft drinks were imported and sold on the parallel market at rather lower prices than goods produced by local agro-SMEs. Agro-entrepreneurs had to respond through gathering information and competitive production. Table 5.3 shows the results from the survey and the preference ranking. Strategies adopted as shown in Table 5.3 contributed significantly towards agro-SME survival. At this level, competitive production scored the highest percentage contribution towards survival of 86% of the agro-SMEs. All agro-SMEs adopted information gathering however, the strategy only managed to contribute towards survival in the very significant category for only 8% of the agro-SMEs.

5.3.2.1 Information Gathering or Market Research

Gathering information on parallel market trends and maximising on any opportunities that may arise became the most feasible solution against prevalence of parallel markets. Information gathering helps an agro-SME to generate ideas and concepts that can be used to its advantage. The strategy show a very high rate of uptake as it recorded 100% adoption rate. The strategy was the most preferred strategy. The favourable results in both cases might indicate that agro-SMEs recognised that it was valuable to assess the market and be on a better position against their competitors on the parallel market, hence a very high uptake and most preference was attached to the strategy.

Some agro-SMEs mentioned that they simply observed customer behaviour, got clues on whether their products really met their needs and wants and then responded to these clues immediately. Some agro-SMEs mentioned that they relied on their sales people as their sources of information. The sales people really know how the products are faring on the market. Other agro-SMEs took time to read newspapers, trade magazines and economic data produced by government to find out about market trends and how the competition was unfolding so that they could act accordingly.

5.3.2.2 Competitive Production

Competitive production in this case entails reducing production of commodities common on the parallel market and reducing product quality to lower costs thereby cutting prices. The strategy was adopted by 81% of agro-SMEs showing a very high rate of uptake but was least preferred as it was ranked last. These results indicate that adopting a strategy does not necessarily mean one prefers it. Agro-

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entrepreneurs, although aware of the ethical issues involved, have been forced by circumstances. They had no other way out. It was an issue of surviving the challenging operating environment.

Agro-SMEs mentioned that they reduced broiler production since it was not viable to produce broilers and sell them at prices that the chicken cuts from South Africa were fetching. Consumers rather opted for chicken cuts from South Africa than the locally produced broilers because they were expensive. In some cases agro-SMEs mentioned that they reduced quality of products in order to reduce costs thereby reducing prices to match the cheap imports. However, this had some ethical issues. Others felt it was better to reduce quantities but maintain the prices of the former containers.

5.3.2.3 Contribution of Strategies against Emergence of Parallel Markets towards survival – Statistical Analysis

The statistical analysis factored in the type of enterprise, number of years since agro-SME establishment, activity class and gender. The type of enterprise was considered because the emergence of parallel markets tends to exploit certain types of businesses than others. The number of years since the agro-SME's establishment was considered because it determines the vulnerability to the emergence of parallel markets. The researcher also considered activity class because some products are usually common on the parallel market than other products. The gender of the entrepreneur was also considered because males generally dominate the industry than females.

The above factors were factored in the analysis and the results are shown in Table 5.4. These show that the model with predictors is a better model as it correctly predicts 83.2% of the cases, which is an improvement from the constant only model with percentage, correct of 73.8%. Model Chi-Square had a value of 85.772, 6 degrees of freedom and $p = 0.000$ which is significant ($p < 0.05$). This means that the predictors as a set reliably distinguished between positive and negative contribution towards agro-SME survival.

The analysis yielded a Negelkerke R^2 of 73.5%, which means that 73.5% of the variation in the outcome variable is explained by the model. The Wald criterion demonstrated both strategies information gathering and competitive production remained significant ($p < 0.05$). The number of years since the agro-SME's establishment, activity class and gender were also significant ($p < 0.05$). However, the direction of influence (B values) differed from one variable to the other. Market research had a positive B value, while all the other significant variables had negative B values.

A positive B value for market research means that agro-SMEs that did not adopt this strategy had higher chances of surviving emergence of parallel markets (recall that 1 = Adopted and 2 = Did not adopt). This is so because market research requires a considerable amount of investment and highly skilled personnel who can bring about positive results. This was a challenge for most agro-SMEs during the period in question. Hence, those who adopted this strategy would face a higher probability of not surviving emergence of parallel markets.

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A negative B value for the number of years since agro-SME's establishment means that older agro-SMEs stand a better chance of surviving emergence of parallel markets than younger agro-SMEs. This is so because they might have stable finances that can help them invest in market research and competitive production than younger agro-SMEs. Activity class was coded 1= Primary, 2= Processing, 3 = Tertiary. The activity class had a negative B value, which means that agro-SMEs involved in primary activities only had a high probability of surviving the emergence of parallel markets than agro-SMEs involved in processing and tertiary activities. The primary activity class only is not involved in marketing of its produce hence the higher probability of surviving emergence of parallel markets. This challenge affects mainly those agro-SMEs involved in marketing.

5.3.3 Strategies Addressing Increased Pricing and Marketing Controls

Most agricultural products, including maize, beef, and wheat were affected by pricing and marketing controls. The government set output prices for such commodities. Sometimes the prices were not high enough to cover the production costs. Agro-entrepreneurs adopted strategies, some of which were illegal, in order to survive. Table 5.3 below shows the results from the questionnaire and preference ranking.

Table 5.3 shows that strategies adopted against increased pricing and marketing controls contributed mostly towards agro-SME survival at a significant scale. Barter trading influenced the highest proportion of agro-SMEs (80%) in the significant category. The strategies that were adopted contributed only towards agro-SME survival in the very significant category at a very low scale. The strategies rarely managed to score above 40% in this category.

5.3.3.1 Real Time Pricing

Most agro-SMEs mentioned that they did not pay particular attention to the pricing or marketing controls. They did what was best for their businesses and made sure that they at least recover the production costs and make some profits. Therefore, they increased the prices whenever the inflation rate increased or whenever the prices of inputs increased. In some extreme cases they just made sure that they breakeven. In some cases, agro-SMEs rather kept their produce and sold it on the parallel market where it could fetch better prices.

A large proportion of 69% adopted this strategy, as it became a reasonable solution to survive the price controls. The results show a high uptake rate. However, the strategy was the 4th preferred strategy out of the 5 strategies. The results show that the strategy was preferred. These results may indicate that although effective pricing may be a practical solution under the circumstances, given a variety of choices it may not be the most preferable strategy. This is so because the strategy was illegal. It is only suitable under challenging operating environments, where one does not have a choice.

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5.3.3.2 Change product or service line

Some agro-SMEs opted to changing their product or service line to address pricing and marketing controls. For example, the agro-SMEs that were producing maize either downsized or left its production totally. The pricing and market controls on maize were severe because it is the country's staple food. However, this strategy had a bearing on the country's food security. Agro-SMEs in the survey mentioned that they rather opted to produce crops like paprika and other horticultural products such as tomatoes or onions that were not affected by price controls.

Results show that the strategy had an adoption rate of only 42%, thus showing a low uptake. It was ranked the 3rd preferred strategy falling into the preferred zone. The results show a disparity, which may be explained by the fact that change, is difficult to embrace. There are relatively high costs involved in changing production of one crop to the other. If it is not executed properly, the agro-SME might suffer dire consequences. Therefore, because of the rigorous planning involved, the adoption of the strategy was limited.

5.3.3.3 Cooperative Marketing with Price Pooling

Cooperative marketing with price pooling provides an agro-SME with some advantages when pricing and marketing controls are prevalent. Cooperative marketing with price pooling as Boughner and Sumner (2000) explain is a type of joint marketing by a group of producers where each producer receives an average price from the sale of a product in an attempt to smooth returns over time.

Only 15% of the agro-SMEs adopted this strategy, which shows a very low uptake. The strategy was however ranked the 2nd most preferred strategy making it one of the preferred strategies. The relatively small proportion of adoption may be explained by findings by Boughner and Sumner (2000). Both scholars found that this strategy usually receives a relatively negative attitude because agro-entrepreneurs view it as a means of transferring ownership of a commodity to a marketing cooperative in exchange for an average return. In some instances, it is better to receive an average return than a loss, hence the strategy was preferred.

Agro-SMEs mentioned that they jointly pooled their harvests so that they could be marketed by the cooperative. This meant that ownership of the commodities was transferred to the cooperative and the cooperative management determined the best time to sell, where to sell and whether to subject the raw commodity to further processing. Growers agreed to accept the average return earned by the pool during the marketing season. The final return paid to participants was adjusted according to the relative quality of the delivered commodity. This method helped agro-SMEs by spreading marketing risk. The strategy came in handy in an environment plagued with pricing and marketing controls.

5.3.3.4 Forward Contracting

Forward contracting involves two parties entering into a legal agreement to buy or sell a product at a certain time in the future for a certain price, which is agreed upon the current day. The contract states

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that the buyer or seller acquires legal obligation to buy or sell a product at a specific future date at a certain price called a future price, which is fixed today. This is a feasible strategy to adopt usually when the business environment is characterised by a series of pricing and marketing controls, which bring uncertainty. Agro-SMEs use forward contracts as hedges against falling prices.

Thirty-eight per cent of the agro-SMEs adopted this strategy during the period when pricing and marketing controls were rife. The results show a low uptake. The strategy was ranked the 1st preferred strategy among other strategies showing that it was the most preferred strategy. These results show a disparity as the results indicate a low uptake yet at the same time, it was most preferred.

The relatively low adoption rate might be explained by the fact that such contracts were relatively few during the period in question and were difficult to come by. On the other hand, it was highly preferred because the agro-SMEs concern in business is to reduce uncertainty. In this case the agro-entrepreneurs' concern was to reduce price and market risk hence the strategy was most preferred. However, the majority of agro-SMEs that adopted this strategy were faced with production risk. They encountered challenges such as droughts and floods. Therefore, meeting the required produce agreed in the contracts became difficult for many. A considerable number of those who adopted this strategy ended up having legal cases.

5.3.3.4 Barter Trading

Instead of considering cash as the only medium of exchange, agro-SMEs saw the potential in barter trading. Exchanging goods for other goods became a feasible solution for most agro-SMEs. Only 38% of the agro-SMEs adopted barter trading as a strategy against pricing and marketing controls showing a low uptake. It was the least preferred strategy in preference ranking. In both cases, the strategy was not highly favourable. This might be because it is a traditional way of doing business therefore agro-SMEs shunned the strategy. Some agro-SMEs mentioned that in some instances they would trade maize for cattle and would later on sell at better prices.

5.3.3.6 Contribution of Strategies against Increased Pricing and Marketing Controls towards Survival – Statistical Analysis

A binary logistic analysis was conducted factoring in the type of enterprise and activity class. The type of enterprise and activity class was factored in because the pricing and marketing controls affected certain products more than other products. Thus, the type of enterprise and activity class played an important role in the success or failure of the strategies adopted. Results from the analysis are shown in Table 5.4. The analysis yielded significant results ($p < 0.05$) for both changing product or service line and cooperative marketing with price pooling. Both the type of enterprise and activity class however, were not significant ($p > 0.05$).

Statistical analysis results from Binary Logistic Regression shown in Table 5.4 indicate that the model with predictors in a significantly better model as it correctly predicts over 80% of the cases. Mode Chi-

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square had a value of 62.524, 7 degrees of freedom and a probability p = 0.000 which is significant ($p < 0.05$). Therefore, the model with predictors was statistically significant indicating that the predictors, as a set, reliably distinguished between positive and negative contribution towards agro-SME survival.

A Negelkerke R^2 value indicated that the model explains 59.0% of the variation in the outcome. Wald estimates revealed that changing product or service line and cooperative marketing remained significant ($p < 0.05$). The type of enterprise and activity class was not significant ($p > 0.05$). This indicates that type of enterprise and activity class did not play a significant role in the success or failure of the strategies listed.

Changing the product or service line and cooperative marketing with price pooling had positive and negative B values respectively. A positive B value for changing product or service line means that agro-SMEs which did not adopt this strategy had a higher chance of surviving increased pricing and marketing controls (recall that 1 = Adopted and 2 = Did not adopt). This was because the products and services affected mostly by the controls were basic goods that were required for day-to-day needs. These products included maize, beef, and wheat and therefore their demand was always high.

Changing production of these commodities would mean producing products with a lower demand, which affects returns in the end. Furthermore, changing production of one product to the other often requires a complete overhaul of the whole agro-SME, which requires huge capital. Most agro-SMEs were struggling during the period in question and would not have huge sums of capital for a complete change. This explains why agro-SMEs, which did not adopt this strategy survived better than those that adopted.

Cooperative marketing with price pooling had a negative B value which means that those who adopted the strategy had a higher probability of survival than those who did not (recall that 1 = Adopted and 2 = Did not adopt). This was so because cooperative marketing with price pooling provides a way of spreading risk against price and market risks. It is a logical strategy to adopt as the agro-SME is guaranteed of some profit, although it will be an average value.

5.3.4 Strategies Addressing Hyperinflation

The hyperinflationary environment expirienced between 2000 and 2010 posed a lot of challenges for the agro-SME sector. This resulted in volatile input prices, volatile output prices and uncertainty on returns. Agro-SMEs in the Kwekwe District adopted survival strategies shown in Table 5.3. Results indicate that the adopted strategies fell under three major categories. These are cost leadership strategies, sound financial management strategies and effective pricing strategies. Table 5.3 summarises survival strategies adopted against hyperinflation, adoption rates, preference ranks and how they contributed towards survival of agro-SMEs. Most of the adopted strategies contributed significantly towards agro-SME survival. Accepting alternative tender and converting local currency into stable foreign currency were adopted by all agro-SMEs. Both had a very significant contribution towards agro-SME survival. The

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least number of agro-SMEs adopted Next In First Out (NIFO) rather than Last In First Out (LIFO) and inflationary adjustment of capital and they had a marginal contribution towards agro-SME survival.

5.3.4.1 Cost Leadership Strategies

These strategies were adopted to create a low operational cost. The strategies that were mentioned by agro-SMEs from the survey include economies of scale and learning, buying in bulk, outsourcing, quality or quantity reduction and downsizing. Economies of scale exist when proportionate increase in inputs result in lower unit costs. A certain amount of fixed costs is involved in the establishment of a production plant and the production of any good or service. The more the production, the lower the cost of each unit produced. This is because the fixed costs are spread.

Fifty-eight per cent of the respondents indicated that they adopted economies of scale and learning as a strategy in order to reduce their production costs. The results show that the strategy had a high uptake. The strategy was one of the preferred. The high uptake may indicate that the strategy was relatively straightforward in terms of implementation and understanding. That might also explain why it was preferred. This may mean that every entrepreneur with at least average business acumen could think about it and successfully implement it. A common reaction to hyperinflation is cutting down costs as signified by both the high uptake and preference rank.

Examples of economies of scale mentioned by agro-SMEs include the division of labour and economies of learning. On the division of labour, agro-SMEs mentioned that they kept factor or input prices low by hiring and training inexperienced students rather than hiring trained individuals. Students from Kwekwe Poly Technical College and nearby Agricultural Colleges such as Mlezu and Rio Tinto were targeted as interns by agro-entrepreneurs in Kwekwe. Agro-SMEs also relied on hiring a few high earning managers or no managers at all. The staff savings allowed them to offer their products at a reduced price than their competitors.

With economies of learning, agro-SMEs indicated that they reduced costs through acquiring production experience. Research has proved that the human race has been able to evolve because of its ability to learn. It is commonly said we learn from mistakes and improve. Through repetition, individual skills are achieved, organisational routines are specialised to provide dexterity and problem solving. As a result, agro-SMEs were able to cut waste and find the most productive means of producing output on a bigger scale.

Other agro-SMEs adopted bulk buying as a strategy against hyperinflation. Purchasing factor inputs in bulk has a huge effect on costs. It is believed that the more you buy the more your suppliers will be willing to offer lower prices. Only 31% of the agro-SMEs adopted the strategy. The results show a low uptake rate. The strategy was least preferred. The low uptake and least preference highlight the impact of the challenging operating environment. Agro-entrepreneurs did not make adequate profits to raise the capital to buy their inputs in bulk.

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Although buying in bulk seems to be feasible under challenging environments, agro-SMEs found the implementation of the strategy difficult. This was because major factor inputs were scarce. Furthermore, in cases where these factor inputs could be found, they were very expensive beyond their reach. In many cases, suppliers of the factor inputs required cash up front, which was also scarce during the period in question. The government also passed laws against hoarding thereby making impossible to implement the strategy, thus leading to the low adoption rate as well as the least preference for this strategy.

Despite the difficult economic environment, some agro-SMEs indicated that they managed to manoeuvre their way through by acquiring inputs such as fuel, fertilizer and seed in bulk. However, a significant number of the agro-SMEs mentioned that they had some connections with suppliers of the necessary inputs they required. The suppliers would often convey the message to them when the inputs were available. Those in the restaurant industry adopted this strategy and implemented it through acquiring factor inputs such as cooking oil, rice and mealie meal in bulk from neighbouring countries such as South Africa and Botswana.

Outsourcing is when an agro-SME identifies activities that can be done by outsiders at a cheaper cost (Thompson, Strickland and Gamble, 2010). The strategy was adopted and implemented by agro-SMEs in peanut butter processing, cropping and mixed farming. In peanut butter processing the agro-entrepreneurs had to find outsiders to do the shelling process or rather opted to buy shelled groundnuts instead of unshelled groundnuts that would require them to buy an expensive sheller. It was economically viable to outsource than to buy a sheller, which required foreign currency that was in short supply and expensive. Those who were involved in cropping and mixed farming mentioned that instead of buying expensive fuel for land preparation, they would ask for tractors from the District Development Fund (DDF) to do the land preparation at a subsidised rate.

This strategy was adopted by 35% of the agro-SMEs, which was a low adoption rate. It was the 6th preferred strategy in preference ranking. This is the preferred zone. The results show some disparity. A small proportion adopted the strategy, whilst on the other hand it was preferred. The low uptake may signify that the implementation of the strategy under challenging operating environment is difficult. Everyone in business during this period faced some obstacles. Therefore, businesses that could offer services to other agro-SMEs were also very limited. Furthermore, since prices for all goods and services were skyrocketing it was not economically viable to adopt outsourcing under such circumstances. On the other hand, in preference ranking it was a matter of choices rather than logic. This meant that given a chance to choose, agro-entrepreneurs would prefer the strategy hence the disparity.

In order to reduce costs, some agro-SMEs mentioned that they reduced product quality or quantity. In as much as this strategy was adopted to reduce production costs, it was also done to increase competition with the cheap imports from South Africa and Botswana that had flooded the market. Agro-SMEs that adopted this strategy mentioned that they were aware that this strategy would compromise their

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products. However, in order to remain operational they had to compromise. For example, agro-SMEs in the dairy industry, mentioned that they chose not reduce their products' quality, but reduced quantities. The sizes of the containers for yoghurt and drinks were reduced from 150ml and 500ml to 100ml and 400ml, respectively, but prices of the former containers were maintained.

Manson (2007) also agrees that a number of firms used this strategy during hyperinflation. However, as Kotler (2002) and Thompson, Strickland and Gamble (2010) emphasise, it is important to note that this strategy is not ethical. This might explain why only 12% agro-SMEs adopted this strategy indicating that the strategy fell in the very low uptake zone. It might also be the reason why it was ranked the 11th out of 13 in the preference ranking where the strategy fell in the least preferred zone. Although the strategy may seem very simple to implement, the ethical issues surrounding the strategy as well as the issue of compromising product quality acted as a discouragement to the agro-SMEs in both cases.

Agro-SMEs also mentioned that they managed to drive costs down by either downsizing or downscaling. Agro-SMEs mentioned that they cut on highly specialised labour. For example, they employed one person where two people were required to cut costs. Those involved in cropping and mixed farming did one round of weeding instead of two to cut on weeding costs. Those in livestock production also mentioned that they downsized less profitable activities such as sheep production as it is less profitable.

Results showed that seventy-seven per cent of the agro-SMEs adopted this strategy that is a very high adoption rate. However, the same strategy was fairly preferred. Downsizing and downscaling is a practical solution under challenging operating environments. It is also important to note that adopting a strategy does not necessarily mean one prefers it. This might explain the discrepancy in the results between the two activities.

5.3.4.2 Sound Financial Management Strategies

Sound financial management refers to the administration of funds of a business to achieve its financial objectives. It involves financial planning, financial control and financial decision-making. Some of the sound financial management strategies mentioned in the survey correspond to the traditional hyperinflation strategies mentioned by Swanson (2007). These include the immediate use of cash, converting local currency into a stable foreign currency, dealing in cash payments only, inventory valuation based on NIFO rather than LIFO and inflationary adjustment of capital.

Agro-SMEs mentioned that they never left cash lying idle. They invested it either through purchasing some inputs or through lending it to others so it could generate interest. Some agro-SMEs mentioned that they used cash from payments as immediately as possible. The strategy was feasible during the hyperinflationary environment where the value of cash depreciated on a daily basis.

This strategy was adopted by all the agro-SMEs. The results show that the strategy fell in the very high uptake zone. In preference, ranking the strategy was ranked 3rd out of 13. This is the most preferred zone. The high uptake and most preference might be explained by the fact that agro-SMEs understood

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the risks involved in allowing the Zimbabwean dollar to remain idle and understood the time value of money. In order for them to remain afloat, they had to maintain the value of their income by never allowing cash to remain idle.

In a hyperinflationary environment, the value of domestic currency depreciated easily. Agro-SMEs mentioned that they kept a minimal proportion of their money in domestic currency and converted the remainder into a more stable currency. The US Dollar, which is currently the world's most freely traded currency, was one of the options available to them. However, some opted for the South African Rand (R) and some for the Botswana Pula (P).

All agro-SMEs adopted this strategy. Results show a very high uptake. The strategy was ranked the fourth out of 13 strategies, which shows that it was preferred. The strategy is a practical solution to hyperinflation and that is why the uptake rate was very high and why it was preferred. Furthermore, agro-entrepreneurs understood that due to hyperinflation their local currency had lost its value. It became viable to convert it into stable foreign currency otherwise, they would not survive the hyperinflationary period.

Agro-SMEs found it feasible to deal in cash payments only during the hyperinflationary period. Agro-SMEs mentioned that they did not deal with credits and indicated that they shortened credit periods during hyperinflation. Those who required credit were considered last or had their orders rejected. Agro-SMEs found it safe to complete transactions immediately, in cash. The time value of money became the most important thing to remember in order for them to survive the hyperinflationary period. Agro-SMEs who considered credit, made sure that a penalty was given to customers who did not stick to their payment plans.

A larger proportion of 73% adopted this strategy. The strategy fell in the high uptake zone. In preference ranking the strategy came out the 5th preferred strategy out of the 13 strategies mentioned. The strategy was preferred. Dealing in cash payments, as a strategy is a relatively simple strategy to implement, hence it was highly adopted and preferred. The results might also signify that agro-SMEs understood that a delay in receiving payment could threaten their profit margin, and therefore spell disaster.

Inventory valuation based on LIFO is probably the best strategy to implement in a stable economy. However, in a hyperinflationary environment, agro-entrepreneurs found out that NIFO becomes more feasible. As Swanson (2007) notes, NIFO reflects future inflation by valuing the cost of replacing inventory, whereas with LIFO, you risk under-pricing the value of your inventory and therefore erode its profit margin.

Only 4% of the agro-SMEs adopted this strategy. Results show a very low uptake. Results from the preference ranking show that it came out the 9th preferred strategy, which shows that it was fairly preferred. This strategy is rather a complex strategy to understand and implement. It requires someone who has a strong business background and knowledge, hence the low uptake and fair preference.

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In order to survive the hyperinflationary environment, there was need to develop an appropriate inflationary adjustment for capital so that the value of capital would not disappear. Only 4% of the agro-SMEs adopted this strategy. In preference ranking the strategy was least preferred. The strategy is difficult to understand and implement as it requires some complex calculations to develop an appropriate inflationary adjustment for capital. Most of the respondents were limited concerning this strategy because they lacked the necessary business knowledge to understand and implement the strategy.

5.3.4.3 Pricing Strategies

During hyperinflation, marketing becomes difficult as one need to constantly consider and compensate for the rapidly rising production costs. Speculation increases during hyperinflation and pricing policies become widespread. Agro-SMEs responded in different ways, some of them illegal. These strategies as profiled below include fluid pricing, accepting alternative tender and barter trading. Some of them correspond to the strategies mentioned by Swanson (2007).

Fluid pricing, also commonly known as real time pricing, involves changing prices to follow what is happening on the market during a specific time. In other words, a product's value is determined based on current market conditions. In this case, prices of goods kept changing according to inflation rates. As the rate of inflation increased, so did the prices of goods and services. Although it was illegal, agro-SMEs found it a viable strategy. Otherwise, they would not have survived the hyperinflationary period. Agro-SMEs mentioned that at times they increased prices weekly or daily or even on an hourly basis. All agro-SMEs adopted this strategy and it was most preferred. Although it was illegal, agro-SMEs found it relatively easy to implement as compared to other strategies, hence the high uptake and most preference. Furthermore, agro-SMEs saw it critical to react immediately to inflation rates in order to survive and remain operational.

Agro-SMEs mentioned that they accepted other forms of payment such as foreign currency and fuel coupons as a medium of exchange. These were relatively stable compared to the then weak Zimbabwean Dollar. Some agro-SMEs accepted foreign currency as a medium of exchange before the government had approved it as legal tender. The most common currencies accepted were the South African Rand, Botswana Pula and the US Dollar. Fuel coupons were also accepted by agro-SMEs to source fuel, which was a scarce commodity during the period in question. All the agro-SMEs adopted this strategy and this was one of the most preferred strategies. The strategy's simplicity in terms of implementation explains the relatively high uptake and most preference. Furthermore, the Zimbabwean Dollar had become worthless and agro-entrepreneurs had lost confidence in it. Therefore, accepting other forms of payment became one of the most probable solutions to survive.

Barter trading is the exchange of goods and services for other goods and services. This is an option that one can consider adopting in a hyperinflationary environment where the value of money is easily swept away. Agro-SMEs mentioned that they used word of mouth, let their friends know, told their friends to tell their friends and neighbours. They also had to be clear about what was being exchanged. This strategy

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requires one to consider fairness i.e. the agro-SMEs needed to consider the value of the goods to be exchanged on the open market. Some of the goods that were mentioned by agro-SMEs include maize for cattle, cattle for spares and farm implements such as disc harrows and carts.

A large proportion of 73% adopted this strategy, however, it was among the least preferred. This might be explained by the fact that barter trading is seen as a traditional and old-fashioned way of doing business. However, those who experienced the conditions during the 2000-2010 period saw it as a feasible strategy to adopt under the circumstances because they needed to survive, hence the disparity.

5.3.4.4 Contribution of Strategies Against Hyperinflation towards Survival – Statistical Analysis

A binary logistic regression was then conducted to statistically predict influence of adopted strategies against hyperinflation on agro-SME survival. The categories cost reduction strategies, sound financial management strategies and pricing strategies were used as predictors. Other factors included in the analysis were education, gender and the number of years since the agro-SME's establishment. Education plays a significant role in overall business success as identified in past research studies such as Marten (2005) and Zindiye (2008). The gender of the agro-entrepreneur in this case was important because most of the strategies required an aggressive approach in order to succeed. The number of years since establishment was factored in with the assumption that older agro-SMEs would survive hyperinflation better that younger agro-SMEs. Results of the analysis are shown in Table 5.4.

The results reveal that the model with predictors is a better model as shown by the improvement in the percentage correctness from 91.6% (Step 0) to 95.9% (Step 1). The Model Chi-square had 6 degrees of freedom, a value of 113.407 and $p = 0.000$ which is significant ($p < 0.05$). Therefore, the model with predictors is statistically significant, which indicates that the predictors, as a set, reliably distinguished between positive and negative contribution towards agro-SME survival. To test model strength, Negelkerke R^2 was used. For this test, Negelkerke R^2 was 87.1 % showing a very strong relationship between the predictors and their contribution towards survival of agro-SMEs. The Wald estimates indicated that none of the strategies had a statistically significant contribution towards agro-SME survival against hyperinflation as indicated by the insignificant results ($p > 0.05$). However, the gender of the agro-entrepreneur and number of years since establishment of the agro-SME had a significant contribution towards agro-SME survival ($p < 0.05$).

However, the B values for both gender and number of years since establishment were negative. Since influence of adopted strategy on survival was coded 0 = negative influence and 1= positive influence whereas gender was coded 1 = Males, 2 = Females, 3 = Co-ownership, the negative B values means that male owned agro-SMEs had a higher probability of surviving hyperinflation than female and co-owned agro-SMEs. On the other hand, younger agro-SMEs had a higher chance of surviving hyperinflation than older agro-SMEs.

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Male owned agro-SMEs stood a better chance of surviving hyperinflation because the business environment was difficult and required a lot of commitment in terms of time, tough decision making and often hustling in order to survive. On the other hand, younger agro-SMEs survived hyperinflation better than older agro-SMEs because they were established when the economy was already showing signs of collapse. Thus, they were born and bred in a hyperinflationary environment. Already they were exposed to the challenge and could cope better than those agro-SMEs that were established when the economy was still stable.

5.4 Summary

This chapter gave a profile of the survival strategies adopted by agro-SMEs in the Kwekwe District during economic recession and their influence on agro-SME survival. Data from the questionnaire survey and preference ranking was analysed. A frequency distribution analysis was used to determine the adoption rate. Matrix scoring was used to determine the preference ranks for the strategies. Content analysis of the responses given by agro-entrepreneurs during the survey was used to determine how the strategies were implemented.

Information was then presented whereby the adopted strategies were stated and explanations about what each strategy entails given. The implementation procedures for each strategy were described regarding the nature of implementation, the mode of implementation and the specific steps followed in implementing the strategies.

It is important to note that the adopted strategies may not necessarily mean that they were the best possible strategies available. Neither were the preferred strategies the best possible strategies for adoption. In other words, the strategies adopted by agro-entrepreneurs who participated in the survey were not exclusive. This explains why results from the questionnaire survey about the influence of adopted strategies on survival were complimented with results from Binary Regression. This was done to statistically validate the influence of adopted strategies on agro-SME survival.

Results from the questionnaire survey indicated that success varied from one agro-SME to the other. This can be explained by various factors including the implementation procedure and the scale at which it was adopted. It is therefore, recommended that agro-entrepreneurs use the most appropriate strategy that can help them overcome challenges posed by economic recession.

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Table 5.3: Adoption Rates, Preference Ranks and Influence on Survival

b) Input and Output Related Challenges

Strategies	Adoption rate	Preference rank	Influence of strategy on agro-SME survival		
			Marginal	Significant	Very significant
Challenge: Reduced demand for products					
Opening new markets	72	2	6	78	16
Superior customer care	64	1	13	75	12
Continuous improvement of products	44	5	18	55	28
Change or add the list of products	28	3	29	43	28
Give discounts/ special offers	20	4	0	80	20
Challenge: Emergence of parallel markets					
Information gathering	100	1	15	77	8
Competitive production	81	2	5	86	9
Challenge: Increased pricing and marketing controls					
Real time pricing	69	4	28	72	0
Change product or service line	42	3	36	55	9
Forward contracting	38	1	10	50	40
Barter trading	38	5	20	80	0
Cooperative marketing with price pooling	15	2	25	75	0
Challenge: Hyperinflation					
Accepting alternative tender	100	2	8	54	38
Fluid pricing	100	1	0	80	20
Never allowing cash to remain idle	100	3	0	80	20
Converting local currency into stable foreign currency	100	4	4	58	38
Downsizing or downscaling	77	8	55	40	5
Barter trading	73	12	37	42	21
Dealing with cash payments only	73	5	5	79	16
Economies of scale and learning	*58*	7	20	66	13
Outsourcing	35	6	11	56	33
Buying in bulk	31	10	50	37.5	12.5
Quality or quantity reduction	12	11	67	33	0
NIFO rather than LIFO	4	9	100	0	0
Inflationary adjustment of capital	4	13	100	0	0

Key: Likert scale ranges for preference ranking

- **Reduced demand of products:** 1 = most preferred, 2 to 3 = preferred, 4 = fairly preferred, 5 = least preferred.
- **Hyperinflation**: 1 to 3 = most preferred, 4 to 7 = preferred, 8 to10 = fairly preferred, 11 to13= least preferred
- **Increased pricing and marketing controls**: 1 = most preferred, 2 to 3 = preferred, 4 = fairly preferred, 5 = least preferred.
- **Emergence of parallel markets** 1 = most preferred, 2 = least preferred

Source: Author's Data Computation (2014)

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Table 5.4: Binary Logistic Regression Analysis Results

b) Input and Output related challenges

Challenge	Model Correctness		Model significance (Model Chi-square)			Model strength (Negelkerke R^2)	Relative contribution of each strategy (Wald statistic)			
	Step 0	Step 1	Value	df	Sig		Strategy/ Agro-SME characteristic	B	Wald	Sig
Hyperinflation	91.6	95.9	113.407	6	0.000	0.871	Cost leadership	2.417	1.928	1.165
							Sound financial management	0.176	0.011	0.917
							Pricing strategies	2.973	2.194	0.139
							Education	1.545	3.310	0.069
							Gender of entrepreneur	-1.930	6.043	0.014
							Years since establishment	-0.265	4.559	0.033
Reduced demand for products	72.0	73.8	63.859	7	0.000	0.599	Give discounts/ special offers	0.574	0.846	0.358
							Superior customer care	-3.035	11.113	0.001
							Opening new markets	-3.716	15.437	0.000
							Change or add the list of products	4.013	18.100	0.000
							Continuous improvement of products	-0.746	1.153	0.283
							Education	1.355	12.825	0.000
							Years since agro-SME establishment	-0.170	10.523	0.001
Increased pricing and marketing controls	73.8	83.2	62.524	7	0.000	0.590	Real time pricing	-0.397	0.215	0.643
							Change product or service line	3.069	19.005	0.000
							Cooperative marketing /price pooling	-2.472	8.270	0.004
							Forward contracting	0.570	0.746	0.388
							Barter trading	0.907	1.746	0.188
							Type of enterprise	-0.567	2.462	0.117
							Activity class	0.256	1.186	0.276
Emergence of parallel markets	73.8	83.2	85.772	6	0.000	0.735	Information gathering/Market research	15.362	15.678	0.000
							Competitive production	-3.273	11.800	0.001
							Years since agro-SME establishment	-0.122	5.138	0.023
							Type of enterprise	-0.813	1.885	0.170
							Activity class	-1.166	5.525	0.019
							Gender	-1.166	7.660	0.006

Key: *df = Degrees of freedom; Sig = p value; Cut value = 0.5

Source: Author's Data Computation (2014)

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6.1 Introduction

Climate change was another dimension of the challenging operating environment experienced by agro-SMEs in Kwekwe between 2000 and 2010. Various authors such as Chigwada (2005); Mano and Nhemachena (2007); Chikodzi and Mutowo (2012) have documented the reality of climate change during the period in question. Some of the evidence documented revealed that rainfall patterns became erratic, highly volatile and variable. The delayed onset of rains was a characteristic, which sometimes led to shorter and dry growing seasons. Wet seasons were characterised by mid-season dry spells. An increased frequency of droughts and floods was noted during the 2000-2010 period. As a result, agro-SMEs adopted various strategies in order to survive these challenges. .

This chapter gives a profile of the strategies adopted by agro-SMEs in the Kwekwe District during the 2000-2010 period in order to survive the challenges posed by climate change. The strategies are presented under the three main categories, which are strategies addressing crop related challenges, strategies addressing livestock related challenges and strategies addressing other climate change related challenges. Crop related challenges were grouped into two groups (A1 and A2) to aid presentation. The survival strategy options are stated, their characteristics explained and the different implementation procedures discussed. Data from the questionnaire survey and preference ranking is examined, analysed, and discussed.

Likert scales were employed to examine results from the questionnaire survey and preference ranking. The following scale ranges were adopted for the adoption rates: 1 to 24% – very low uptake, 25 to 49% – low uptake, 50 to 74% – high uptake and 75 to 100% – very high uptake. The Likert scale ranges for preference ranking vary from one challenge to the next. Therefore, these are specified per challenge (see key for Table 6.1).

Adopted strategies and their contribution towards agro-SME survival are presented in Table 6.1, Table 6.3 and Table 6.5. Contribution towards survival was measured on a Likert scale as marginal, significant and very significant. A frequency distribution analysis was used to determine the number of agro-SMEs that adopted specific strategies and the percentage contribution for the different classes, marginal, significant and very significant.

A binary logistic regression analysis was then conducted to statistically assess the contribution of adopted strategies towards agro-SME survival using the survival strategy options as predictors. The analysis was run twice. Firstly, the strategies were regressed in isolation assuming that all other factors are constant. However, in reality this is not the case. The success or failure of strategies adopted is influenced by other factors such as socio-demographic characteristics and agro-SME characteristics. This study analyses results, which factored in other factors.

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The analysis involved determining fitting models for the dependent variable (contribution of adopted strategies towards agro-SME survival) and the independent variables or predictors (survival strategies). This was done for each of the challenges faced during the challenging operating environment between 2000 and 2010. The results from the analysis are shown in Table 6.2, Table 6.4 and Table 6.6.

Parameters used in Chapter 5 were also employed to statistically assess the contribution of adopted strategies against climate change towards agro-SME survival. These are model correctness (classification tables), model significance (model Chi-square), model strength (Negelkerke R^2) and the relative contribution of each strategy towards survival (Wald Statistics).

6.2 Strategies Addressing Crop Related Challenges

6.2.1 Delayed or Late Onset of Rains

Traditionally, the planting season in Zimbabwe starts in late October. However, due to climate change rains have started coming as late as December in some years, although actual dates of onset vary from place to place and from year to year. The delayed or late onset of rains affects production as many farmers fail to plant on time. Those who plant with the first rains face the risk of replanting. It is important to note that, this challenge affected the considered agro-SMEs involved in primary production only. Therefore, out of the 26 agro-SMEs who participated in the survey, 21 were involved in primary production.

Agro-SMEs adopted survival strategies to mitigate the effects of the delayed or late onset of rains. Table 6.1 shows the survival strategies adopted, their adoption rates, preference ranks and their actual contribution towards survival of agro-SMEs. As shown in Table 6.1, strategies adopted against delayed or late onset of rains contributed mostly towards agro-SME survival marginally. Developing or expanding irrigation facilities was adopted by most agro-SMEs, however, it only managed to score the highest percentage contribution in the marginal category. This indicates that most agro-SMEs faced challenges in setting up and maintaining efficient irrigation systems during the period in question. This coupled with scarcity of water, power outages and shortage of spares might have contributed to unfavourable results on agro-SME survival. Only one agro-SME adopted dry planting and the strategy contributed marginally towards its survival.

6.2.1.1 Shifting Planting Dates

In order to mitigate the effects of delayed or late onset of rains, agro-SMEs mentioned that they shifted planting dates. Most agro-SMEs mentioned that they delayed planting and only planted when adequate rains were falling. Sixty-two per cent of the agro-SMEs adopted the strategy and it was one of the most preferred. The results reflect the possibility that agro-SMEs were well informed about the risks involved in planting during the normal planting dates in a changing climate. Agro-SMEs mentioned that it was rather wiser to delay planting until adequate rains started falling.

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The implementation procedure adopted by agro-SMEs in this survey depicts results from the CERES Maize Simulation (Makhado, 1996) run under five planting dates i.e. 15 October, 1 November, 15 November, 1 December and 15 December at 4 sites in Zimbabwe. Results from the model showed that late planting would not make maize production a viable activity under changing climate. It was concluded that maize production would depend on proper timing of planting dates in a changing climate. Likewise, agro-SMEs mentioned that they sometimes shifted the planting dates to 2 to 3 weeks before the normal planting dates to lengthen the growing season.

This strategy corresponds with farmer adaptations to climate change mentioned by Burke and Nobel (2010). They observed that farmers shift planting dates by a month or more from year to year-in response to climate variability. It was indicated that the shifting of planting dates should be planned properly with the help of information from well-trained extension and meteorological officers to ensure that critical and sensitive growth stages do not coincide with very harsh climatic conditions in the season. It is also important to consider seasonal weather outlooks and weekly updates to maximise on this strategy.

It should be noted that this strategy was also adopted against shorter, drier growing seasons. To mitigate the effects of shorter, drier growing seasons, agro-SMEs mentioned that this strategy was adopted with an intention to lengthen the growing season. It was indicated that whenever this strategy was employed for purposes of lengthening the growing season, other strategies such as dry planting, developing or expanding irrigation facilities and conservation of soil moisture were employed.

6.2.1.2 Soil Moisture Conservation

When faced with the delayed onset of rains, conservation of soil moisture becomes a priority. This might allow crops to be planted and germinate before the onset of rains. This strategy has the potential to modify the length of the growing season as it offers an important source of additional water.

Eighty-five per cent of the agro-SMEs adopted the strategy and was preferred. Regardless of issues concerning high labour demand for practices such as weeding and issues surrounding shortages of the necessary materials to use for mulching, results show that the strategy was highly adopted and preferably ranked. This might indicate that the strategy had a relatively high potential in mitigating the effects of late onset of rains.

Agro-SMEs indicated that they conserved soil moisture by reducing evaporation as much as possible. Some agro-SMEs mentioned that they conserved soil moisture by keeping fields free from weeds. Post planting weeding helped agro-SMEs to reduce competition for water between plants and weeds. Winter weeding helped conserve soil moisture for the plants when the cropping season began. Some agro-SMEs mentioned that they practised mulching by spreading crop residues, dry grass and leaves on the field. Among other benefits, mulching reduces evaporation of soil moisture and reserves it for the crops.

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It should be underscored that this strategy was also adopted against various challenges that will be explained later on in the chapter. These challenges are increased temperatures, highly unpredictable and varying rainfalls, mid-season dry spells and shorter drier growing seasons. Agro-SMEs indicated that they practiced soil moisture conservation to mitigate the effects of increased temperatures. They mentioned that they conserved soil moisture through reducing evaporation of the available soil moisture as much as possible. Practices such as winter ploughing and mulching helped them reduce evaporation of soil moisture. Some agro-SMEs who mentioned winter ploughing indicated that it was effective when done just after the winter rains.

Agro-SMEs also mentioned that they practised conservation of soil moisture from the little rainfall amounts received during unpredictable and varying rainfalls and mid-season dry spells. This was achieved through minimising runoff and evaporation. Agro-entrepreneurs mentioned that they reduced runoff by carrying out practices that encouraged infiltration of water into the soil and at the same time minimising evaporation. Digging potholes and infiltration pits was one practice that helped agro-entrepreneurs reduce water loss by runoff. The techniques encourage infiltration. Potholes and infiltration pits collect water when it is raining thus facilitating infiltration into the soil. Other practices include the construction of terraces, contour ridges and half-moons. All these practices were intended to reduce water loss through runoff and increasing infiltration into the soil. Another strategy mentioned by several farmers was planting vetiver grass, which reduces water runoff speed and therefore encourages infiltration.

6.2.1.3 Irrigation

Developing irrigation facilities becomes a priority when faced with late onset of rains. Ninety per cent of the agro-SMEs adopted the strategy, which depicts a very high uptake and that it was preferred. The results suggest that this is a feasible strategy that can be adopted to survive changing climatic conditions. Different irrigation systems were used by different agro-SMEs. Among them were sprinkler irrigation system, drip irrigation system, centre pivots and flood system. Agro-SMEs mentioned that they, however, faced some constraints in either setting up the irrigation facilities or maintaining an efficient irrigation system. This highlights the characteristics of the operating environment during the period in question, which was plagued by an economic recession and climate change. Therefore, they faced challenges such as lack of the necessary capital to set up the irrigation facilities due to the harsh economic environment. Interrupted irrigation schedules due to power and water cuts were also common. Some mentioned that they lacked foreign currency to import some of the necessary spares to repair their irrigation systems.

This strategy was also adopted to mitigate other challenges, which include increased temperatures, unpredictable and varying rainfall, mid-season dry spells and shorter, drier growing seasons. Irrigation was necessary as it increased the length of the growing season, helped alleviating water stress, expanded opportunities for switching planting dates and increased return on investment. Irrigation

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facilities also augmented rainfall thereby increasing productivity. This is a long-term strategy that one can invest in considering the continual and ever changing climatic conditions experienced globally.

The agro-SMEs emphasised that they ensured that their irrigation technologies would reduce evaporation as much as possible in order to minimise water loss in the face of increased temperatures. In this case, the flood irrigation system was less preferred as much of the water will be exposed and therefore lost. Some agro-SMEs mentioned that they adopted the use of clay pipes, a recently discovered technology. Clay pipes reduce water lost from the soil surface because water is applied directly to the root zone where it can be easily absorbed by the plants.

6.2.1.4 Grow Short Season or Early Maturing Varieties

Since the growing seasons became shorter, agro-SMEs opted to grow short season varieties that would mature early to compensate for the lost time due to the delayed onset of rains. In this case, where rainfall is the limiting factor, agro-SMEs mentioned that they opted for early maturing varieties. Previous research, however, reveals that agro-SMEs have little or no access to improved seed varieties and continue to recycle seed that has been exhausted after generations of cultivations (CIMMYT, 2004). Furthermore, accessing seed was difficult for agro-entrepreneurs due to the challenging operating environment that was being experiences in Zimbabwe between 2000 and 2010, in which scarcity of inputs like seed was a characteristic and fetched exorbitant prices.

The results show that 71% of the agro-SMEs adopted the strategy and it was among the most preferred. Despite all the shortcomings associated with the strategy, results showed that the strategy has potential in mitigating the effects of delayed onset of rains, hence the high uptake and most preference. Agro-SMEs mentioned specific short season maize varieties from the companies SeedCo and Pannar, which they preferred in cases where the onset of rains was delayed. SeedCo has very early and early maturing varieties. A very early maturing variety that was mentioned by agro-SMEs is SC403, commonly called Shoko (Monkey). SC513 and SC525, commonly known as Zebra (Mbizi), are early maturing varieties that were mentioned by agro-SMEs in Kwekwe District during the 2000-2010 period. All varieties have good heat and drought stress tolerance. From the company, Panner, Pan 6227 was mentioned as the preferred variety by agro-SMEs. This is an early maturing hybrid with high yield potential and is ideal for late planting.

The advantage of growing early maturing varieties is twofold. They can be planted early and be harvested before the end of the season or planted late in the season and be harvested by the end of the season. In this scenario, agro-entrepreneurs opted for the later because of the delayed onset of rains. This strategy was also adopted by agro-SMEs to mitigate other challenges like highly unpredictable and varying rainfall, mid-season dry spells and shorter, drier growing seasons. Agro-SMEs indicated that they grew short season or early maturing varieties to mitigate the effects of these challenges.

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6.2.1.5 Diversification

Agro-SMEs were also confronted with production risks due to late onset of rains. Therefore, they responded through diversifying. In the face of delayed onset of rains, agro-SMEs indicated that they diversified production by carrying out other activities that do not solely rely on natural rainfall. Results show that 71% of the agro-SMEs adopted the strategy showing a high uptake. However, the strategy was fairly preferred. Results suggest that this is a relatively feasible strategy to implement to mitigate the effects of late onset of rainfall. Despite the fact that it may be difficult to find efficient combinations of farming activities that can minimise risk as much as possible, the strategy was highly adopted and fairly preferred.

Agro-SMEs mentioned that they adopted both on-farm and off-farm diversification. On-farm diversification activities mentioned included crop diversification whereby agro-SMEs grew a number of different crops. This enabled them to reduce the risk of complete crop failure as different crops have varying degrees of drought and moisture stress tolerance. Another form of crop diversification mentioned by agro-SMEs includes the growing of drought resistant crops such as sorghum and millet. Sorghum and millet are small grains that have been proven to withstand high temperature stress than the commonly grown cereals like maize and wheat. It should be noted that crop diversification was also adopted against unpredictable and varying rainfalls, mid-season dry spells and shorter and drier growing seasons. This strategy allowed agro-entrepreneurs to spread the risk of complete crop failure.

Other on-farm diversification activities mentioned include the production of both crops and livestock. Incorporating livestock production helped offset losses in crop failure. In this case there was need to find efficient combinations of crops and livestock enterprises that would interlink. This was done in such a manner that the products of one enterprise can be used as inputs for the other enterprise. Common examples mentioned by agro-entrepreneurs include cattle rearing and crop production, broiler production and horticulture. Cattle provided manure for the crops and the broilers provided manure for the horticulture crops respectively. Some agro-SMEs indicated that instead of relying on on-farm activities alone, they also took up off-farm employment. This corresponds to the findings by Burke and Lobell (2010) who view diversifying through taking up off-farm employment as a promising strategy in the face of changing climate. This strategy was also adopted to mitigate a variety of challenges including increased temperatures, unpredictable and varying rainfall, mid-season dry spells and shorter, drier growing seasons.

6.2.1.6 Change from Crops to Livestock

Farmers make decisions about changing from crops to livestock basing on changing climatic conditions. In this case, agro-SMEs found it difficult to produce crops efficiently due to the shortened growing season. They encountered major losses in crop production as they were sometimes forced to replant. Only 29% of the agro-SMEs adopted this strategy indicating a low uptake. Likewise, the strategy was

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fairly preferred. Results suggest that change is difficult to embrace. It comes with extra costs as it may mean restructuring of the whole farm hence the low adoption rate and fair preference.

Livestock provide more flexibility to some agro-entrepreneurs under changing climatic conditions. As temperature warms, agro-entrepreneurs will raise more livestock. Agro-entrepreneurs mentioned that they switched from crop production to sheep and goat production. Sheep and goats can adapt better to harsh climatic conditions than crops. This strategy was also adopted by agro-SMEs to mitigate other challenges like increased temperatures, unpredictable and varying rainfall, mid-season dry spells and shorter drier growing seasons.

6.2.1.7 Dry or Early Planting

Some agro-SMEs opted for dry or early planting to deal with the late onset of rains. Only 14% of the agro–SMEs adopted this strategy, which shows a very low uptake. Likewise, the strategy was among the least preferred. Results depict the magnitude of the demerits associated with this strategy. This strategy required agro-SMEs to source seed varieties that could stay in the soil for some time before the rains. Agro-SMEs who adopted this strategy mentioned that they faced a major risk of loss of seed due to rotting. This was encountered under circumstances where the rains would come but would not be sufficient for germination, as a result, the seed would rot away in the soil. For this strategy to be effective, agro-SMEs needed to consider climatic forecasts of the season and rely heavily on meteorological and extension officers more often. This strategy was also adopted to mitigate other challenges including unpredictable and varying rainfall and shorter, drier growing seasons.

6.2.1.8 Prayer or Ritual Offerings

Some agro-SMEs indicated that they resorted to either prayer or ritualised requests for rains to a higher power. Christians prayed for rains in Church and African traditional believers observed rainmaking ceremonies. Only 4% of the agro-SMEs adopted the strategy and the strategy was least preferred. Results may indicate that the agro-SMEs now put more emphasis in Science rather than religion when it comes to climate issues. Moreover, this strategy came with many shortcomings. In some cases, ceremonies were held but rains had failed to materialise hence the very low uptake and least preference.

6.2.1.9 Contribution of Strategies against Delayed Onset of Rains towards Survival – Statistical Analysis

The statistical analysis factored in activity class, gender, age, and educational level of agro-entrepreneur. The results are shown in Table 6.2 and they indicate that there was an improvement in percentage correctness from the constant only model to the model with predictors. This is shown by the change in the percentage correct from 50% to 88.5%. Model Chi-square had a value of 14.936, 12 degrees of freedom and a probability $p = 0.245$ which is insignificant ($p > 0.05$). Negelkerke R^2 indicated that 58.3% of the cases are explained in the outcome variable.

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Wald statistics indicated that irrigation had a negative B value. This means that those who adopted the strategy had a better chance of surviving delayed or late onset of rains (1 = Adopted, 2 = Did not adopt) and these results were significant ($p < 0.05$). These results may be explained by the fact that irrigation is a feasible strategy to adopt against delayed or late onset of rains. It lengthens the growing season and therefore the production season can be started well before the onset of rains. Neither the socio-demographic characteristics of agro-entrepreneur nor activity class had a significant influence on agro-SME survival ($p > 0.05$). This means that although these variables are important in determining the success or failure of the listed strategies, they were insignificant.

6.2.2 Strategies Addressing Increased Temperatures

Climate change experts have observed that global surface temperatures have increased considerably since the turn of the century. In Zimbabwe, it has been observed that the number of warm days has increased. There is growing evidence that increases in global warming has significantly affected agricultural production in Zimbabwe. Increases in temperature slow down rather than stimulate plant growth. Thus, a reduced crop growth period due to increased temperatures during the grain filling and ripening stages is the main factor contributing to reduced productivity.

Agro-SMEs in Kwekwe adopted strategies to address the effects of increased temperatures over the period under review. Table 6.1 shows the strategies adopted, their adoption rates, preference ranks and their contribution towards survival for each strategy. The results in Table 6.1 show that most of the strategies adopted against increased temperatures contributed significantly towards agro-SME survival. Soil moisture conservation that reduces evaporation contributed towards the survival of a large number of agro-SMEs in this category. This reflects that soil conservation techniques that aim at reducing evaporation provide the logical solution against increased temperatures. The least number of agro-SMEs adopted changing from crops to livestock. Rarely did the strategy manage to contribute towards the survival agro-SMEs either significantly or very significantly.

6.2.2.1 Drought Tolerant Varieties

The use of drought tolerant varieties improves the chances of successful harvests and ensures higher productivity despite the adverse effects of increased temperatures. Seventy-six per cent adopted this strategy showing a very high uptake and the strategy was preferred. This might be explained by the fact that agro-SMEs understood that drought tolerant varieties stood a better chance in high temperature stress. The results may also signify that agro-SMEs were well aware of the impact of increased temperatures on productivity. Agro-SMEs indicated that they faced shortages of seed and this forced them to buy whatever was available on the market during the 2000-2010 period. Please note that this strategy was adopted against a wide range of challenges including unpredictable and varying rainfall, mid-season dry spells and shorter, drier growing seasons

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6.2.2.2 Irrigation Techniques that Minimise Evaporation Loss

A detailed explanation of the strategy and its implementation is given in Section 6.2.1.3. In this case, agro-SMEs adopted those techniques that minimised evaporation loss due to increased temperatures. Ninety per cent of the agro-SMEs indicated that they adopted this strategy against increased temperatures, thus showing a very high rate of uptake. The strategy was also the most preferred strategy. This indicates that the strategy can be very significant in mitigating the effect of increased temperatures on production. This may imply that agro-SMEs were well informed of the potential that irrigation has in increasing production as well as the fact that production can be done throughout the year.

6.2.2.3 Soil Moisture Conservation Techniques that Reduces Evaporation

A detailed explanation of the strategy and its implementation is given in Section 6.2.1.2. In this case, the strategy was adopted by 86% of the agro-SMEs. The strategy was 3rd on the preference ranking. The strategy had a very high uptake and was among the preferred strategies. The strategy is associated with relatively high costs in winter ploughing and mulching. It requires draft power, mechanical implements and labour. Results suggest that the need to survive that confronted agro-SMEs compelled them to adopt the strategy despite the relatively high costs associated with the strategy. Therefore, they had to try everything possible to ensure survival.

6.2.2.4 Change from Crops to Livestock

A detailed explanation of the strategy and its implementation is given in Section 6.2.1.6. Some agro-SMEs mentioned that they shifted from crops to livestock production. Livestock is better adaptable to increased temperatures than crops. The Agro-SMEs indicated that they considered wildlife, goat, piggery and beef production as they could withstand higher temperatures than crops. Only 14% of the agro-SMEs adopted this strategy, which shows a very low uptake. The strategy was the least preferred. This might be because change is difficult to embrace, as it is associated with extra costs and sometimes calls for complete restructuring of the whole operation hence the low uptake and least preference.

6.2.2.5 Crop Diversification, Incorporating Small Grains

A detailed explanation of the strategy and its implementation is given in Section 6.2.1.5. Seventy-one per cent of the agro-SMEs adopted the strategy and it was ranked third, the same position with conservation of soil moisture. The strategy had a high uptake and was preferred. Crop diversification comes in handy as a strategy against increased temperatures as it allows risk to be spread among different enterprises. It also reduces the risk of complete crop failure as the different crops are affected differently by increased temperature stresses. This might explain why agro-SMEs largely opted for the strategy and why it was among the preferred strategies. However, agro-SMEs were concerned that the optional drought resistant crops such as sorghum and millet are not highly marketable. Their demand is relatively very low on the market as compared to maize. Despite that, agro-SMEs found the strategy feasible.

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6.2.2.6 Contribution of Strategies against Increased Temperatures towards Survival – Statistical Analysis

The activity class was factored into the analysis as it is an important variable in determining the success or failure of the adopted strategies. Results are shown in Table 6.2. Results revealed that there was an improvement in model correctness between the constant only model and the model with predictors. This is shown by the change in percentage correct from 65.4% to 80.8%. The model Chi-square had a value of 15.845, 6 degrees of freedom and a significant p value of 0.015 ($p < 0.05$). This means that the predictors as a set reliably distinguish between positive and negative contribution of adopted strategies towards survival. Negelkerke R^2 indicated that 60.8% of the cases are explained in the outcome variable.

The Wald estimates revealed that although the activity class was an important variable for inclusion in the analysis it was insignificant ($p > 0.05$). The results also indicated that crop diversification incorporating small grains had a positive B value. Thus, agro-SMEs, which did not adopt this strategy had a higher probability of surviving increased temperatures (1 = Adopted 2 = Did not adopt). Results indicate that this was the only significant strategy to adopt against increased temperatures ($p < 0.05$). These results might be explained by the fact that, although crop diversification, incorporating small grains is a competitive strategy, small grains have a very limited market. Generally, people prefer maize and wheat than sorghum and millet, hence those who adopted the strategy stood a very small chance of surviving against increased temperatures.

6.2.3 Strategies Addressing Unpredictable and Varying Rainfall

During the 2000-2010 period, rainfall in Zimbabwe has been highly unpredictable and varying. Due to its vulnerability to climate change, Zimbabwe experienced unstable rainfall patterns. Mano and Nhemachena (2007) observed that sometimes rainfall was erratic, highly volatile and varying. Sporadic showers were also common. In some instances heavy downpours were followed by long dry spells occurred. This posed some challenges for the agro-SME sector. Agro-SMEs in the Kwekwe District were compelled to adopt strategies shown in Table 6.1. The adoption rates, preference ranks and actual contribution towards survival are shown in Table 6.1. As results show in Table 6.1, most of the strategies adopted against unpredictable and varying rainfalls contributed significantly towards agro-SME survival. A large proportion of agro-SMEs indicated that growing short season and drought tolerant varieties significantly contributed towards their survival. This indicates that growing short season varieties that are at the same time drought tolerant yields better results under unpredictable and varying rainfalls. The adopted strategies rarely contributed towards agro-SME survival at a very significant scale. This signifies the intensity of unpredictable and varying rainfalls towards agro-SME survival.

6.2.3.1 Irrigation

This strategy is addressed in detail under Section 6.2.1.3. The results show that the strategy was adopted by 90 % of the agro-SMEs, thus showing a very high uptake rate. The strategy was one of the most preferred ones. The results highlight the ability of the strategy to augment unpredictable and

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varying rainfall amounts. Irrigation facilities can thus help increase the chances of higher production levels. Despite the challenges encountered in setting up and maintaining the irrigation systems the results demonstrate that the strategy comes in handy in cases where rainfall is unpredictable and varying.

6.2.3.2 Soil Moisture Conservation by Reducing Evaporation and Runoff

This strategy is addressed in detail under Section 6.2.1.2. Results show that 86% of the agro-SMEs adopted the strategy, thus showing a very high rate of uptake. The results also show that the strategy was the most preferred as it was ranked the 1st. This might indicate that the agro-SMEs were well informed regarding the importance of conserving soil moisture as an important source of water for crops. Soil moisture conservation techniques used by agro-SMEs to reduce evaporation and runoff include mulching, tied contour ridges, infiltration pits, terraces, potholes, growing vetiver grass.

6.2.3.3 Crop Diversification, Incorporating Drought Tolerant Crops

This strategy is addressed in detail under Section 6.2.1.5. The results show that 76% of the agro-SMEs adopted the strategy and the strategy was preferred. This might be explained by the fact that agro-SMEs understood that through engaging in production activities that make efficient use of the available water serve as an important form of reducing risk against rainfall variability. Drought tolerant crops such as sorghum and millet, rather than maize and wheat, were incorporated in order to reduce risk of devastating crop failure. Small grains such as sorghum and millet have a proven ability to tolerate drought related stress caused by unpredictable and varying amounts of rainfalls.

6.2.3.4 Grow Short Season Varieties that are Drought Tolerant

This strategy was also adopted in the face of a late onset of rainfall as well as high temperatures and is addressed in detail under Sections 6.2.2.1 and 6.2.2.4. The results show that 62% of the agro-SMEs adopted the strategy and it was fairly preferred. In the case of unpredictable and varying amounts of rainfall, agro-SMEs chose to grow short season varieties that have significant heat and drought tolerance in order to stand a better chance of survival. Despite the fact that these seed varieties were scarce on the market, expensive, rely heavily on fertilizers, chemicals and irrigation for high yields, these seed varieties were the most reasonable and affordable solution to reduce the risk of failure.

6.2.3.5 Change from Crops to Livestock

This strategy is addressed in detail under 6.2.1.6. Only 10% of the agro-SMEs opted to change from crops to livestock as a result of the unpredictable and varying rainfalls experienced during the 2000-2010 period. Results from preference ranking show that the strategy was ranked the last of the 6 strategies. These results show a very low rate of uptake and the least preference. This might relate to the fact that changing from crops to livestock requires a complete overhaul of the whole operation. This means that there are excessive costs involved. This might explain why most agro-entrepreneurs shunned the strategy over the other strategies.

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6.2.3.6 Dry or Early Planting

This strategy is addressed in detail under 6.2.1.7. The results, however, show that only 19% of the agro-SMEs adopted dry or early planting as a way to mitigate challenges posed by unpredictable and varying rainfall. The strategy was the 5th preferred strategy out of the 6. This shows that the strategy had a very low rate of uptake and was fairly preferred. Results deduce that agro-entrepreneurs considered the risk involved in losing the seed if it failed to germinate. Considering that seed was scarce and or expensive, most agro-entrepreneurs did not consider dry or early planting as a reasonable solution to mitigate the effects of unpredictable and varying rainfalls hence the low uptake and fair preference.

6.2.3.7 Contribution of Strategies against Unpredictable and Varying Rainfalls on Survival – Statistical Analysis

The analysis factored in activity class, which is an important variable in determining the outcome of the listed strategies. Results as shown in Table 6.2 yielded significant results for dry or early planting ($p < 0.05$). The activity class was not significant ($p > 0.05$) meaning although it is an important variable to consider in the analysis it is not significant in determining the influence of adopted strategies towards survival.

The results also revealed that there was a difference in model correctness between the constant only model and the model with predictors. Percentage correct changed from 65.4% to 84.6%. The model I Chi-square had a value of 14.851, 7 degrees of freedom and a significant p value of 0.038 ($p < 0.05$). Negelkerke R^2 scored 0.580 revealing that 58% of the cases are explained in the outcome variable.

Dry or early planting had a positive B value. As a result, agro-SMEs which did not adopt this strategy had a higher chance of surviving unpredictable and varying rainfall than those which adopted (1 = Adopted, 2 = did not adopt). These results were significant ($p < 0.05$). This is because dry or early planting is a risky strategy to adopt. There is the risk of losing out when seed rot away in the soil and fail to germinate. That is why those agro-SMEs that adopted the strategy had a low probability of surviving this challenge.

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Table 6.1: Adoption Rates, Preference Ranks and Actual Contribution of Strategies towards Survival

A1) Crop Related Challenges

Strategies	Adoption rates (%)	Preference rank	Actual Contribution of Adopted Strategy towards survival (%)		
			Marginal	Significant	Very significant
Challenge: Delayed or late onset of rains					
Develop/ expand irrigation facilities	90	4	47	37	16
Soil moisture conservation	85	3	44	44	12
Grow short season/ early maturing varieties	71	2	53	40	7
Diversification	71	5	47	47	6
Shifting planting dates	62	1	54	38	8
Change from crops to livestock	29	6	50	50	0
Dry planting	14	7	100	0	0
Prayer or ritual offering	4	8	67	0	33
Challenge: Increased temperatures					
Irrigation techniques	90	1	16	74	10
Soil moisture conservation	86	3	11	78	11
Drought resistant varieties	76	2	13	75	12
Crop diversification (small grains)	71	3	20	67	13
Change from crops to livestock	14	4	100	0	0
Challenge: Unpredictable and varying rainfall					
Irrigation	90	2	21	79	0
Soil moisture conservation	86	1	17	83	0
Crop diversification (drought resistant crops)	76	3	81	19	0
Grow short season/ drought tolerant varieties	62	4	15	85	0
Dry or early planting	19	5	50	50	0
Change from crops to livestock	10	6	50	50	0

Key: Likert scale ranges for preference ranking

- **Delayed onset of rains**: 1 to 2 = most preferred, 3 to 4 = preferred, 5 to 6 = fairly preferred, 7 to 8 = least preferred
- **Increased temperatures**: 1 = most preferred, 2 to 3 = preferred, 4 = fairly preferred, 5 = least preferred.
- **Unpredictable and varying rainfalls:** 1 to 2 = most preferred, 2 to 3 = preferred, 4 to 5 = fairly preferred and 6 = least preferred.

Source: Author's Data Computation (2014)

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Table 6.2: Binary Logistic Regression Analysis Results

A1) Crop Related Challenges

Challenge	Model correctness		Model significance (Model chi square)			Model strength (Negelkerke R^2)	Relative contribution of strategy towards survival (Wald statistic)			
	Step 0	Step 1	Value	df	Sig		Strategy	B	Wald	Sig
Delayed or late onset of rains	50	88.5	14.936	12	0.245	0.583	Shifting planting dates	1.098	0.645	0.422
							Soil moisture conservation	-1.967	1.076	0.299
							Develop/ expand irrigation facilities	-6.156	4.031	0.045
							Grow short season/ early maturing varieties	-0.935	0.151	0.697
							Diversification	2.848	1.671	0.196
							Change from crops to livestock	0.350	0.052	0.820
							Dry planting	3.032	0.536	0.464
							Prayer or ritual offering	4.624	3.652	0.056
							Activity class	-0.191	0.438	0.508
							Gender	2.500	2.138	0.144
							Age	-2.675	3.502	0.061
							Educational level	-0.451	0.386	0.535
Increased temperatures	65.4	80.8	15.845	6	0.015	0.608	Drought resistant varieties	0.008	0.000	0.996
							Irrigation techniques	-2.231	2.587	0.108
							Soil moisture conservation	-3.673	3.522	0.061
							Change from crops to livestock	2.036	1.783	0.182
							Crop diversification incorporating small grains	3.097	5.768	0.016
							Activity class	-0.080	0.056	0.812
Unpredictable and varying rainfall	65.4	84.6	14.851	7	0.038	0.580	Irrigation	-0.376	0.064	0.800
							Soil moisture conservation	-1.610	1.293	0.256
							Crop diversification, drought resistant crops	-0.520	0.134	0.714
							Grow short season/ drought tolerant varieties	-1.287	0.642	0.423
							Change from crops to livestock	-0.431	0.101	0.751
							Dry or early planting	3.836	5.436	0.020
							Activity class	-0.199	0.426	0.514

Key: *df = Degrees of freedom; Sig = p value; Cut value = 0.5

Source: Author's Data Computation (2014)

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6.2.4 Strategies Addressing Mid-Season Dry Spells

A number of wet seasons during the 2000-2010 were characterised by mid-season dry spells. In many instances, long dry spells followed heavy downpours. This posed challenges to agro-SMEs. The mid-season dry spells sometimes coincided with the critical stages of plant growth such as pollination and grain filling stages. This negatively affects the overall productivity. Agro-SMEs adopted various strategies to address these issues. Table 6.3 shows the results, in which most of the adopted strategies against mid-season dry spells contributed towards survival marginally and significantly. The adopted strategies hardly contributed towards survival on a very significant scale. Growing short season varieties contributed significantly towards the survival of a large proportion of agro-SMEs. Changing from crops to livestock managed to contribute towards survival in the marginal category.

6.2.4.1 Irrigation

This strategy is addressed in detail under Section 6.2.1.3. A large proportion of 77% adopted the strategy and it was ranked the 1st. Results show a very high uptake and most preference attached to the strategy. The reason for high favourability in both cases might be, among other reasons, that this is a long-term strategy that can as well increase production and revenue not only against mid-season dry spells but also against a whole lot of other challenges brought about by changes in climate.

6.2.4.2 Soil Moisture Conservation by Reducing Evaporation and Runoff

This strategy is addressed in detail under Section 6.2.1.2. The results show that 61% of the agro-SMEs conserved soil moisture as a way of mitigating challenges posed by mid-season dry spells. The results also show that the strategy was ranked 2nd and was among the preferred strategies. This might indicate that agro-SMEs were well informed on the ability of the strategy to address moisture stress and maximise the little rainfall received during the season, hence the strategy was preferred adoptable.

6.2.4.3 Grow Short Season Varieties that are Drought Tolerant

This strategy is addressed in detail under Sections 6.2.2.1 and 6.2.1.4. The results show that 58% of the agro-SMEs adopted the strategy. However, the strategy was ranked 4th out of 5. In addition, the results indicate a high rate of uptake and a fair preference. As explained earlier, survival was the highest priority. Agro-SMEs had to adopt even undesirable strategies to stay afloat. This reveals that adopting a strategy does not mean one prefers it. Despite the challenges surrounding the strategy, which includes the scarcity of hybrid seeds on the open market, the high cost and their heavy reliance on fertilizers and chemicals for high yields, agro-SMEs had to consider the issue of survival, hence the high rate of uptake and fair preference.

6.2.4.4 Crop Diversification, Incorporating Drought Tolerant Crops

This strategy is addressed in detail under Section 6.2.1.5. A relatively large proportion of 62% adopted this strategy to mitigate the effects of mid-season dry spells. The strategy was also ranked 3rd out of 5. The results show a high uptake rate and the strategy was among the preferred strategies. Crops such as

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sorghum and millet are better adapted to changing climate than the usual crops like maize and wheat hence the high rate of uptake and preference. However, agro-SMEs raised a concern that drought tolerant crops have a low demand on the market. Consumers opt for the traditional cereals, maize and wheat.

6.2.4.5 Change from Crops to Livestock

This strategy is addressed in detail under 6.2.1.6. Only 15% of the agro-SMEs indicated that they adopted the strategy and the strategy was ranked the last. Results show a very low uptake rate and least preference. The reason, as explained earlier, is that change is difficult to embrace. It is associated with the fear of the unknown, hence the low uptake and least preference.

6.2.4.6 Contribution of Strategies against Mid-Season Dry Spells towards Survival – Statistical Analysis

Activity class was factored into the analysis and the results are shown in Table 6.4. The results show a percentage correct improvement from 57.7% to 73.1% between constant only model and model with predictors. The Model Chi-square had a value of 12.511, 6 degrees of freedom and a p value of 0.05, which is significant ($p > 0.05$).

Negelkerke R^2 shows that the model explains more than 51% of the variation in the outcome variable. Wald estimates revealed that changing from crops to livestock was significant ($p < 0.05$). However, the activity class was not significant ($p > 0.05$) although it is an important variable.

A positive B value for changing from crops to livestock means that those who did not adopt the strategy had a higher chance of surviving mid-dry spells than those who adopted it (1 = Adopted, 2 = Did not adopt). This is because changing from crops to livestock normally requires a complete overhaul of the whole premises, which requires large sums of capital and proper planning. Furthermore, it usually takes time to establish a new business and for it to run to full capacity. Livestock enterprises are also affected by climate change. All these factors ruin the chances of survival hence those who adopted changing from crops to livestock had lesser chances of surviving mid-season dry spells.

6.2.5 Strategies Addressing Shorter and Drier Growing Seasons

This challenge comes with a combination of challenges, which include the late onset of rains, unpredictable and varying rainfall and increased temperatures. The late onset of rains shortens the wet growing season. Increased temperatures, unpredictable and varying rainfall reduce moisture in the season. Agro-entrepreneurs adopted different strategies to mitigate the effects of shorter, drier growing seasons. The results, as shown in Table 6.3, reveal that most of the strategies adopted against shorter, drier growing seasons contributed towards agro-SME survival significantly. Growing short season varieties that are drought tolerant scored the highest percentage contribution in this category. The least number of agro-SMEs adopted changing from crops to livestock and dry or early planting. However, the strategies rarely managed to contribute towards survival beyond marginal contribution.

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6.2.5.1 Shifting Planting Dates

This strategy is addressed in detail under Section 6.2.1.1. Shifting planting dates was done with an intention to lengthen the growing seasons. Results show a high uptake with 57% adopting this strategy to mitigate the effects of shorter drier growing seasons. The strategy was among the most preferred strategies. In both cases, the strategy was favourable. This may indicate the possibility that the agro-SMEs were aware that the strategy had been tried and tested and has resulted in improved yields. It may also reflect that they were fully aware that taking advantage of the lengthened growing season would yield better results.

6.2.5.2 Grow Short Season Varieties that are Drought Tolerant

This strategy is addressed in detail under Sections 6.2.2.1 and 6.2.1.4. Since the growing seasons were shorter and drier, agro-SMEs grew short season drought tolerant varieties. Short season varieties mature faster. Drought tolerant varieties withstand drier conditions. In this case, yields are improved. Sixty-two per cent of the agro-SMEs adopted this strategy against shorter, drier growing seasons. The strategy was also preferred. Agro-SMEs demonstrated that they were well informed of the advantages of using such, varieties hence the high preference.

6.2.5.3 Irrigation

This strategy is addressed in detail under Section 6.2.1.3. The results show that 90% of the agro-SMEs adopted this strategy and at the same time, the strategy was most preferred. Despite the fact that it is expensive to set up an irrigation system, agro-SMEs chose this strategy due to its demonstrated potential to alleviate moisture constraints, lengthen the growing season and increase returns.

6.2.5.4 Crop Diversification, Incorporating Drought Resistant Crops

This strategy is addressed in detail under Section 6.2.1.5. The results show that a considerably high proportion of 71% adopted the strategy and the strategy was less preferred. The results show incongruence. This might be explained by the available options under the difficult operating environment. Adopting a specific strategy would be the only reasonable option in order to survive this challenge. It does not necessarily have to be a preferred strategy. The fact that drought resistant crops such as sorghum and millet are not very popular on the market makes the strategy less preferable. However, the option had to be taken in order for the operation to survive, hence the disparity.

6.2.5.5 Soil Moisture Conservation by Reducing Evaporation

This strategy is addressed in detail under Section 6.2.1.2. A large proportion of 86% adopted soil moisture conservation as a strategy to address the effects of shorter, drier growing seasons. The strategy had a very high uptake rate and it was among the preferred strategies. These results presume that despite the high labour demand associated with soil moisture conservation, agro-SMEs found it a useful strategy as this can play a vital role in providing additional water that can be used to lengthen the growing season.

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6.2.5.6 Change from Crops to Livestock

This strategy is addressed in detail under Section 6.2.1.6. Only 9% adopted this strategy, which shows a very low uptake rate. The strategy was ranked last showing that it was least preferred. This was possibly because most people find it difficult to embrace change as it is associated with a completely new set of risks and uncertainties hence the low uptake and least preference.

6.2.5.7 Early or Dry Planting

This strategy is addressed in detail under 6.2.1.7. Results show that only 9% adopted the strategy and the strategy was ranked 6th out of 7. The Likert scale results show a very low uptake rate and a fair preference for the strategy. Early or dry planting is associated with the risk that the seed will rot if rains were to come but will be not enough to facilitate germination.

6.2.5.8 Contribution of Strategies against Shorter, Drier Growing Seasons towards Survival – Statistical Analysis

The statistical analysis factored in activity class, which was assumed to have an influence on strategies, adopted yielded results shown in Table 6.4. The results show an improvement in model correctness from 65.4% to 84.6%. The Model Chi-square had a value of 20.986, 8 degrees of freedom and a p value of 0.007, which is less than 0.05 and therefore significant. Negelkerke R^2 the model explains 73.8% of the cases in the outcome variable.

The Wald criterion revealed that dry or early planting had a positive B value. This means that those who adopted the strategy had a lower chance of surviving shorter, drier growing seasons (1 = Adopted 2 = Did not adopt) and these results were significant ($p < 0.05$). This is because the strategy is associated with major drawbacks such as the risk of losing out the expensive and scarce seed from rotting in the soil. Activity class was however insignificant ($p > 0.05$) meaning the success or failure of the listed strategies was not determined by activity class and these results were insignificant.

6.2.6 Strategies Addressing Greater Risk of Plant Diseases and Pests

Plant diseases and pests increase in the event of climate extremes such as floods and temperature increases. Climate affects agricultural pests as temperature, light and water are the major factors controlling their growth and development. The increase in plant pests also enhances plant diseases. Stalk bores, locusts and weevils are some of the pests that increased in numbers during climatic extremes. The risks of maize cob rot, mildew and grey leaf spot diseases also increased.

This had a very significant bearing on the productivity and quality of produce. Agro-entrepreneurs adopted survival strategies to address the challenge. Table 6.3 shows the results, where it is evident that the strategies adopted against the greater risk of plant diseases and pests contributed towards agro-SME survival significantly. Good cropping practices contributed towards the survival the highest proportion of 74% of the agro-SMEs in this category. Change from crops to livestock was adopted by the

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least number of agro-SMEs and only contributed towards survival marginally. This challenge was only encountered by 21 agro-SMEs who were involved in production of crops and horticulture.

6.2.6.1 Use of Tolerant Varieties

National seed companies such as SeedCo and Pannar introduced diseases and pests tolerant seed varieties. Seventy-one per cent of the agro-SMEs adopted this strategy and it was ranked 2nd out of 5. The strategy had a high uptake rate and was among the preferred strategies. These results suggest that the strategy is feasible in addressing greater risk of plant diseases and pests. Agro-SMEs mentioned their preference for SC513, a variety from SeedCo that is resistant to Grey leaf spot. SC525 have a good tolerance to grey leaf spot, average tolerance to maize streak virus and mottle virus. SC403 has a good tolerance to maize streak virus and mottle virus. From the company, Pannar, Pan 6227 was mentioned to have a proven leaf disease resistance.

6.2.6.2 Good Cropping Practices

Good cropping practices reduce the risk of plant diseases and pests. Ninety per cent of the agro-SMEs adopted the strategy and it was ranked 1st out of 5. The results show a very high uptake rate and most preference for the strategy. The results depict a well-informed farming community that knows conservation agriculture. Good cropping practices are part of conservation agriculture that aims at conserving natural resources. Crop rotation and inter cropping were practised to reduce the risk of plant diseases and pests. Agronomically efficient rotations such as cereals and legumes or cash crops were adopted. In this case, a legume crop such as groundnuts followed a cereal crop such as maize. This helped to control diseases and pests by breaking their life cycles through the introduction of a new crop. Agro-SMEs mentioned two types of intercropping arrangements, these are row and strip intercropping.

6.2.6.3 Monitoring and Control Measures

In order to reduce greater risk of plant diseases and pests agro-SMEs indicated that they adopted monitoring and control measures. It was indicated that monitoring involved regular surveillance to detect the presence of diseases or pests. Some agro-SMEs indicated that they resorted to trapping where they used sticky adhesives to trap birds. Ninety per cent of the agro-SMEs adopted this strategy and it was ranked 3rd out of 5. The results show a very high uptake rate and it was among the preferred strategies. These results suggest that this strategy was adoptable against greater risk of plant diseases and pests. Despite the relatively high costs associated with getting the chemicals to control pests and diseases, it was preferred among other strategies.

6.2.6.4 Diversification

This strategy is explained in detail under section 6.2.5. Both on-farm and off-farm diversification became viable to spread the risk of total failure. Seventy-six per cent of the agro-SMEs adopted this strategy and it was ranked 4th out of 5. The results indicate that the strategy had a very high uptake rate and it was

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fairly preferred. The results also indicate that the enterprise can offer a wide range of opportunities to spread risk and reduce the chances of complete failure.

6.2.6.5 Change from Crops to Livestock

This strategy is addressed in detail under section 6.2.6. Only 14% of the agro-SMEs adopted the strategy and it was ranked the 5th out of 5 strategies. The Likert scale show that the strategy had a low uptake and it was least preferred. As explained earlier, change is difficult to embrace. It is associated with the fear of the unknown as well as extra costs as it may require a complete restructuring of the whole premises.

6.2.6.6 Contribution of Strategies against Greater Risk of Plant Diseases and Pests on Survival

The main activity and number of years since establishment were factored into the analysis and results are shown in Table 6.4. The main activity was factored in because plant diseases and pests affect activities that include the production of crops and horticulture. The number of years since the agro-SME's establishment was also included in the analysis because it was assumed that older agro-SMEs would survive this challenge better than younger agro-SMEs.

Results from binary regression show a percentage improvement in correctness from 61.2% to 73.1%, thus indicating that the model with predictors is a significantly better model. The Model Chi-square had a value of 15.852, 7 degrees of freedom and a p value of 0.006, which is significant ($p < 0.05$). Negelkerke R^2 indicated a moderately strong relationship of 63.5% between strategies and survival.

The Wald estimates indicated that good cropping practices had a negative B value. This means that those who adopted the strategy had a higher probability of surviving greater risk of plant diseases and pests than those who did not (1 = Adopted, 2 = Did not adopt) and the results were significant ($p < 0.05$). These results depict the significance of conservation agriculture in addressing the greater risks of plant diseases and pests at very limited costs. This is a feasible strategy to adopt under harsh economic conditions and changing climate. It addresses a number of challenges including hyperinflation, scarcity of chemicals and pesticides. The ultimate result is conservation natural resources and increasing productivity at minimal costs.

The results also indicated that adopting monitoring and control measures had a positive B value. This means that those who did not adopt the strategy had a higher probability of surviving risks of plant diseases and pests than those who adopted it (1= Adopted, 2 = Did not adopt) and these results were significant ($p < 0.05$). These results may be explained by the fact that monitoring and control measures are constrained by factors such as availability of time and financial resources. The feasibility of this strategy is however compromised considering that there were huge economic challenges and a scarcity of resources. This might explain why those who adopted the strategy were confronted with a lower probability of surviving greater risk of pests and diseases.

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6.3 Strategies Addressing Livestock Related Challenges

6.3.1 Strategies Addressing Reduced Quality and Quantity of Grazing

Due to the extreme weather conditions such as the increased temperatures and erratic rainfall, agro-SMEs involved in livestock production were confronted with the challenge of reduced quality and quantity of grazing. This posed a threat to the production capacity in dairy and meat production, as livestock died due to lack of adequate nutrition in the absence of natural pastures. This had a bearing on the weight of livestock. Livestock experienced considerable loss of weight. Fourteen agro-SMEs, affected here out of the 26 agro-SMEs studied in this research, responded to this challenge in a variety of ways as shown in Table 6.5 below.

The results in Table 6.5 show that the strategies that were adopted to address the reduced quality and quantity of grazing contributed mostly towards survival at a significant scale. Destocking and switching to crops however, only managed to contribute towards survival marginally. The adopted strategies only managed to contribute towards agro-SME survival at a limited scale in the very significant category. The use of indigenous breeds managed to score the highest percentage influence of only 40% in this category.

6.3.1.1 Rotational Grazing or Paddocking

Rotational grazing or paddocking is a system where pastures are subdivided into small areas called paddocks and livestock are moved from one paddock to another for a specified period of time. Agro-entrepreneurs indicated that they fenced the areas covered by pasture and then internally subdivided the area into paddocks in order to practice rotational grazing.

A large proportion amounting to 86% adopted the strategy showing a very high adoption rate. The strategy was ranked 4th out of 8, placing it in the preferred zone. These results may indicate the possibility that agro-entrepreneurs were well informed on the benefits of rotational grazing. Tinoziva *et al* (2013) recommends a rotational grazing scheme with short durations. These are characterised by greater paddock numbers, shorter grazing periods and longer rest periods.

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Table 6.3: Adoption Rates, Preference Ranks and Actual Contribution of Strategies towards Survival

A2) Crop related Challenges

Strategies	Adoption Rates (%)	Preference Rank	Actual Contribution of Adopted Strategy towards Survival (%)		
			Marginal	Significant	Very significant
Challenge: Mid-season dry spells					
Irrigation	77	1	25	75	0
Soil moisture conservation	61	2	81	19	0
Crop diversification, (drought tolerant crops)	62	3	81	19	0
Grow short season varieties that are drought resistant	58	4	20	80	0
Change from crops to livestock	15	5	75	25	0
Challenge: Shorter drier growing seasons					
Irrigation	90	1	16	63	21
Soil moisture conservation	86	4	17	61	22
Crop diversification, (drought resistant crops)	71	5	20	67	13
Grow short season/ drought tolerant varieties	62	3	23	77	0
Shift planting dates	57	2	25	75	0
Change from crops to livestock	9	7	100	0	0
Early or dry planting	9	6	100	0	0
Challenge: Greater risk of plant diseases and pests					
Good cropping practices	90	1	11	74	15
Monitoring and control measures	90	3	5	69	26
Diversification	76	4	19	56	25
Use tolerant varieties	71	2	0	73	27
Change from crops to livestock	14	5	100	0	0

Key: Likert scale ranges for preference ranking

Mid-season dry spells: 1 = most preferred, 2 to 3 = preferred, 4 = fairly preferred, 5 = least preferred.
Shorter, drier growing seasons: 1 to 2 = most preferred, 3 to 4 = preferred, 5 to 6 = fairly preferred, 7 = least preferred
Greater risk of plant diseases and pests: 1 = most preferred, 2 to 3 = preferred, 4 = fairly preferred, 5 = least preferred.

Source: Author's Data Computation (2014)

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Table 6.4: Binary Logistic Regression Analysis Results

A2) Crop Related Challenges

Challenge	Model correctness		Model significance (Model chi square)			Model strength (Negelkerke R^2)	Relative contribution of strategy towards survival (Wald statistic)			
	Step 0	Step 1	Value	df	Sig		Strategy	B	Wald	Sig
Mid-season dry spells	57.7	73.1	12.571	6	0.050	0.511	Irrigation	-0.833	0.219	0.640
							Soil moisture conservation	-2.472	2.733	0.098
							Crop diversification, drought tolerant crops	-1.940	1.690	0.194
							Grow short season/ drought resistant varieties	1.754	1.470	0.225
							Change from crops to livestock	3.007	7.264	0.007
							Activity class	-0.277	0.908	0.341
Shorter, drier growing seasons	65.4	84.6	20.986	8	0.007	0.738	Shift planting dates	-0.689	0.133	0.715
							Grow short season/ drought tolerant varieties	2.567	1.927	0.165
							Irrigation	-3.527	3.527	0.060
							Crop diversification, drought resistant crops	-2.416	1.449	0.229
							Change from crops to livestock	0.826	0.125	0.724
							Soil moisture conservation	-3.505	2.500	0.114
							Early or dry planting	4.624	3.990	0.046
							Activity class	0.088	0.016	0.900
Greater risk of plant diseases and pests	61.2	73.1	15.852	7	0.006	0.635	Use tolerant varieties	-0.397	0.215	0.643
							Good cropping practices	-2.472	8.270	0.004
							Monitoring and control measures	3.069	19.005	0.000
							Diversification	0.570	0.746	0.388
							Change from crops to livestock	0.907	1.746	0.188
							Main activity	-0.567	2.462	0.117
							No. of years since agro-SME establishment	0.256	1.186	0.276

Key: *df = Degrees of freedom; Sig = p value; Cut value = 0.5

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6.3.1.2 Supplements

Agro-SMEs addressed reduced quality and quantity of grazing by using supplements. Supplements, although expensive, serve a vital role in situations where natural pasture cannot meet the nutritional requirements of animals. Sixty-four per cent of the agro-SMEs adopted the strategy and it was ranked 1st out of 8. The results show that the strategy had a high uptake rate and it was among the most preferred strategies. Such results depict the relatively high potential attached to the strategy in mitigating the effects of reduced quality and quantity of grazing.

The Agro-SMEs mentioned that they incorporated supplements such as cottonseed cake, oilseed cake, brewery by-products and sugar industry by-products into the animals' diets. These oilseed cakes include sunflower and soybean cake. Brewery by-products such as grains and yeast residues were mentioned by agro-SMEs as another alternative supplement readily accepted by cattle. Sugar industry by-products that were mentioned included dried sludge, molasses and bagasse. However, this was not common in the district.

6.3.1.3 Destocking

Agro-SMEs mentioned that they adopted destocking in order to mitigate cattle losses due to reduced quality and quantity of grazing. Destocking fits well with the concept of surviving a challenging operating environment. The agro-SMEs used different approaches. Some agro-SMEs reduced their livestock herds in order to exchange them for money to buy supplements and fodder for the remaining animals. Some used the money to start, increase and maintain goat and sheep production, which have a better tolerance to reduced quality and quantity of grazing. The agro-SMEs realised that cattle were the most vulnerable and susceptible to reduced quantity and quality of grazing and suffered the highest rates of mortality. Therefore, they started culling cattle, especially the old and sick cows. Only 29% adopted the strategy and it was ranked the 6th out of 8. The results show a low uptake and fair preference, which indicates the possibility that agro-SMEs were reluctant in adopting this strategy for survival purposes. The low uptake and fair preference could be because Agro-SMEs do not usually adopt destocking as they always hope that rainfall will come soon or additional grazing will be found.

6.3.1.4 Use of Indigenous Breeds

Indigenous breeds are those that have their origins in Zimbabwe. These include, among others, Mashona, Tuli and Nguni. Generally, farmers in commercial beef production favour exotic breeds than indigenous ones. However, exotic breeds are not well adapted to local and changing climatic conditions. The continuously changing climatic conditions experienced in Zimbabwe made adaptability even more difficult. Sixty-four per cent of the agro-SMEs adopted this strategy showing a high adoption rate. The strategy was ranked 5th showing that the strategy was fairly preferred. The performance of exotic breeds is unsatisfactory when compared to their performance in mother countries. Evaluations between indigenous and exotic breeds have indicated that indigenous breeds perform well for economically

important traits. For example, the Mashona breed is known for its ability to remain productive in terms of draft power, manure, milk and meat under adverse environmental conditions.

6.3.1.5 Switch to Cropping

Other agro-SMEs found switching to cropping viable in addressing reduced quality and quantity of grazing. Only 14% of the agro-SMEs adopted this strategy and the strategy was ranked 8th out of 8. Results show a very low uptake rate and least preference. Switching to crops means a complete overhaul of the whole farm. This is associated with relatively high costs. Furthermore, the climatic conditions were even harsher for cropping than livestock production hence the low rate of uptake and low preference.

6.3.1.6 On-farm Diversification

This strategy was also adopted due to the late onset of rainfall and is explained in detail under 6.2.5. Integrating different enterprise concepts becomes a priority in cases where there is inadequate grazing for animals. Agro-SMEs indicated that rather than concentrating on cattle alone, for example, they incorporated animals like sheep and goats that are more tolerant to reduced quality and demand lower quantities of grazing. The agro-SMEs also indicated that they diversified into crop production in order to spread the risk. All agro-SMEs adopted this strategy and the strategy was ranked the 6th out of 8. The results show that the strategy had a very high adoption rate and was among the fairly preferred strategies.

6.3.1.7 Contract Grazing

Contract grazing is one of the survival options adopted by agro-entrepreneurs in order to address reduced quantity and quality of grazing. This is a livestock production system in which normally 3 entities are involved. These are a landowner, livestock owner and a grazing manager who oversees the grazing activities. Usually a fee is charged and in most cases, as mentioned in the survey, a flat rate is charged on a daily basis. The agro-entrepreneurs indicated that they were involved in a system with only 2 entities i.e. the land owner and livestock owner. Species of livestock that were involved include cattle and goats. Two contract-grazing arrangements were mentioned. These are summer grazing and all year round grazing. In the former, livestock grazing was contracted in summer only whereas in the later livestock was contracted all year round.

Only 29% of the agro-SMEs adopted the strategy, showing a low uptake rate. The strategy was ranked 3rd out of 8 showing that the strategy was preferred. A low rate of uptake does not mean agro-SMEs did not prefer the strategy. In this case, adoption may have been limited by the fact that almost everyone was confronted with the same challenge. Few agro-SMEs had extra pastures to spare let alone quality pastures to consider contract grazing, hence the low uptake rate. In addition, many agro-SMEs did not have enough grazing areas for their livestock. However, under normal circumstances contract grazing

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offer a wide range of advantages. These include the possibility of getting higher quality pastures at the same time allowing your own pastures to recuperate. This might explain why the strategy was preferred.

6.3.1.8 Planted Pastures

Growing additional grazing is another strategy that one could adopt to ensure adequate amounts and better quality of grazing for livestock. These pastures are called cultivated pastures and they normally have better quality than natural pastures. Only 29% of the agro-SMEs adopted this strategy and it was ranked 2nd out of the 8. The results show that the strategy had a low uptake rate yet it was among the most preferred strategies. The results depict that the strategy was difficult to adopt and implement. The major constraint was finance and water resources making cultivating pasture expensive.

The agro-SMEs indicated that they often cultivated legumes of better quality than natural pastures. It was indicated that the pastures were either harvested and stored during the wet season or left as standing hay. Examples of planted pastures mentioned by agro-entrepreneurs include Katambora grass and a legume called Siratro. However, the agro-entrepreneurs also indicated that they were often constrained by lack of fertilizers and water to irrigate the additional grazing.

6.3.1.9 Contribution of Strategies against Reduced Quality and Quantity of Grazing towards Survival – Statistical Analysis

The statistical analysis factored in the type of enterprise because it was assumed some types of enterprises would survive this challenge better than others. The results of the analysis are shown in Table 6.6 and they mainly reveal that there is an improvement in model correctness from 85.7% to 90.2%. This shows that the model with predictors is a significantly better model in terms of correctness. The Model Chi-square had a value of 19.483, 9 degrees of freedom and a p value of 0.019, which is significant ($p < 0.05$). Negelkerke R^2 indicated a very strong relationship between the strategies adopted and the influence on survival.

The Wald estimates revealed that those agro-SMEs that adopted contract grazing had a lesser chance of survival against reduced quality and quantity of grazing than those that did not and these results were significant ($p < 0.05$). These results might be explained by the fact that contract grazing is not a feasible strategy to adopt against reduced quality and quantity of grazing in a changing climate because everyone would be confronted with the same challenge. Getting the opportunity for the contract is a challenge on its own, hence adopting the strategy will yield lesser chances of survival.

6.3.2 Strategies Addressing Greater Risk of Animal Diseases and Infections

Climate extremes experienced over the past decade exposed animals to greater risk of infections. The climate extremes increased parasite, bacterial and fungal infections among animals. Production risk was therefore increased which led to higher losses. Strategies adopted to address this challenge are shown in Table 6.5 with corresponding results from the questionnaire survey and preference ranking. This was only applicable to those involved in livestock production, therefore only 14 agro-SMEs responded to this

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question. Most of the strategies that were adopted significantly contributed towards agro-SME survival, as shown in Table 6.5. Diversification contributed towards the survival of as much as 70% of the agro-SMEs in this category. Thus, the adopted strategies contributed towards survival at a limited scale in the marginal and very significant categories.

6.3.2.1 Monitoring and Control

Animal diseases and infections need to be controlled in order to prevent outbreaks and huge losses. Agro-SMEs adopted monitoring and control measures to address the greater risk of infections and diseases during incidences of climate extremes. Agro-entrepreneurs mentioned that they adopted at least one of, good hygiene practices, cattle dipping, use of chemicals, vaccination, stamping out and the use of quarantines. All the agro-SMEs adopted this strategy and the strategy was ranked 2nd out of 5. The results show that the strategy had a very high rate of adoption and was among the preferred strategies. These results reveal that the strategy was feasible in reducing loses and ensuring the survival of the agro-SMEs during the challenging period.

To combat tick borne diseases agro-SMEs mentioned that they increased the dipping frequency for cattle. Acaricide application was used against tick borne diseases. Animals were also systematically and frequently vaccinated to prevent spread and outbreak of diseases. However, this approach was limited by the fact that the government was the main source of vaccines for the agro-SMEs. During the period in question, the government was constrained by lack of infrastructure and resources to produce and deliver the vaccines. Agro-SMEs also mentioned that they sometimes resorted to stamping out. In this case, they attempted to eradicate diseases by destroying all infected animals. The agro-SMEs indicated that they were reluctant towards this approach because they could lose out and may not be able to be productive again. Quarantines were also used by some agro-SMEs. This ensured continuous surveillance of the remaining stock and of the area where the disease had been observed. This was done to ensure complete eradication of the disease.

6.3.2.2 Diversification

Both on-farm and off-farm diversification was adopted by agro-entrepreneurs to address the greater risk of animal diseases. Some agro-SMEs indicated that they incorporated wildlife to spread the risk. Wild animals have better resistance to diseases and infections compared to domestic animals. Seventy-one per cent of the agro-SMEs adopted the strategy and it was ranked 3rd out of 5. The strategy had a high uptake and was among the preferred strategies. This shows that diversifying into different activities both on-farm and off-farm increases the chances of survival in challenging environments.

6.3.2.3 Tolerant Breeds

In order to reduce the effects of the greater risk of animal diseases and infections, agro-entrepreneurs shifted to tolerant breeds. Eighty-six per cent of the agro-SMEs adopted this strategy against the greater risk of animal diseases and infections. The strategy was ranked 4th out of 5. The results show a high

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uptake rate and a fair preference for the strategy. The agro-SMEs indicated that there were animals that have proven to be more tolerant to diseases and infections. For example, some cattle carry fewer ticks than others do, although they would be grazing in the same environment. Likewise, some breeds of animals have also shown a greater ability to tolerate parasites. This relates to the ability to respond immunologically to tick and parasite infestation. Indigenous cattle possess a natural resistance to diseases and infections. For example, the Nguni has proven to have greater resistance to tick borne diseases. Ability to develop resistance is inheritable. Therefore, resistant breeds can be genetically engineered. Despite the relatively high costs involved in genetic engineering and the ethical issues surrounding the process, this may offer a breakthrough in the face of changing climatic conditions.

6.3.2.4 Switch to Cropping

This strategy was discussed in detail in section 6.3.1.5. Only 14% of the agro-SMEs adopted this strategy and the strategy was ranked the 5th out of 5 strategies. The results show a very low uptake and least preference. This suggests that this strategy is difficult to implement as cropping itself is less adaptable to extreme climatic conditions than livestock. Furthermore, change is difficult to embrace. It is associated with many costs hence the unfavourable results.

6.3.2.5 Intensive Pasture Management

The interaction of pastures and grazing animals may react adversely on the later. Pastures can facilitate the spread of parasitic infections such as intestinal worms and lungworms. They can also facilitate bacterial infections like anthrax. In this case, intensive pasture management becomes key to healthy and productive pastures, which in turn results in healthy livestock. The agro-SMEs indicated that they practised sound methods of pasture hygiene to reduce the incidences of infections and diseases. Some of the sound methods mentioned include rotational grazing which is discussed in detail under section 6.9.1. The agro-entrepreneurs indicated that they avoided overcrowding animals as much as possible to reduce the risk of animal diseases and infections. This was done by keeping optimum stock densities.

6.3.2.6 Contribution of Strategies against Greater Risk of Animal Diseases and Infections towards Survival

The results of the Binary regression analysis factored in the type of enterprise as an important variable in determining the success or failure of the listed strategies are shown in Table 6.6. The results then revealed that model correctness improved from 85.7% to 92.9% indicating that the model with predictors is a significantly better model. The Model Chi-square had a value of 16.985, 5 degrees of freedom and a p value of 0.042. This means that the predictors as a set distinguished between positive and negative influence of adopted strategies on agro-SME survival. Negelkerke R^2 indicated that there is a strong relationship of 70.2% between the adopted strategies and agro-SME survival.

The Wald statistics indicated that the use of resistant breeds had a negative B value. This means that agro-SMEs which adopted this strategy had a higher probability of surviving greater risk of animal

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diseases (1 = Adopted, 2 = Did not adopt) and these results were significant ($p < 0.05$). This reflects the fact that using resistant breeds when confronted with a greater risk of animal diseases offers a logical solution under challenging environments.

The type of enterprise had a negative B value meaning that private entities had a better chance of surviving greater risk of animal diseases that family business, cooperatives or institutional agro-SMEs (1 = Private, 2 = Family business, 3 = Cooperative, 4 = Institution) and these results were significant. This is because private agro-SMEs have established disease control programs that are often adhered to, executed properly and on time.

6.4 Strategies Addressing Other Climate Change Related Challenges

6.4.1 Strategies Addressing Flooding and Water Logging

In some instances, flooding and water logging of arable land occurred due to tropical cyclones experienced during the 2000-2010 period. Tropical Cyclones Eline and Japheth resulted in floods that in turn caused difficulties in the utilisation of arable land. When rain falls continuously, water infiltrates into the soil and is stored in the pores. If saturation point is reached, no water can be absorbed. Pools of water may form on the surface thereby causing the flooding and waterlogging of arable land. Flooding and waterlogging are detrimental to crops, as roots also require air. Most crops cannot withstand saturated soils for long periods. Besides damage to the crops, very wet soils make the use of machinery difficult and thus interrupt planned operations.

The agro-SMEs in Kwekwe responded to this challenge in different ways. Table 6.7 shows the results. It is important to note that flooding of arable land was not a common problem in Kwekwe District. Only seven agro-SMEs out of 21 encountered the challenge. Nevertheless, the results in Table 6.7 indicated that most of the adopted strategies contributed towards agro-SME survival significantly. Crop diversification contributed towards the survival of the largest proportion of agro-SMEs in this category. No strategies with the exception of surface drainage managed to contribute towards survival at a very significant scale.

6.4.1.1 Changes in Land Use Patterns

Eighty-six per cent of the agro-SMEs indicated that they changed land use patterns to mitigate the effects of flooding and waterlogging of arable land. The strategy was ranked 4th out of 5. The results show a high uptake rate and a fair preference. These results suggest the possibility that the strategy was only adopted to reduce loss of production due to flooding and water logging of arable land. Adoption was not due to preference for the strategy, it was merely for survival purposes, hence the disparity in adoption rate and preference.

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Table 6.5: Adoption Rates, Preference Ranks and Actual Contribution of Strategies towards Survival

B) Livestock Related Challenges

Strategy	Adoption rate (%)	Preference rank	Actual Contribution of Adopted Strategy towards Survival (%)		
			Marginal	Significant	Very significant
Challenge: Reduced quantity and quality of grazing					
On-farm diversification	100	6	14	64	22
Rotational grazing	86	4	17	83	0
Supplements	64	1	0	100	0
Use indigenous breeds	64	5	12	44	44
Destocking	29	6	100	0	0
Contract grazing	29	3	50	50	0
Planted pastures	29	2	25	50	25
Switch to cropping	14	8	100	0	0
Challenge: Greater risk of animal diseases and infections					
Monitoring and control measures	100	2	14	64	22
Resistant breeds	86	4	8	67	25
Diversification	71	3	20	70	10
Intensive pasture management	57	1	0	63	37
Change to cropping	14	5	14	64	22

Key: Likert scale ranges for preference ranking

- **Reduced quantity and quality of grazing**: 1 to 2 = most preferred, 3 to 4 = preferred, 5 to 6 = fairly preferred, 7 to 8 = least preferred.
- **Greater risk of animal diseases and infections:** 1 = most preferred, 2 to 3 = preferred, 4 = fairly preferred, 5 = least preferred

Source: Author's Data Computation (2014)

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Table 6.6: Binary Logistic Regression Analysis Results

B) Livestock Related Challenges

Challenge	Model Correctness		Model significance (Model Chi-square)			Model strength (Negelkerke R^2)	Relative contribution of strategies towards agro-SME survival			
	Step 0	Step 1	Value	df	Sig		Strategy	B	Wald	Sig
Reduced quantity and quality of grazing	85.7	90.2	19.483	9	0.019	1.000	Rotational grazing	-0.376	0.064	0.800
							Supplements	-1.610	1.293	0.256
							Destocking	-0.520	0.134	0.714
							Use indigenous breeds	-1.287	0.642	0.423
							Switch to cropping	-0.431	0.101	0.751
							On-farm diversification	N/A	N/A	N/A
							Contract grazing	4.624	3.990	0.046
							Planted pastures	0.088	0.016	0.900
							Type of enterprise	-0.567	2.462	0.117
Greater risk of animal diseases	85.7	92.9	16.985	5	0.042	0.702	Monitoring and control measures	N/A	N/A	N/A
							Diversification	1.071	3.918	0.048
							Resistant breeds	-1.231	5.502	0.019
							Change to cropping	-0.520	0.905	0.341
							Intensive pasture management	-0.693	2.263	0.132
							Type of enterprise	-1.221	4.634	0.031

Key: N/A = Not applicable (excluded from analysis), df = Degrees of freedom, Sig = p value

Source: Author's Data Computation (2014)

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The agro-SMEs indicated that they introduced several changes in land use patterns. Some agro-SMEs mentioned that they converted the water logging problem areas into conservancies, plantations and pasture areas. Some agro-SMEs mentioned that they used places that were vulnerable to flooding and waterlogging for cultivation of upland crops such as grain legumes, vegetables and semi perennials like bananas. Some indicated that they introduced clay mining for the production of bricks. Some even considered land filling for infrastructure development.

6.4.1.2 Surface Drainage

Surface drainage is the removal of excess water either from the ground surface or from the root zone. Fifty-seven per cent of the respondents indicated that they adopted surface drainage to mitigate the effects of flooding and water logging of arable land showing a high uptake rate. The strategy was ranked 1st out of the 5. This shows that the strategy was most preferred. Agro-SMEs mentioned that they adopted artificial surface drainage, as natural drainage was often inadequate. They indicated that they managed to remove excess water from the ground surface by creating shallow diversion ditches or open drains that would discharge into deeper drains at the far ends of the field. Artificial slopes were created to facilitate the flow of excess water towards the deeper drains located at the ends of the fields. Some indicated that they used subsurface drainage systems where they buried pipe drains into the subsoil. Excess water would flow into these drains and discharged out of the field. However, it was indicated that this strategy was associated with high costs, which constrained most agro-SMEs.

6.4.1.3 Water Harvesting

Water harvesting refers to the different techniques used to collect floodwater for storage for other purposes like crop production. Only 29% of the respondents adopted this strategy and it was ranked 3rd. Results indicate a low uptake and yet the strategy was among the preferred strategies. The results deduce that failure to adopt a strategy does not necessary mean one does not prefer it. The results also depict that although the strategy was useful in mitigating the effects of floods, it was difficult to implement, hence it was preferred but had a low uptake.

Agro-SMEs mentioned that they dug out ponds and lakes to trap the excessive rains. These ponds and lakes served as reservoirs that collected excessive rains and stored it for later use. Agro-SMEs indicated that the construction of these ponds and lakes was very crucial. They indicated that they often situated the ponds and lakes in areas with permeable soils that would promote infiltration into the sub soil or aquifers. Some respondents mentioned that they used wells and water tanks to trap the excessive rains.

6.4.1.4 Crop Diversification

Diversification is also another strategy that was used by agro-SMEs to mitigate the effects of flooding and waterlogging of arable land. The agro-SMEs indicated that they incorporated crops such as rice that thrive well in waterlogged conditions. Seventy-one per cent of the agro-SMEs adopted this strategy and

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the strategy was ranked 5th out of 5. Results show a low uptake rate and least preference. These results suggest that this strategy was only adopted for survival purposes only. In cases where one is given a choice, it is not preferable. This might be because the rice varieties that most agro-SMEs grow are traditional varieties, which are not highly marketable.

6.4.1.5 Application of High Water Affinity Aggregates

Application of high water affinity aggregates such as manure, compost, humus, ash or anthill in flooded and waterlogged areas is one of the strategies adopted by agro-SMEs to diminish the effects of flooding and water logging. The strategy was adopted by 86% of the agro-SMEs and it was ranked 2nd out of 5. The results show a very high uptake rate and it was among the preferred strategies. This suggests that application of manure, ash, compost, humus or anthill is a workable strategy against flooding and water logging. Manure, humus, ash, compost and anthill helped to increase the biological activity of flooded and water logged areas. This led to improved soil structure thereby enhancing drainage and air circulation. The application of any of these aggregates helped to reduce soil compaction. The soil becomes easy to work with and increase the chances of producing a higher yield.

6.4.1.6 Contribution of Strategies against Flooding and Water Logging towards Survival – Statistical Analysis

The statistical analysis factored in activity class and number of years since an agro-SME's establishment. Activity class was factored in because usually those in primary production are affected more by flooding and water logging than those in processing and tertiary classes. The number of years since agro-SME establishment was included because it was assumed that older agro-SMEs affected by this challenge would have developed better and more useful means of addressing the challenge as compared to younger agro-SMEs.

The results of the analysis, shown in Table 6.8, revealed that there was an improvement in model correctness from 71.4% to 85.7%. The model Chi-square had a value of 11.982, 7 degrees of freedom and a p value of 0.003, which was significant ($p < 0.05$). This means that the predictors, as a set, reliably distinguished between positive and negative contribution of adopted strategies towards agro-SME survival. Negelkerke R^2 had a value of 0.789 indicating a very strong relationship between the adopted strategies and survival. It also means that the model explains 78.9% of the cases in the outcome variable.

The Wald statistics indicated that introducing changes in land use patterns had a positive B value. This means that those agro-SMEs which did not adopt the strategy had a higher probability of survival than those who adopted it (1 = Adopted, 2 = Did not adopt) and these results were significant ($p < 0.05$). These results may be explained by the fact that the implementation procedures involved converting areas affected by flooding and waterlogging into conservancies or plantations. Such activities take a very long time to realise return on investments made. Furthermore, activities such as land filling were considered for these areas. Such activities are very expensive and often require large sums of capital,

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which was a challenge for most of the agro-entrepreneurs during the 2000-2010 period. This also meant reduction in arable land leading to an ultimate reduction of productivity, hence those who adopted this strategy had lesser chances of survival than those who did not. The results also indicated that activity class and number of years since agro-SME establishment, although they are important variables that should not be left out in the analysis, were insignificant ($p > 0.05$).

6.4.2 Strategies Addressing Inaccessible Roads to the Market

Zimbabwe's public infrastructure has been in a state of disrepair since the year 2000. The collapsed economy, lack of public funds and frequent floods left the country's road network severely dilapidated. The frequent floods swept several bridges away and roads leading to markets became impassable. Agro-SMEs responded to this challenge through a variety of ways shown in Table 6.7. This challenge was however not common in the Kwekwe District as only 13 agro-entrepreneurs out of the 26 agro-SMEs encountered it. Most of the strategies adopted against inaccessibility to the market contributed towards agro-SME survival significantly. Lobbying and seeking help from the government contributed towards the survival of a large proportion of agro-SMEs in this category. However, none of the strategies contributed towards survival at a very significant scale.

6.4.2.1 Lobbying for Investment in Public Infrastructure

Getting agriculture moving requires public investment and this requires private individuals, businesses and the state working together. The agricultural sector in Zimbabwe has been reliant on state support. However, there has been vanishingly little support from the government during the period under review. This left individual agro-SMEs to make a difference.

Results from the survey show that 62% of the agro-SMEs adopted this strategy showing a high rate of uptake. The strategy was ranked 3rd out of 4 showing that the strategy was fairly preferred. Agro-SMEs indicated that they lobbied for investments in public infrastructure through well-connected networks. Agro-SMEs mentioned that they went through their friends and families who had a very good standing in politics and pushed for investments in road network systems in their areas. However, politics has been divisive in the recent years. Therefore, many shy away from seeing political parties as the basis for lobbying for public investments.

6.4.2.2 Seek Help from Government and NGOs

Some agro-SMEs opted to seek help from the government and NGOs. This strategy was adopted by only 31% of the agro-SMEs and it was ranked 2nd out of 4. The results show a low uptake rate but it was preferred. The results suggest that seeking help from government and NGOs is a preferable strategy but difficult to implement. This explains why it had a low rate of uptake and why it was preferred. Agro-SMEs mentioned that the government played a vital role to a certain extent in assisting them to transport their produce to the market. In some cases, the government responded to the plight of farmers by sending lorries to carry their produce to the market. The GMB and Cottco sometimes came and collected the

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produce from the farm gate, thus easing the burden off the farmers. In some cases DDF, although constrained by resources, responded to agro-SMEs' plights and made the necessary efforts to maintain the road networks.

6.4.2.3 Change Marketing Strategy or Target Market

Some agro-SMEs opted to change their marketing strategies and their target market. The agro-SMEs mentioned that instead of transporting their produce to sell in town, they opted to sell their products on the farm and locally. This reduced transport costs to the market and addressed the problem of inaccessible roads at the same time. Seventy per cent of the agro-SMEs adopted this strategy and it was ranked 1st out of 4. The results revealed that the strategy was highly adopted and most preferred. This exposes the relative feasibility attached to the strategy and the relatively simple implementation procedure, hence the favourable results.

6.4.2.4 Alternative Transport

Alternative transport is the way to go when roads are inaccessible. Agro-SMEs indicated that in some cases they would carry their produce with scotch carts from the farm to the tarred road where they would get reliable transport to the market. Sixty-two per cent of the agro-SMEs adopted the strategy and it was ranked 4th out of 4. The results show a high uptake rate and least preference. These results indicate that seeking alternative transport may was necessary but not feasible. A scotch cart can only be useful in cases where productivity is not very high. It is not practical under circumstances where productivity is very high and is of a bulky nature and when the produce is highly perishable. Scotch carts cannot travel long distances, as they are slow and use drought power.

6.4.2.5 Contribution of Strategies against Inaccessible Roads to Market towards Survival – Statistical Analysis

The analysis included the number of years since agro-SME establishment. The results are shown in Table 6.8, where an improvement in model correctness from 61.5% to 69.2% is revealed. The model Chi-square had a value of 19.464, 5 degrees of freedom and a p value of 0.003, which is significant ($p < 0.05$). This means that the predictors included in the model as a set reliably distinguish between positive and negative contribution of adopted strategies towards agro-SME survival. Negelkerke R^2 showed that the model explained 63.5% of the cases in the outcome variable.

The Wald statistics indicated that none of the strategies was significant ($p > 0.05$). However, the number of years since an agro-SME's establishment was significant ($p < 0.05$) with a negative B value. This means that older agro-SMEs survived better against inaccessible roads to the market than younger agro-SMEs. This is because older agro-SMEs would have developed means to mitigate the challenge since the time they were established unlike younger agro-SMEs who are still starting and still developing.

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6.4.3 Strategies Addressing Reduced Quality of Products

The agro-SMEs faced the challenge of reduced quality of products in the face of climate change. Due to excessive rainfall that came in the form of floods, agro-entrepreneurs faced problems such as poor cotton lint quality, for those in cotton production. Maize producers encountered reduced quality due to diseases such as maize cob rot and mildew. Small grain producers encountered poor product quality due to the sprouting of grains. These are just but some of the few problems that resulted in reduced product quality.

Ultimately this affected returns negatively. The agro-SMEs responded in a variety of ways to address these challenges as shown in Table 6.7. Please note that 24 agro-SMEs encountered the challenge. Table 6.7 shows that both strategies mostly contributed towards agro-SME survival significantly. Although product quality control was adopted by more agro-SMEs than value addition, the later significantly contributed towards survival of more agro-SMEs.

6.4.3.1 Product Quality Control

The agro-SMEs indicated that they invested in product quality control to address the challenge of reduced quality of products. It was indicated that they ensured product quality by reducing the incidences of pests and diseases in the fields, reducing animal infections and maintaining good storage facilities for their products. Pests and disease were controlled by natural and artificial methods including good cropping practices and the use of chemicals. Animal infections were reduced by practising good pasture management, monitoring and control.

Eighty-three per cent of the agro-SMEs adopted the strategy and it was ranked 2nd out of 2. The results show a very high rate of uptake and least preference from the Likert scale ranges. The results may deduce the possibility that the strategy was a feasible strategy in addressing reduced product quality. However, the least preference may portray the relatively high costs associated with the strategy. A considerable amount of capital is required in investing in product quality control.

6.4.3.2 Value Addition

Value addition refers to all the processes such as cleaning, grading, processing and packaging that are aimed at increasing the product quality that increase the economic value of a commodity. Value addition helps in diversifying customer base, increases consumer appeal and the willingness to buy a product. Some of the products that were considered by agro-SMEs for value addition include milk, groundnuts, wheat, maize and sunflower. These were transformed into yoghurt, peanut butter, flour, maputi or maize meal, and cooking oil respectively.

Fifty per cent of the agro-SMEs adopted value addition to address the challenge of reduced product quality. The strategy was ranked 1st out of 2. The results show that the strategy had a high uptake and it was most preferred. These results deduce the benefits associated with this strategy. The strategy is

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critical to the long-term survival of an agro-SME and can transform an unprofitable agro-SME into a profitable one hence the favourable results.

6.4.3.3 Contribution of Strategies against Reduced Quality of Products towards Survival – Statistical Analysis

The binary regression analysis factored in the type of enterprise and main activity. The type of enterprise was factored in because it was assumed that certain agro-SMEs survive this challenge better than others do. The main activity was included in the analysis because some products were affected more by this challenge than other products. The results, shown in Table 6.8, indicate some improvement in model correctness from 79.2% to 81.7%. The Chi-square had a value of 14.115, 4 degrees of freedom and a p value of 0.024. These results signify that the predictors, as a set, reliably distinguish between positive and negative contribution of adopted strategies towards agro-SME survival. Negelkerke R^2 had a value of 60.0% showing a strong relationship between the strategies and survival.

The Wald estimates indicated that although the type of enterprise is an important variable to be considered in the analysis it was not significant ($p > 0.05$). The results also indicated that value addition had a negative B value. This means that those agro-SMEs, which adopted value addition against reduced quality of products, had a higher probability of surviving the challenge than those which did not (1 = Adopted, 2 = Did not adopt) and these results were significant ($p < 0.05$).

6.4.4 Strategies Addressing Interrupted Planned Operations

Farm operations are normally performed in a given sequence, one at a time. However, they are dependent on a combination of factors including climate extremes. Climate extremes such as persistent rains and heat waves affected planned schedules for activities like weeding and harvesting. The late onset of rains affected planting dates resulting in many farmers planting late, thus disrupting planned farm operations. Operation duration times were delayed due to flooding. This is so because it is difficult to cultivate water-saturated areas. These climate extremes interrupt system operations and upset planned schedules that would have been established earlier. The interruptions also caused completion delays and affected overall productivity.

Agro-SMEs responded to these unexpected climatic extremes by adopting rescheduling and the use of technology. Table 6.7 shows the results. It should be noted, however, that this challenge only affected 22 agro-SMEs. The results revealed that strategies adopted against interruption of planned programs contributed towards agro-SME survival marginally. The use of technology contributed towards the survival of 57% of the agro-SMEs in this category. Rarely did the strategies adopted contribute towards agro-SME survival at a very significant scale.

6.4.4.1 Rescheduling

Agro-SMEs had to reschedule operations in cases where climatic extremes interrupted operations. In some cases, agro-SMEs postponed farming operations until the climatic extreme is over then operations

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will resume. Seventy-seven per cent of the agro-SMEs adopted rescheduling to address the issue of unexpected climatic extremes. The strategy was ranked 1st out of 2. Results show that the strategy had a high uptake and it was most preferred. These results depict the nature of strategy implementation. It was a simple strategy to implement. Otherwise, every agro-entrepreneur would first think about it after the occurrence of an extreme weather event.

6.4.4.2 Use Technology

In some cases agro-entrepreneurs resorted to the use of machinery rather than using manual labour. To avoid further delays in farm operations, agro-entrepreneurs used machinery such as planters, ploughs and combine harvesters. Technology increases efficiency than the use of manual labour. The strategy was adopted by 64% of the agro-SMEs and it was ranked 2nd out of the 2 strategies indicating a high uptake and least preference. The results depict that the strategy has a potential to mitigate the effects of interrupted farm operations, yet at the same time it depicts the constraints associated with the strategy, hence the disparity. Most agro-SMEs indicated that they faced various challenges in implementing this strategy. Most of the agro-SMEs could not afford to buy big machinery let alone hire them because they were expensive.

6.4.4.3 Contribution of Strategies against Interrupted Planned Operations towards survival-Statistical Analysis

The main activity was factored into Binary regression analysis and results are shown in Table 6.8. The main activity was factored in because some activities were affected more than others by this challenge. Results show that there is an improvement in model correctness from 59.1% to 63.6%. This means that the model with predictors is a better model. The model Chi-square had a value of 11.813, 3 degrees of freedom and a p value of 0.004, which is significant ($p < 0.05$). Negelkerke R^2 indicated that there is a moderately strong relationship of 59.6% between the strategies and survival.

The Wald statistics indicated that the use of technology had a positive B value meaning those who did not adopt the strategy had a higher probability of survival than those who adopted the strategy (1 = Adopted, 2 = Did not adopt) and the results were significant ($p < 0.05$). This is because use of technology was associated with relatively high costs. Furthermore, some of the suitable technologies were not compatible with the small nature of the agro-SMEs. All these issues affected productivity in a negative way, hence those who adopted the strategy had lesser chances of survival than those who did not.

Results also indicated that the main activity had a negative B value meaning those involved in mixed farming had a higher chance of surviving interrupted planned operations than those involved in the production of a single product and these results were significant ($p < 0.05$). This is because risk is spread better in mixed farming than in single commodity production.

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6.4.5 Strategies Addressing Greater Risk of Damage to Infrastructure

The risk of damage to infrastructure increased over the 2000-2010 period due to the increased frequency of floods, heavy winds and torrential rains. Farm buildings, equipment and implements were destroyed. Public goods such as roads and bridges were also exposed to these climate extremes and therefore faced greater risk of damage. The agro-SMEs responded to this challenge in various ways as shown in Table 6.7. Table 6.7 also shows adoption rates, preference ranks as well as influence of individual strategies on survival. This challenge however, affected 22 agro-SMEs only. The results show that the strategies adopted against greater risk of damage to infrastructure only managed to contribute towards agro-SME survival marginally. All agro-SMEs that adopted insurance indicated that the strategy contributed towards survival only at a marginal scale. Rarely did the strategies contributed towards survival at a very significant scale.

6.4.5.1 Bear the Cost

Agro-SMEs were forced to bear the cost of infrastructure damage. It was indicated that repairs were done whenever possible. Eighty-two per cent of the agro-SMEs adopted the strategy and it was ranked the 1st among the 4 strategies showing a very high uptake and most preference. The results predict that the strategy was a credible one in cases where one was faced with greater risk of infrastructure damage. Although the strategy was associated with extra, unplanned and unforeseen costs, agro-SMEs saw it feasible to bear the cost of infrastructure damage and avoid further destruction and ultimately improve productivity, hence the very high uptake and most preference.

6.4.5.2 Seek Help from Government and NGOs

Agro-SMEs mentioned that the government and NGOs played a vital role, to a certain extent, in assisting them to rebuild and repair damaged infrastructure such as roads and bridges. In this case, the government and NGOs responded to the plight of farmers through providing funds to rebuild and repair the damaged roads and bridges. However, it was indicated that in some cases, due to corruption, the funds were misused or intercepted before they reach the intended recipients. The strategy was adopted by only 23% of the agro-SMEs and it was ranked the 4th, thus indicating that the strategy had a very low uptake and least preference. These results indicate the possibility that the agro-entrepreneurs lacked confidence in the strategy. It is most probable that the agro-entrepreneurs could not place their survival hopes in this strategy because the government and NGO support was not reliable.

6.4.5.3 Insurance

Agricultural insurance is a risk-mitigating tool that was adopted by agro-SMEs to address the greater risk of damage to infrastructure. According to Olofsson (2011), insurance is a financial product that pools risk by collecting small premiums from a large population and funding relatively large pay-outs to the small portion of that population that suffers losses from a specific risky event. It is intended to cover losses from adverse weather events and similar events beyond the control of agro-entrepreneurs.

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Only 14% of the agro-SMEs adopted the strategy. (Insurance) ranked 3rd in preference ranking. The results show a very low uptake and fair preference. These results depict various scenarios. They may depict the harsh economic environment that was experienced during the 2000-2010 period. Most agro-entrepreneurs could not afford the premiums set by insurance companies. Furthermore, most insurance companies had since closed down due to the difficult operating environment. A few companies were thus offering insurance services at high premiums, which most agro-entrepreneurs could not afford.

In a study carried out by Tsikirayi, Makoni and Matiza (2013) on the uptake of agricultural insurance services by the agricultural sector in Zimbabwe, it was revealed that generally agro-entrepreneurs view insurance as an unnecessary expense rather than an investment to curtail future risk. Tsikirayi *et al* (2013) highlighted that agricultural insurance was a preserve of the LSCF sector before the FTLRP. Post FTLRP, a new breed of farmers emerged which forced the insurance companies to reconsider conditions and criteria for their services. This resulted in increased premium prices corresponding to the higher level of risk associated with the new agro-entrepreneurs. Tsikirayi *et al* also attributed the low uptake to the inputs and farm machinery subsidies that the government gave out to the new agro-entrepreneurs.

6.4.5.4 Build Stronger Structures

In order to reduce risk of damage to farm structures, agro-SMEs aimed at building stronger and properly engineered structures. Properly engineered structures can withstand damage while sustaining acceptable levels of damage. Agro-SMEs made sure that the buildings would be able to survive rare and severe damages without collapsing. Other agro-SMEs mentioned that they used steel buildings that have been proven to withstand strong winds. Others opted for concrete buildings. Concrete is resistant to wind, floods and has the ability to withstand nature's normal deteriorating mechanisms as well as natural disasters.

Ninety-five per cent of the agro-SMEs adopted this strategy. The strategy was ranked 2nd out of 5 showing that the strategy had a very high uptake and was preferred. Despite the extra costs involved in building stronger structures, results depict that this strategy was feasible in addressing risk of damage to infrastructure. Agro-entrepreneurs felt that it was better to invest in stronger buildings than to be confronted with production losses after all the inputs and produce had been destroyed by harsh weather conditions.

6.4.5.5 Contribution of Strategies against Greater Risk of Damage to Infrastructure towards Survival – Statistical Analysis

A binary regression analysis was conducted with the inclusion of the type of enterprise. Results from the analysis are shown in Table 6.8. These results indicate that there is an improvement in model correctness from 50% to 79.1%. This means that the model with predictors is a better model. The model Chi-square had a value of 12.074, 5 degrees of freedom and a p value of 0.007, which is significant ($p < 0.05$). Negelkerke R^2 indicated a very strong relationship of 75.2% between strategies and survival.

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The Wald estimates revealed that although the type of enterprise is important in determining the success or failure of the strategies, it was not significant ($p > 0.05$). The results also indicated that bearing the cost had a negative B value. This means that those who adopted that strategy stood a higher chance of survival than those who did not (1 = Adopted, 2 = Did not adopt) and the results were significant ($p < 0.05$). This is because this was the most logical strategy to adopt among other strategies. Furthermore, the costs would be recovered from the sale of the products.

6.4.6 Strategies Addressing Escalated Maintenance costs

Due to increased risk of damage to infrastructure, maintenance costs also escalated. This posed another challenge to agro-SMEs as funds were diverted to cover the unexpected and unplanned maintenance costs. Agro-SMEs adopted various strategies to mitigate the challenge. The strategies are shown in Table 6.7 along with the adoption rates, preference ranks and contribution towards survival. This challenge, it should be noted, affected only 22 agro-SMEs. Nevertheless, the results in Table 6.7 show that the strategies adopted against escalated maintenance cost only managed to contribute towards agro-SME survival marginally. With the exception of passing the cost to the consumer, rarely did the adopted strategies manage to contribute towards survival at significant or very significant scales.

6.4.6.1 Borrowing

Some agro-SMEs mentioned that they resorted to borrowing when they were confronted by escalated maintenance costs. They indicated that they borrowed from friends and family to cover the costs of repair and maintenance. Only 14% of the agro-SMEs adopted the strategy and it was ranked 2nd out of 4 strategies indicating a very low uptake and that it was preferred.

These results predict that borrowing, as a strategy is not reliable. It is not advisable to depend on borrowing to address any challenge. This is because it is difficult to predetermine or guarantee that the money will be available for borrowing hence the very low uptake. However, the low uptake does not indicate agro-entrepreneurs' preferences. The strategy was one of the preferred strategies, which depicts the need for survival among agro-entrepreneurs operating in a challenging environment. In a challenging operating environment, where one is faced with the need for survival, borrowing, is worthy trying if it can help strengthen the agro-SMEs' ability to withstand challenging environments.

6.4.6.2 Neglect or Abandon

In some cases, agro-SMEs mentioned that they neglected or abandoned the buildings, equipment or implements that required maintenance. This strategy was adopted to avoid the maintenance costs altogether. Some buildings, equipment and implements would have been damaged to an extent where they needed a complete refurbishment, which would require large sums of capital. In such cases, agro-SMEs chose to neglect or abandon. Only 9% of the agro-SMEs adopted this strategy and it was ranked the 4th out of 4, thus showing that the strategy had a very low uptake and least preference. These results may depict that the strategy was not good enough to address the challenge of increased maintenance

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costs. The damaged buildings, equipment and implements may be put to better uses than to neglect or abandon them altogether.

6.4.6.3 Pass the Cost to the Consumer

Competitive production becomes necessary when one is faced by escalated maintenance costs. Competitive production, in this case, entails recovering all the cost incurred during production including maintenance costs for buildings, equipment and implements involved in the production of a specific product. Agro-entrepreneurs did that by passing the extra costs to the consumer. In that manner they ensured that, their prices would cover all the costs incurred during maintenance. Eighty-six per cent of the agro-SMEs adopted the strategy and it was ranked the 1st out of 4, thus indicating that the strategy had a very high uptake and most preference. These results indicate that the strategy was feasible in addressing escalated maintenance costs, hence the very high uptake and most preference.

6.4.6.4 Insurance

This strategy was also adopted to address the greater risk of damage to infrastructure. Section 6.4.5.3 above provides the full details about the insurance strategy and implementation procedures. Agro-SMEs insured their farm buildings, equipment and implements against unexpected damage and destruction. Only 14% of the agro-SMEs adopted this strategy and the strategy was ranked the 2nd out of 4, which indicates that the strategy had a very low uptake but was preferred. The very low uptake depicts the harsh economic conditions during the period in question. Insurance companies also increased premiums due to the high risk associated with the agro-entrepreneurs, hence it was difficult for agro-SMEs to adopt the strategy. Furthermore, most insurance companies had closed down. However, the strategy was among the preferred strategies. This depicts that in a normal environment, the strategy is feasible to curtail unexpected risks due to climatic extremes.

6.4.6.5 Contribution of Strategies against Escalated Maintenance Costs towards Survival – Statistical Analysis

A binary regression analysis included the type of enterprise, which was assumed to influence the success or failure of the strategies adopted. The results, shown in Table 6.8, revealed that there is an improvement in model correctness from 54.5% to 68.2%. The model Chi-square had a value of 16.319, 5 degrees of freedom and a p value of 0.001, which is significant ($p < 0.05$). Negelkerke R^2 revealed that there is a strong relationship of 77.1% between strategies adopted and survival.

The Wald estimates revealed that although including the type of enterprise in the analysis was necessary it was not significant ($p > 0.05$). The results also revealed that insurance had a positive B value, which means that the agro-SMEs, which did not adopt this strategy, stood a better chance of surviving escalated maintenance costs than those that adopted it. This was because during the period in question most insurance companies were not capable of paying out the claims made by their clients due to the harsh economic environment. This meant that even if one paid their premiums in full, there was a

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risk of not getting their claim when disaster strikes. Hence those agro-SMEs that adopted the strategy faced greater risk of not surviving escalated maintenance costs.

6.5 Summary

This chapter profiled the survival strategies adopted by agro-SMEs in Kwekwe District to address challenges posed by climate change between 2000 and 2010. Data from the questionnaire survey and preference ranking was presented, discussed and analysed. Results from both the questionnaire survey and preference ranking were presented in tables. A frequency distribution analysis was used to determine the adoption rate. A matrix scoring was used to rank the strategies from the most preferred to the least preferred.

The implementation procedures for the different strategies were determined through a content analysis of the responses given by agro-entrepreneurs during the questionnaire survey. The nature of implementation, the mode of implementation and the specific steps followed in implementing the strategies were also explained. The influence of the adopted strategies on agro-SME survival was also discussed, analysed and corroborated to validate the results. In assessing the influence of specific survival strategies, content analysis and Binary Logistic Model were used. Content analysis helped the researcher to get the actual influence of specific strategies from the agro-entrepreneurs whilst Binary Logistic assisted in statistically assessing the influence of specific strategies on agro-SME survival.

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Table 6.7: Adoption Rates, Preference Ranks and Mutual Contribution of Strategies towards Survival

C) Other Climate Change Related Challenges

Strategy	Adoption rate (%)	Preference rank	Contribution towards agro-SME survival (%)		
			Marginal	Significant	Very significant
Challenge: Flooding and water logging					
Change land use patterns	86	4	33	67	0
Application of high water affinity aggregates	86	2	33	67	0
Diversification	71	5	20	80	0
Surface drainage	57	1	25	50	25
Water harvesting	29	3	50	50	0
Challenge: Inaccessible roads to the market					
Change marketing strategy	70	1	56	44	0
Lobbying for investments in public infrastructure	62	3	25	75	0
Seek alternative transport	62	4	50	50	0
Seek help from government and NGOs	31	2	24	75	0
Challenge: Reduced quality of products					
Product quality control	83	2	25	65	10
Value addition	50	1	8	67	25
Challenge: Interruption of planned programs					
Rescheduling	77	1	53	47	0
Use technology	64	2	57	43	0
Challenge: Greater risk of damage to infrastructure					
Build stronger structures	95	2	52	48	0
Bear the cost	82	1	56	44	0
Seek help from government and NGOs	23	4	40	60	0
Insurance	14	3	100	0	0
Challenge: Escalated maintenance costs					
Pass the cost to the consumer	86	1	11	63	26
Borrow	14	2	100	0	0
Insurance	14	2	100	0	0
Neglect or abandon	9	4	100	0	0

Key: Likert Scale ranges for preference ranking

- **Flooding and water logging**: 1 = most preferred, 2 to 3 = preferred, 4 = fairly preferred, 5 = least preferred
- **Inaccessible roads to the market**: 1 = most preferred, 2 = preferred, 3 = fairly preferred, 4 = least preferred.
- **Reduced quality of products**: 1 = most preferred, 2 = least preferred.
- **Interruption of planned operations:** 1 = most preferred, 2 = least preferred.
- **Greater risk of damage to infrastructure:** 1 = most preferred, 2 = preferred, 3 = fairly preferred, 4 = least preferred.
- **Escalated maintenance costs:** 1 = most preferred, 2 = preferred, 3 = fairly preferred, 4 = least preferred

Source: Author's Data Computation (2014)

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Table 6.8: Binary Logistic Regression Analysis Results

C) Other Climate Change Related Challenges

Challenge	Model correctness		Model significance (Model Chi-square)			Model strength (Negelkerke R^2)	Relative contribution of strategies towards survival			
	Step 0	Step 1	Value	df	Sig		Strategy	B	Wald	Sig
Flooding and water logging	71.4	85.7	11.982	7	0.003	0.789	Change land use patterns	2.332	15.380	0.000
							Surface drainage	0.444	0.612	0.434
							Water harvesting	0.575	0.987	0.320
							Apply high water affinity aggregates	-0.714	1.617	0.204
							Diversification	0.146	0.175	0.675
							Main activity	-0.439	2.964	0.085
							No. of years since establishment	-0.061	1.989	0.158
Inaccessible roads to the market	61.5	69.2	19.464	5	0.003	0.676	Lobbying	-0.962	0.340	0.560
							Seek help from government and NGOs	0.162	0.012	0.913
							Change marketing strategy	-1.395	1.095	0.295
							Seek alternative transport	1.984	1.882	0.170
							No. of years since establishment	-0.170	10.523	0.001
Reduced quality of products	79.2	81.7	14.115	4	0.024	0.608	Product quality control	0.680	0.450	0.503
							Value addition	-1.579	9.157	0.002
							Type of enterprise	-0.603	0.552	0.458
							Main activity	-0.942	0.910	0.340
Interruption of planned operations	59.1	63.6	11.813	3	0.004	0.596	Rescheduling	0.561	0.748	0.387
							Use technology	1.641	6.867	0.009
							Main activity	-1.466	10.556	0.001
Greater risk of damage to infrastructure	50	79.1	12.074	5	0.007	0.752	Bear the cost	-2.472	8.270	0.004
							Seek help from government and NGOs	0.570	0.746	0.388
							Insurance	0.907	1.746	0.188
							Build stronger structures	-0.567	2.462	0.117
							Type of enterprise	0.256	1.186	0.276
Escalated maintenance costs	54.5	68.2	16.319	5	0.001	0.771	Borrow	-0.520	0.134	0.714
							Neglect or abandon	-1.287	0.642	0.423
							Pass the cost to the consumer	-0.431	0.101	0.751
							Insurance	3.836	5.436	0.020
							Type of enterprise	-0.199	0.426	0.514

Key: df = Degrees of freedom, Sig = p value

Source: Author's Data Computation (2014)

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CHAPTER 7 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

Although agro-SMEs have not been given preferential option in national economic planning and development, this study argues that they have the potential to contribute towards socio-economic development and poverty alleviation in rural areas of both the developed and developing world. This is enhanced through employment creation, human capital formation, income generation, provision of basic goods and services to those in marginalised regions, generation of public revenue and increased opportunities of women empowerment. However, vulnerability of agro-SMEs to economic recession and climate change affect their establishment, growth and development. This calls for effective survival strategies for agro-SMEs to enhance their resilience in such challenging operating environments.

The economic recession and climate change experienced in Zimbabwe during the 2000-2010 period created a challenging environment for virtually all sectors of the economy. These twin factors made it difficult even for the LSE involved in agriculture such as Cairns Food, Agri-Foods, Cotton Marketing Board, Dairy Marketing Board, Cold Storage Commission, among others to remain operational. As such, they either downsized or closed down. Agro-SMEs began proliferating in various parts of the country including Kwekwe District. They became the missing middle link and filled in the gap left by the LSEs. Due to their flexibility and adaptability, they somehow managed to thrive in this difficult operating environment. It is of paramount importance to note that their triumph came as a result of adopting various survival strategies, which enabled them to withstand the effects of both economic recession and climate change-induced stress. However, a gap in knowledge was noted on which strategies enabled their survival during this trying period, how the strategies were implemented and how they contributed towards the survival of these agro-SMEs.

As a result, the researcher was compelled to investigate the survival strategies adopted by the agro-SMEs in Kwekwe District from 2000 to 2010, in response to economic recession and climate change. The study examines the survival strategies adopted by agro-SME s in Kwekwe District during this period of economic difficulty and changing climatic conditions. The study shows the importance of agro-SMEs in challenging environments and advises policy makers to prioritise them under such circumstances. Four specific objectives were set for the investigation. The first objective was to determine the characteristics of agro-SMEs that survived the challenging period. The second and third objectives were to examine the strategies adopted by agro-SMEs against economic recession and climate change, respectively. Finally, the researcher assessed the contribution of the adopted strategies towards agro-SME survival.

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Specific population parameters were set to determine the study sample. The parameters stipulated that all agro-SMEs established before 2005, survived the 2000-2010 challenging environment and were still operational during the time of the research were to constitute the study population. A total population sampling technique was used due to the relatively small population size. The research adopted a mixed method design in which both qualitative and quantitative methods were used for an effective investigation. Although the questionnaire was the main data collection tool, its findings were complemented by other activities such as preference ranking and matrix scoring as well as comparative scaling using the constant sum scaling technique, key informant interviews and data mining. This chapter summarises the findings of the study. This is followed by the conclusions and finally recommendations.

7.2 Summary of the Findings

7.2.1 Characteristics of Agro-SMEs that Survived the Challenging Environment

Two main characteristics of interest were of focus in this research. These were the socio-demographic characteristics of owners and operational characteristics of agro-SMEs. The socio-demographic characteristics that were considered were the gender of owner, age of owner and educational qualifications. The operational characteristics of agro-SMEs included the number of employees and employee type, type of enterprise, main activities carried out and activity class. It is important to note that these characteristics had a bearing on the contribution of adopted strategies towards agro-SME survival. Survival strategies do not operate in a vacuum. Their success or failure is influenced by a variety of factors including socio-demographic characteristics of owners and operational characteristics of agro-SMEs, among other factors.

The results reflect that male owned agro-SMEs stood a better chance of survival in challenging operating environments. The issue of gender imbalances is again reflected in this study. Women are always found lagging behind due to unequal opportunities presented to males and females. Furthermore, this might reflect the possibility that challenging operating environments require more commitment in terms of time to ensure survival of the agro-SME. Most women are therefore found wanting because they have too many responsibilities and commitments than men.

Cross-gender co-ownership of agro-SMEs was found common in challenging operating environments. However, in most of these cases males were found engaged in off-farm employment. Their major role was to provide capital for the agro-SMEs, leaving all the hard work for their female counterparts. This brings in the issue of division of labour between males and females. Females are always at a disadvantage. Despite the fact that the agro-SME is registered in both their names, females are the ones who are found toiling to ensure smooth operation of the agro-SME, whilst men are somewhere in the name of providing capital for the business.

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Partnerships were also found to be common among agro-SMEs that thrive in challenging operating environments. Both male and female partnerships were found to have equal chances of surviving challenging environments. This reveals that resource pooling in terms of capital and ideas is of paramount importance to ensure agro-SME survival in challenging operating environments.

Institutional agro-SMEs were also found among agro-SMEs that can withstand challenging operating environments. Although institutional agro-SMEs that survived the challenging environment only constituted a very small proportion, it is important to note that governmental institutions provide a way by which developing countries can set up and continue to provide rural development opportunities even in challenging economic and uncertain climatic conditions.

Agro-SMEs owned by agro-entrepreneurs above 40 showed a higher chance of survival in challenging operating environments than those owned by younger age groups. This can be related to issues such as access to capital and experience. It takes time for one to build up the necessary capital to start an agro-SME that can withstand difficult economic and climatic issues. It also takes experience and skill to develop business acumen that can help an agro-SME to survive challenging environments hence agro-SMEs that survived the 2000-2010 period were owned by agro-entrepreneurs in older age groups.

Educational qualifications showed a direct link on survival of some agro-SMEs in challenging environments. Agro-SME entrepreneurs that participated in the survey had at least a Junior Certificate. Evidence from the study reveals that they managed to survive a historical challenging operating environment. The survival is attributed partly to the educational levels of their owners, among other factors. Education increases the likelihood of identifying good business opportunities and the chances of success of a business, even in challenging environments.

The study revealed that there were some variations in employment thresholds and employee type between those maintained by agro-SMEs and the Ministry of SME's standards. This reflects the necessity of bending rules in challenging environments in order to survive. Challenging environments require tough decision-making and sometimes carrying out illegal actions in order to thrive.

Agro-SMEs in the survey indicated that they hired seasonal employees whereas the Ministry stipulates that agro-SMEs should hire permanent employees only. This shows that seasonal employees serve an enormous role in challenging operating environments. In such environments, agro-SMEs are confronted with a lot of risks and uncertainties that bring about cash flow problems. In such circumstances, it becomes difficult to hire and maintain permanent employees. Seasonal employees can therefore cover this gap whereby they can only be hired only when necessary, for example during labour peak periods and released as soon as the period is over.

The disparities between the Ministry of SMEs' standards and what was being practised by the agro-SMEs on the ground reflect that there is a need for the Ministry of SMEs to revisit their standards and regulations in challenging environments. This is because challenging operating environments require an

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extraordinary approach that is different from that adopted under normal situations. Rules and regulations should be adhered to but if they threaten the survival of the agro-SMEs, owners tend to bend them. Therefore, there is need to revisit some of these rules and regulations to allow proper execution of decisions among agro-SMEs without compromising.

The study showed that private entities stood a better chance of survival in challenging environments than any other type of enterprise. This is because they can make prompt decision making than any other type of enterprise in the survey. Prompt decision-making is crucial under difficult economic conditions and a changing climate. Cooperatives, family businesses and institutional agro-SMEs may need to wait for the responsible authorities first before passing and implementing a decision. This may be detrimental to the survival of an agro-SME in challenging environments. Furthermore, finance in private entities can be disbursed immediately without waiting for approval from certain signatories like with other types of enterprises.

Agro-SMEs involved in mixed farming had a better chance of survival in challenging environments among other activities. Diversification is important in challenging environments in order to spread the risk and prevent incidences of complete failure. This activity also allows for efficient use of resources, which is a crucial aspect in challenging environments. The efficient use of resources allows for conservation, recycling and reutilising resources. This might also explain why most of the agro-SMEs that survived the challenging operating environment fell in the hybrid activity class where the agro-SMEs were not only involved in primary or secondary production only but in more than one of these activities in order to spread the risk.

7.2.2 Strategies Addressing Economic Recession and Contribution towards Survival

Agro-SMEs in Kwekwe District adopted various strategies to address challenges posed by economic recession. The strategies were grouped in two main groups that is, those addressing input related challenges only and those addressing both input and output related challenges. Input related challenges included scarcity of inputs, lack of foreign currency, difficulties in accessing loans and unpleasant labour related issues. Input and output related challenges included reduced demand of products, emergence of parallel markets, increased pricing and marketing controls and hyperinflation. Different adoption rates for the adopted strategies were noted. Survival strategies also attained varying preferences from agro-entrepreneurs. The adoption rate was measured as a percentage whilst preferences were attached as to the strategy that had the highest score after matrix scoring. Likewise, their contribution towards agro-SME survival varied from one agro-SME to the other. Comparative scaling technique results sometimes corresponded and sometimes differed with statistical results regarding the extent to which the strategies contributed towards survival.

To address scarcity of inputs, agro-SMEs indicated that they adopted a variety of strategies. These were categorised into four main groups, which are, conservation, involvement in cooperatives, clusters, or professional bodies, use of alternatives and changing business patterns. The researcher had assumed

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that educational level, gender, and number of years of establishment could affect contribution of strategies towards survival. These factors did not yield significant results in the statistical analysis. Changes in business patterns among other strategies was the only statistically significant strategy that contributed towards agro-SME survival.

Agro-SMEs adopted substituting imported inputs with locally produced, sourcing foreign currency on the parallel market, barter trade or used own foreign currency savings to address lack of foreign currency. Among these strategies, substituting imports with locally produced inputs was highly adopted and most preferred. Results indicated that the strategy contributed 65% towards agro-SME survival in the significant category. However, sourcing foreign currency on the parallel market and barter trading scored the highest contribution of 80% towards survival in that same category Rarely did the strategies adopted contribute towards agro-SME survival in the very significant category. Statistical analysis revealed that, enterprise type and gender of owner play a very significant role for agro-SMEs to withstand the effects of lack of foreign currency as indicated by the significant p values ($p < 0.05$). As such, private agro-SMEs as well as male owned agro-SMEs have a higher probability of surviving lack of foreign currency. Substituting imports with locally produced inputs and use of own foreign currency savings also yielded statistically significant results ($p < 0.05$).

Difficulties in accessing loans was addressed by a various strategies including involvement in cooperatives, sale or mortgage of assets, seek government or NGO financing, opting for self-liquidating loans and negotiating friendly terms with informal moneylenders. Although involvement in cooperatives was highly adopted, agro-entrepreneurs indicated that they mostly preferred self-liquidating loans. Results indicated that contribution towards survival was mainly in the marginal and significant categories. A statistical analysis revealed that gender, age of owner and activity class significantly influence the contribution of survival strategies towards survival as indicated by the significant p values ($p < 0.05$). Gender and age obtained negative B values, thus indicating that male owned agro-SMEs and agro-SMEs owned by younger agro-entrepreneurs respectively had a higher chance of surviving difficulties in accessing loans.

To address unpleasant labour related issues agro-SMEs introduced motivation programs, other forms of payment, staff education and training and staff retention. Motivation programs and other forms of payment were both highly adopted and most preferred. The strategies contributed significantly towards survival with other forms of payment contribution as much as 70% towards agro-SME survival. Statistically number of seasonal employees and activity class significantly influence contribution of survival strategies towards survival of agro-SMEs as indicated by the significant p values ($p < 0.05$).

To address challenges listed as input and output related challenges, agro-SMEs adopted a variety of strategies. Findings reveal that to address reduced demand of products agro-SMEs opened new markets, exercised superior customer care, changed, or added their list of products among other things. Agro-SMEs highly adopted opening new markets despite the fact that superior customer care was

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mostly preferred. Giving discounts and special offers had a very low adoption rate whilst continuous improvement of products was least preferred. The comparative scaling revealed that all strategies mostly contributed towards survival at a significant scale. Statistical analysis revealed that superior customer care, opening new markets and changing or adding the list of products significantly contributed towards agro-SME survival as indicated by the significant p values ($p < 0.05$).

Increased pricing and marketing controls was addressed by various strategies including real time pricing, changing product or service line and price pooling among others. Findings revealed that real time pricing was highly adopted whilst forward contracting was mostly preferred. Comparative scaling technique revealed that all strategies adopted against increased pricing and marketing controls contributed towards agro-SME survival at a significant scale. Statistical analysis yielded significant results ($p < 0.05$) for changing product or service line and cooperative marketing with price pooling. Although the researcher had assumed that type of enterprise and activity class could influence contribution of strategies towards agro-SME survival, their results were statistically insignificant ($p > 0.05$).

Agro-SMEs adopted information gathering and competitive production in the face of an emergence of parallel markets. Information gathering was both highly adopted and most preferred. The comparative scaling technique revealed that both strategies contributed towards agro-SME survival at a significant scale. A statistical analysis yielded statistically significant results for both strategies. However, it is important to note that the number of years since agro-SME establishment and activity class have a statistically significant influence on the contribution of these strategies towards survival as indicated by the significant p values ($p < 0.05$. Both variables have negative B values meaning older agro-SMEs and those agro-SMEs involved in primary activities stand a better chance of surviving the emergence of parallel markets.

To address hyperinflation, agro-SMEs adopted a variety of strategies that were categorised into three main groups i.e. cost leadership strategies, sound financial management and pricing strategies. However, it is important to note that some of the strategies correspond to the traditional strategies adopted by other businesses that experienced similar challenges before. For example, strategies such as converting local currency into a stable foreign currency and never allowing cash to remain idle were adopted by agro-SMEs in Kwekwe District. These correspond with the traditional hyperinflation strategies mentioned by Swanson (2007) in the hyperinflation survival guide. These strategies received the highest adoption rates and fell in the most preferred to preferred categories. Furthermore, results indicate that these strategies had a significant to very significant influence on the survival of agro-SMEs. This suggests that these strategies are compatible for adoption by any other business regardless of the specific activities being carried out.

Apart from the above, other highly adopted and most preferred strategies addressing hyperinflation included fluid pricing and accepting alternative tender. Comparative scaling indicated that they

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contributed towards agro-SME survival mostly at insignificant scale. Statistical analysis revealed that gender and the number of years since establishment had a statistically significant influence on the contribution of survival strategies towards surviving hyperinflation.

The strategies adopted to address economic recession had different implementation procedures. Some strategies were precautionary, whilst some were reactionary. Some strategies were transformational and some were incremental. Although specific steps in implementing the strategies differed from one agro-SME to the other, implementation procedures for the strategies adopted against economic recession were largely reactionary, (ex-post) which means they were adopted in response to economic recession challenges. For example, fluid pricing against hyperinflation was adopted after agro-SMEs had realised that the value of the currency was continually losing value on a day-to-day basis.

Implementation procedures were also largely transformational than incremental. The implementation procedures were largely transformational in the sense that they involved profound, fundamental and sometimes irreversible changes and shifts in the way things were done. For example, minimising energy consumption against scarce inputs, converting local currency to a stable foreign currency against hyperinflation and competitive production against parallel markets among others were some of the transformational strategies. To a lesser extent, some of the strategies adopted were incremental. These include use of alternatives against scarcity of inputs and changing product line against increased pricing and marketing controls.

Findings revealed that adopting a strategy do not necessarily mean it was preferred. Likewise, preference for a strategy did not guarantee adoption. Some strategies were adopted solely for the purposes of surviving economic recession. In the same vein, preferences were based on the fact that, given a choice what would an agro-entrepreneur choose among the listed strategies however this was no guarantee that the strategy will be adopted. This brought about some disparities between the two activities, whereby sometimes a strategy was highly adopted but least preferred. Likewise, a strategy could be most preferred but attain a low adoption rate.

Adoption rates were affected by a variety of factors. The factors include the availability of capital, agro-entrepreneur expertise, strategy compatibility and relative advantage among others. Although capital was limited for most agro-SMEs, they found ways to find the necessary capital to adopt a strategy deemed feasible. For most of the agro-entrepreneurs, their expertise was above average. Therefore, in most cases agro-entrepreneur expertise had a positive influence on adoption. The compatibility and relative advantage of strategies adopted to address economic recession varied from one agro-SME to the other. However, these factors greatly affected the ultimate influence on agro-SME survival.

Results from Binary logistic shows that model correctness for all the challenges improved. This implies that the models with predictors (survival strategies) were significantly better models than constant only models. The p values for the model Chi-square of all the challenges were significant ($p < 0.05$) thus indicating that the predictors (survival strategies) as a set reliably distinguished between positive and

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negative contribution of the strategies towards agro-SME survival. The Wald statistics yielded varying B values for individual strategies. The different B values showed different directions of the contribution for individual strategies towards agro-SME survival. Their significance was determined by the p value. Most of the results however, were statistically insignificant ($p > 0.05$). Despite this fact however, the agro-SMEs that adopted these strategies survived.

It is of great importance to note that the strategies adopted against economic recession challenges may not necessarily be the best possible strategies available for adoption. Neither are the preferred strategies the best possible strategies for adoption. In other words, the strategies adopted by agro-entrepreneurs are not exclusive. Therefore, for those agro-entrepreneurs who might find this useful, there is need for them to consider individual attributes concerning their capital base, expertise and the relative compatibility and advantages for their specific enterprises.

7.2.3 Strategies Addressing Climate Change and Contribution towards Survival

A number of strategies were adopted to address challenges posed by climate change. These were profiled accordingly under the challenges they addressed. These challenges were grouped into three main categories i.e. crop related challenges, livestock related challenges and other climate change related challenges. Crop related challenges included delayed onset of rains, increased temperatures, unpredictable and varying rainfall, mid-season dry spells, shorter, drier growing seasons and greater risk of plant diseases and pests.

Livestock related challenges included reduced quantity and quality of grazing and greater risk of animal diseases and infections. Other climate change related challenges included flooding and water logging, inaccessible roads to the market, reduced quality of products, interruption of planned programs, greater damage to infrastructure and escalated maintenance costs. The adoption rates and preferences differed from one strategy to the other. Likewise, their contribution towards agro-SME survival varied from one agro-SME to the other. The comparative scaling technique results sometimes corresponded and sometimes differed with statistical results regarding the extent to which the strategies contributed towards survival.

To address delayed onset of rains, agro-SMEs highly adopted irrigation and soil moisture conservation. Prayer or ritual offerings had a very low adoption rate among others and it was least preferred at the same time. However, shifting planting dates was the most preferred strategies among other strategies. Findings from comparative scaling indicated that the strategies only managed to contribute marginally towards survival. Statistical analysis results indicated that those who adopted irrigation and those who did not adopt prayer or ritual offering stood a better chance of surviving delayed onset of rains and these results were statistically significant ($p < 0.05$).

Findings reveal that agro-SMEs adopted a variety of strategies to address increases temperature. Among the adopted strategies irrigation, soil moisture conservation and drought resistant varieties were

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highly adopted and mostly preferred at the same time. Changing from crops to livestock had a very low adoption rate and least preference. Comparative scaling technique indicated that the adopted strategies mostly contributed towards agro-SME survival at a significant scale.

In order to reduce the effects of unpredictable and varying rainfall, agro-SMEs highly adopted irrigation, soil moisture conservation and crop diversification. These same strategies were also mostly preferred. Comparative scaling indicated that the strategies adopted against unpredictable and varying rainfalls had a significant contribution towards survival. Rarely did the strategies contribute at a very significant scale. Statistical analysis indicated that those who did not adopt dry or early planting stood a better chance of surviving delayed onset of rains and these results were significant.

Mid-season dry spells were addressed by a variety of strategies. Among the strategies adopted irrigation was highly adopted and most preferred whilst changing from crops to livestock was lowly adopted and least preferred. Comparative scaling indicated that contribution of strategies towards survival was mostly in the significant category. However, the strategies did not manage to contribute very significantly towards survival. Statistical analysis results discourages adopting changing from crops to livestock as revealed by a negative B value and significant p value ($p < 0.05$) which means that those who did not adopt the strategy had a higher chance of surviving mid-season dry spells.

Results from the study revealed that irrigation and soil moisture conservation were also among the strategies adopted against shorter, drier growing seasons. These strategies were highly adopted whilst early or dry planting had a very low adoption rate. Irrigation was also the most preferred strategy whilst changing from crops to livestock was least preferred. Statistical analysis indicated that in addressing shorter, drier growing seasons, early or dry planting is not favourable as revealed by the positive B value and the results were statistically significant ($p < 0.05$).

Good cropping practices, monitoring and control measures and diversification were highly adopted against greater risk of plant diseases and pests. Good cropping practices were the most preferred whereas changing from crops to livestock was least preferred. Comparative scaling technique indicated that all the strategies adopted significantly contributed towards survival. A statistical analysis indicated that adopting good cropping practices against greater risk of plant diseases and pests would improve chances of surviving.

The reduced quality and quantity of grazing affected those agro-SMEs involved in livestock production. In order to reduce the effects of this challenge agro-SMEs adopted strategies such as the use of supplements, planted pastures, contact grazing and destocking. Among the adopted strategies, diversification and rotational grazing were highly adopted and comparative scaling technique revealed that these both strategies contributed significantly towards agro-SME survival. Use of supplements was mostly preferred by agro-SMEs whilst switching to cropping was least preferred. Statistical analysis revealed that, contract grazing would minimally contribute towards survival.

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Agro-SMEs highly adopted monitoring and control measures and the use of resistant breeds to address greater risk of animal diseases and infection. Other strategies adopted included intensive pasture management, use of resistant breeds, diversification and changing to cropping. Results from comparative scaling revealed that all the strategies mostly had a significant contribution towards survival. Intensive pasture management was mostly preferred whilst changing to cropping was least preferred. Statistical analysis yielded significant results for the use of resistant breeds indicating that adopting the strategy would contribute significantly towards survival.

Flooding and water logging was addressed by various strategies. Agro-SMEs highly adopted changing land use patterns and the application of high water affinity aggregates whereas water harvesting was lowly adopted. In addition, agro-SMEs indicated that they mostly preferred surface drainage to address this challenge whist diversification was least preferred. It is however, important to note that all the strategies adopted to address flooding and water logging contributed towards agro-SME survival mostly at a significant scale. Statistical analysis indicated that adopting changing land use patterns has a lesser contribution towards agro-SME survival.

To address inaccessible roads to the market, agro-SMEs highly adopted changing marketing strategy. Likewise, the strategy was the most preferred among other strategies. Strategies adopted to address this challenge rarely contributed towards agro-SME survival at a very significant scale, they only contributed towards survival at marginal and significant scales only. Statistically, none of the strategies adopted had a significant contribution towards survival. However, statistical results revealed that number of years since agro-SME establishment is a significant factor in addressing this challenge.

Product quality control and value addition were adopted to address reduced quality of products. Product quality control was highly adopted but least preferred and vice versa. Both strategies contributed towards agro-SME survival mostly at a marginal scale. Statistical analysis results indicated that adopting value addition contributed towards agro-SME survival.

Agro-SMEs addressed interruption of planned programs by either rescheduling or using technology. Rescheduling was highly adopted and most preferred than the use of technology. Agro-SMEs indicated that both strategies only contributed towards agro-SME survival marginally. Statistical analysis indicated that adopting use of technology had a lesser contribution towards survival.

The greater risk of damage to infrastructure was addressed by building stronger structures, bearing the cost, insurance and seeking help from the government or NGOs. Building stronger structures and bearing the cost were highly adopted and most preferred. Insurance was least adopted whilst seeking help from the government or NGOs was least preferred. Statistically, bearing the cost of the damage would contribute significantly towards survival.

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To reduce the effects of escalated maintenance costs, agro-SMEs indicated that they passed the cost to the consumer, borrowed, insured, neglected, or abandoned. Findings reveal that passing the cost to the consumer was highly adopted and most preferred. Borrowing, insurance and neglecting had very low adoption rates and all the three strategies only marginally contributed towards survival. Statistically, adopting insurance had a lesser contribution towards survival.

Findings revealed that strategies adopted were implemented at different scales and varying degrees with varying procedures from one agro-SME to the other. The nature of implementation differed from one agro-SME to the other. However, the researcher established that most of the strategies adopted were largely reactionary (ex-post) i.e. they were usually implemented in response to challenges posed by climate change rather than precautionary. Furthermore, the strategies were implemented at an incremental scale i.e. they were implemented as small adjustments towards an expected goal without changing the existing structure or altering current methods.

It is important to note that the statistical analysis was run twice to determine whether significant results could be obtained when strategies were assumed to operate in isolation. Most of these analyses were insignificant. This compelled the researcher to make some logical assumptions on other socio-demographic factors and agro-SME characteristics that could affect the success or failure of a particular set of strategies. Results of these analyses indicated that the success or failure of a particular set of strategies was influenced by certain socio-demographic factors as well as agro-SME characteristics.

Binary logistic regression results were analysed and interpreted using classification tables, model Chi-square, Negelkerke R^2 and Wald estimates. These gave us model correctness, significance, strength and the direction of contribution of each strategy towards survival of agro-SMEs, respectively. Model correctness shows that models with predictors (survival strategies) were significantly better models (p , 0.05). The p values for Model Chi-square of all the challenges except delayed onset of rains were significant ($p < 0.05$). This implies that the predictors as a set reliably distinguished between positive and negative contribution of adopted strategies towards agro-SME survival. The Wald statistics showed varying degrees of B value for individual strategies indicating varying levels of contribution towards survival. Most of these results were however insignificant, ($p > 0.05$).

It is important to note that this study provides a guideline of the strategies that an agro-SME can adopt under changing climatic conditions. However, it is advised that agro-entrepreneurs should consider their situation carefully before adopting and implementing strategies. This is because influence differs from one agro-SME to the other due to various factors. These factors include implementation procedures, the scale at which they were implemented and agro-entrepreneur expertise among other factors.

7.3 Conclusions

The main objective of this research was to investigate the survival strategies that agro-SMEs in Zimbabwe's Kwekwe District adopted from 2000 to 2010 in response to economic recession and climate

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change-induced stress. The effects of these realities compelled agro-SMEs to adopt various strategies as profiled in preceeding chapters in order to remain operational. Four specific objectives were set for an effective investigation. The first objective was to determine the characteristics of agro-SMEs that survived the challenging period. The second and third objectives were to examine the strategies adopted by agro-SMEs against economic recession and climate change, respectively. Finally, the researcher assessed the contribution of the adopted strategies towards agro-SME survival.

Over and above all things, findings of the study revealed that, agro-SMEs are unique from other SMEs in general. This is because agro-SMEs are confronted with an extra dimension of climate change challenges which other SMEs are not directly confronted with. It is therefore always necessary to consider climate change when dealing with issues concerning agro-SMEs and not treat them just like any other SME.

Findings also revealed that, for an agro-SME to survive challenging environments, such as the one expirienced in Zimbabwe during 2000 -2010 period, it should possess a particular set of characteristics. This study therefore concludes that a male owned agro-SME, whose owner is in age groups above 40 years and have at least a Juniour Certificate has better chances of surviving a challenging environment. Apart from agro-entrepreneur characteristics, the agro-SME itself should possess a particular set of characteristics. This study concluded that, private entities practising mixed farming as a major activity and hires more seasonal employees has a better chance of surviving challenging environments.

It is apparent from the findings of the study that agro-SME characteristics alone would not effectively contribute towards survival. Certain survival strategy options also contributed towards agro-SME survival during the period in question. Thus, this study examined survival strategies adopted by agro-SMEs in Kwekwe District in order to withstand the effects of economic recession and climate change between 2000 and 2010. The study therefore concludes that, a variety of strategies are available for adoption by agro-SMEs operating in challenging environments. Strategies varied from illegal to formal strategies, ethical to unethical strategies and from outdated, traditional and old-fashioned to modern, artificial and unnatural strategies that were often more complex. It is therefore concluded that, when agro-entrepreneurs deal with challenging environments they often explore every route that they think can give them positive results.

Based on the nature of the strategies examined, it is concluded that, good management skills and basic knowledge of economic principles as well as general knowledge on how climate is changing are a pre-requisite for surviving both a challenging economic situation and changing climatic conditions. Challenging economic environments are unstable and things change overnight. Changing climatic conditions are unpredictable and extreme conditions are experienced. Therefore, good management skills are required to assist agro-entrepreneurs to absorb new information quickly and be able to act immediately and accordingly. This helps to avoid unnecessary delays in passing and implementing decisions that can avoid devastating effects for the agro-SME.

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The study concludes that, flexibility is a key aspect in an uncertain economic environment and changing climate, which is plagued by challenges such as pricing and marketing controls, hyperinflation, and scarcity of inputs among others. An uncertain economic climate brings about volatile input and output prices, which ultimately lead to uncertainty on returns whilst changing climatic conditions brings unexpected climatic extremes. In this case, decision makers need to be flexible enough to make suitable adjustments that can make an agro-SME triumph under a challenging environment.

Findings from the examined strategies revealed that some of the adopted strategies addressed more than one challenge. The study concludes that, efficient allocation of resources is enhanced and is crucial in challenging environments. Agro-entrepreneurs become conscious of allocating resources efficiently, which will ultimately bring increased profits since one strategy would be addressing a variety of issues. Findings from the study lead to the conclusion that agro-entrepreneurs are well informed about the changing climate as well as the concept of conservation agriculture and how it can assist them to reduce the effects of a changing climate.

Findings from the study also led to a conclusion that, although some of the strategies adopted were compatible with the concept of surviving challenging environments, they were often resisted. These strategies include destocking, neglecting or abandoning destroyed infrastructure and switching from crops to livestock or vice versa. Despite the fact that these strategies are associated with the concept of surviving changing climate, agro-entrepreneurs view them as drawbacks.

Findings of the study revealed that, the rate at which these strategies were adopted also varied. Some strategies were highly adopted whilst some were adopted at very low rates. Meanwhile, strategies also attained varying preferences from agro-entrepreneurs. Some strategies were most preferred whilst some were least preferred. Complementing these findings led to a conclusion that, adopting a strategy did not necessarily mean it was preferred. On the other extreme, the fact that a strategy was mostly preferred did not guarantee adoption. In other words, a strategy could be highly adopted but least preferred and vice versa. In most circumstances, adoption was merely for the purpose of surviving the challenging period and not necessarily because it was more preferred or it was the best possible starategy.

Implementation procedures differed from one agro-SME to the other. However, the study concluded that strategies adopted against economic recession and climate change were largely reactionary. Meaning they were adopted and implemented in response to the challenges.

The comparative scaling technique gave actual contribution of adopted strategies towards agro-SME survival. Results showed that contribution of strategies towards survival also varied in scale from one agro-SME to the other. Basing on the findings, it is concluded that all the strategies adopted against economic recession and climate change at least managed to contribute towards survival. However, contribution varied from marginal to significant to very significant scales.

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The most important thing that agro-entrepreneurs should grasp from this study is the fact that business success results from embracing the whole package of the available survival strategy options. This would help them remain resilient and remain operational in challenging environments. This study offers evidence that survival in challenging environments can be achieved through possessing a particular set of characteristics as well as adopting some survival strategies examined in this study.

It is a fact that today the agro-SME sector in Zimbabwe is still the major producer of goods and services. Most commercial farms and big companies are still facing severe financial problems and have not yet fully resuscitated. This brings us to the conclusion that agro-SMEs are appropriate business models in challenging environments. They can therefore be used as instruments to alleviate poverty through income distribution and service provision to those in marginalised areas, thereby promoting rural development.

7.4 Recommendations

Challenging operating environments present a survival puzzle for agro-SMEs. Economies are never stable for a long time and climate is always changing and variable. Agro-entrepreneurs respond to changes in the natural and economic environments by adopting survival strategies. This study investigated the survival strategy options adopted by agro-SMEs operating in the challenging environment prevalent in Zimbabwe from 2000 to 2010. The challenging operating environment resulted in a myriad of challenges.

The unprecedented economic recession resulted in hyperinflation, scarcity of inputs, lack of foreign currency and unavailability of loans. In addition, the government increased marketing and pricing controls, which led to the emergence of parallel markets. Hyperinflation eroded the incomes culminating in reduced buying power as labour issues became agitated.

On the climate change front, agro-entrepreneurs had to deal with delayed onset of rainfall, increased temperatures and mid-season dry spells. Shorter drier growing seasons, flooding, dilapidated transportation infrastructure, compromised grazing resources and increased plant and animal disease prevalence compounded the climate change problem. Variable climate compromised the quality of products, interrupted planned operations damaged infrastructure and increased maintenance costs.

Results show that agro-entrepreneurs adopted a variety of strategies to overcome these challenges. From the findings, it is important to point out that the government lacked financial capacity to assist the agro-entrepreneurs. Where finance was availed, it was distributed in an opaque and politically oriented manner. As such, agro-entrepreneurs had to be self-reliant. Consequently, it is recommended that the government should play a more active and transparent role in support of agro-entrepreneurs during challenging operating environments.

On the other hand, agro-entrepreneurs should consider a holistic approach in dealing with economic recession and climate change. They should thus consider the whole package of survival strategy options

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available for adoption in order to remain relevant in challenging operating environments. It is recommended that agro-SMEs should take a proactive approach in order to survive. They must have some foresight that can enable them to forecast into the future. In this manner, they will be able to identify opportunities and challenges beforehand. This would enable them to take advantage of any opportunities and deal with any challenges that comes their way accordingly. Agro-SMEs also need to become aggressive in a period of economic turmoil.

The economic recession experienced in Zimbabwe was extraordinary. This called for agro-SMEs to adopt "extraordinary" solutions. If need be, agro-entrepreneurs should transform radically, adopt necessary strategies in order to adapt to challenging operating environments. In terms of labour, it is advisable to employ casual labour than permanent as this is cheaper and hired only when and where needed. Hyperinflation anchored by increased government control of the market requires diversification into domains less controlled by the government to allow adoption of pricing strategies. Faced with reduced demand of products and scarcity of inputs, one is encouraged to institute operational changes.

Although climate change during this period was not catastrophic, it significantly affected agro-SMEs. Variable seasons became common and it is recommended that operations requiring water should rely less on rainfall. Agro-SMEs are encouraged to adopt water-harvesting strategies to address mid-season dry spells, delayed onset of rains, unpredictable and varying rainfalls. Concerning flooding, insurance is recommended to farmers. In addition, agro-entrepreneurs are encouraged to change land use plans to those that are adaptable to flooding such as aquaculture and growing rice. The government has always availed agricultural extension services for both crops and livestock. Agro-SMEs are encouraged to harness the expert knowledge provided by extension workers to adapt to climate change. Getting daily weather updates and forecasts is also useful in planning.

This study assumed that only socio-demographic characteristics of agro-entrepreneurs and operational characteristics of agro-SMEs have a bearing on the contribution of survival strategies towards survival. It is therefore recommended that, further studies should be carried out to determine if there are other factors that can have a bearing on the contribution of survival strategies towards agro-SME survival.



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QUESTIONNAIRE FOR AGRO-SMEs

Research Topic: Adoption of Survival Strategies by Agro-SMEs in a Challenging Rural Environment in Zimbabwe

ADMINISTRATION

Administered by.....Date...../...../20.....

Administered at.....Questionnaire No.....

Preamble

Zimbabwe experienced a historic economic recession compounded by severe climate change over the 2000-2010 period. You may agree with me that it was quite a challenging environment for the agro-SME sector. Agro-SMEs in Zimbabwe, including Kwekwe District adopted survival strategies in order to remain operational during this economically turbulent and climatically unpredictable environment. However, not much is known about the nature of survival strategies that agro-SMEs in this district adopted nor is there any adequate scientifically generated information on how they were implemented.

This questionnaire survey is designed to obtain this data and you have been selected as one of the sources of this data. Personal confidentiality of respondents is guaranteed and the information collected is for and will be used for academic purposes only.

Should you feel uncomfortable to continue with the questions please feel free to stop at any stage. Please feel free to provide any additional information that you think may be useful in this study. Your cooperation is highly appreciated.

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SECTION A: DEMOGRAPHIC CHARACTERISTICS OF OWNER

Gender		Age	<20	21-30	31-40	41-50	51-60	<60
	M							
	F							

Highest Educational Level	Grade 7	Juniour Certificate	O' Level	A' Level	Tertiary

SECTION B: CHARACTERISTICS OF AGRO- SMEs

Date of establishment.....

No of employees..... Main activity ....

Permanent	Seasonal	Main season hired	Summer
			Winter

Primary Production	Processing	Transportation	Marketing

SECTION C: SURVIVAL STRATEGIES ADOPTED AGAINST ECONOMIC RECESSION CHALLENGES

a. i) How did you respond to hyperinflation?

Cost leadership strategies		Effective financial management strategies		Effective pricing strategies		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

iii) How did the strategy contribute towards the survival of the agro- SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

b. i) How did you respond to the scarcity of inputs (fuel, seed, fertilizers, chemicals, water, and electricity)?

Conservation		Involvement in clusters/ cooperatives/ proffessional bodies		Use of alternatives		Changes in business patterns		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

c. i) How did you respond to lack of foreign currency?

Substitution of imported machines/ raw material with locally produced machines/ raw materials		Other (Specify)	

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ii) Briefly explain how the strategy was implemented

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

d. i) How did you respond to the difficulties in accessing loans?

Involvement in clusters, cooperatives, professional bodies		Opt for self liquidating loans		Seek finance from other sources e.g. government, informal money lenders		Negotiate friendly terms with suppliers of finance		Sale or mortgage of assets		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

iii) How did the strategy contribute towards the survival of the agro- SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

e. i) How did you respond to increased pricing and marketing controls?

Effective pricing		Cooperative marketing with price pooling		Forward contracting		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/little		Significant		Very significant	

f. i) How did you respond to the emergence of parallel markets?

Gather information on parrallel market trends and maximise on best opportunities		Change or reduce production of products/ services common on the parallel market		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

g. i) How did you respond to unpleasant labour related issues (reduced labour force, highly demoralised work force)?

Improve staff education and training		Introduce motivation programs		Use other forms of payment other than Z$		Other (Specify)	

ii) Briefly explain how the strategy was implemented

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iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

h. i) How did you respond to reduced demand for products/ services?

Give discounts/ special offers		Superior customer care		Sourcing new customers		Change/ add the list of products/ services		Continously improving quality/ durability of products/ services		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

SECTION D: STRATEGIES ADOPTED AGAINST CLIMATE CHANGE CHALLENGES

a. i) How did you respond to delayed onset of rains?

Shifting planting dates		Develop water management systems		Develop irrigation facilities		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/little		Significant		Very Significant	

b. i) How did you respond to increased temperatures?

Use of drought resistant varieties		Develop irrigation facilities		Develop water management systems		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

c. i) How did you respond to highly volatile and varying rainfalls?

Develop and expand irrigation		Develop water management		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

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.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

d. i) How did you respond to mid-dry spells?

Develop and expand irrigation facilities		Water conservation practices		Tillage practices that address moisture deficiences		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

e. i) How did you respond to shorter drier growing seasons?

Shifting planting date		Use early maturing varieties		Develop and exapnd irrigation		Timing of operations		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

f. i) How did you respond to difficulties in accessing land due to floods?

Change in land use patterns		Use of diversion ditches		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

g. i) How did you respond to transportation problems (inaccessible roads to the market)?

Lobbying for investiments in public infrastructure (roads)		Atenative transport e.g. train		Changing marketing strategy/ target market		Seek help from government and NGOs		Other (Specify)	

ii) Briefly explain how the strategy implemented.

.....

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iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

h. i) How did you respond to reduced quality and quantity of grazing?

Rotational grazing/ paddocking		Supplement with artificial feeds		Destocking		Contract grazing		Use of improved breeds/		Other (Specify)

ii) Briefly explain how the strategy was implemented.

.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

i. i) How did you respond to greater risk of plant diseases?

Use of resistant crop varieties		Good cropping practices (e.g. crop ratation, crop spacing, mixed cropping		Adopting careful monitoring/ control measures		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

j. i) How did you respond to greater risk of animal infection?

Adopting careful monitoring/ control measures		Diversification		Use of improved breeds		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

k. i) How did you respond to reduced quality of products?

Invest in product quality control		Transform into different forms that have more market value		Adopting precautionary principles that aensure improved quality		Other (Specify)	

ii) How was the strategy implemented?

.....

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

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Not at all		Marginal/ little		Significant		Very significant	

l. i) How did you respond to interruption of planned operations due to climate extremes?

Rescheduling		Substitution		Insurance		Other (Specify)	

ii) How was the strategy implemented?

.....

.....

iv) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

m. i) How did you respond to greater risk of damage to infrastructure?

Insurance		Bear the cost	Seek help from government, NGOs		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

n. i) How did you respond to escalated maintenance cost?

Borrowing		Effective pricing		Neglect/ abandon		Other (Specify)	

ii) Briefly explain how the strategy was implemented.

.....

iii) How did the strategy contribute towards the survival of the agro-SME? Please tick

Not at all		Marginal/ little		Significant		Very significant	

Thank you for your cooperation

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RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF RESEARCHER/INVESTIGATOR:
Ms D Shoko

Student No: 11622294

PROJECT TITLE: **ADOPTION OF SURVIVAL STARTEGIES BY AGRO-SMALL AND MEDIUM ENTERPRISES IN A CHALLENGING RURAL ENVIRONMENT IN ZIMBABWE.**

PROJECT NO: SARDF/13/IRD/02/0625

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Prof J Francis	University of Venda	Supervisor
Ms G Oloo	University of Venda	Co-supervisor
Ms D Shoko	University of Venda	Investigator - Student

ISSUED BY:
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE

Date Considered: July 2013
Decision by Ethical Clearance Committee Granted
Signature of Chairperson of the Committee: .....
Name of the Chairperson of the Committee: Prof. X.G Mbhenyane

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Creating Future Leaders

Ministry of Local Government, Rural and Urban Development

Tel: 263 (055) 23721/3, 22947

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Office of the District Administrator

P.O Box 114

Kwekwe

Zimbabwe

10 June 2013

To...whom it may concern.....

RE: PERMISSION TO CONDUCT MASTERS RESEARCH IN KWEKWE DISTRICT

This letter from the District Administrator's Office serves to confirm that Dumisani Shoko registered for Masters in Rural Development programme at University of Venda in South Africa has been granted permission to conduct a masters Research in Kwekwe District.

Information collected in this research is purely for academic purposes and will be used for academic purposes only.

Assist her in anywhere possible

DISTRICT ADMINISTRATOR
10 JUN 2013
P.O. BOX, KWEKWE, ZIMBABWE TEL

Thank you for participation

Yours Faithfully

Mafukidze

MAFUKIDZE MM MRS.....

Assistant District Administrator.

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