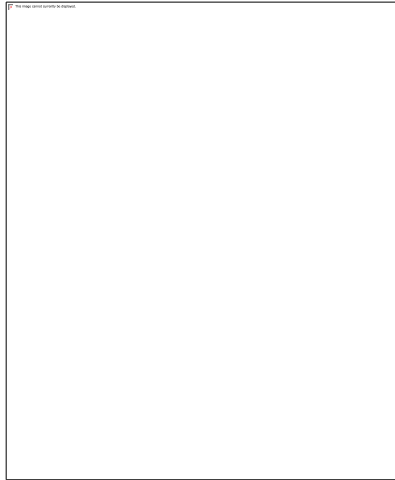


**BINDURA UNIVERSITY OF SCIENCE EDUCATION**



**FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCE  
DEPARTMENT OF AGRICULTURAL ECONOMICS, EDUCATION AND  
EXTENSION**

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**B202531B**

**ANALYSIS OF THE MARKETING CHANNELS AND PROFITABILITY OF  
SMALL-SCALE PIG PRODUCTION ENTERPRISE: A CASE STUDY OF BINDURA  
UNIVERSITY PIGGERY PROJECT**

**A dissertation submitted to the Bindura University of Science Education as partial  
fulfilment of the Bachelor of Agriculture Science Degree in Agricultural Economics and  
Management.**

**31 May 2024**

**Name of Candidate:** Mitchell Mandipaka

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### **APPROVAL FORM**

The undersigned certified that they have supervised and recommended to Bindura University of Science Education for acceptance of the dissertation entitled '**Analysis of the Marketing Channels and Profitability of Small-Scale Pig Production Enterprise: A Case Study of Bindura University Piggery Project**' submitted in partial fulfilment of a Bachelor of Science Honours Degree In Agricultural Economics And Management

**Name of supervisor:** Dr Lovemore Musemwa

**Signature:**.....

**Date:** .....

## **DECLARATION**

I hereby declare that the research project entitled ‘**Analysis of the Marketing Channels And Profitability Of Small-Scale Pig Production Enterprise: A Case Study Of Bindura University Piggery Project**’ submitted to Bindura University of Science Education, Faculty of Agriculture and Environmental Science, Department of Agricultural Economics, Education And Extension, is a record of an original work done by me under the guidance and supervision of Dr Lovemore Musemwa and this work is submitted in partial fulfilment of the requirements for the award of a Bachelor of Science Honours Degree In Agricultural Economics And Management. The results embodied in this thesis have not been submitted to any University or Institute for the award of any degree or diploma.

**Author: Mitchell Mandipaka**

**Reg. Number: B202531B**

**Signature: .....**

**Date:.....**

## **DEDICATION**

I dedicate this work to my Father and Brother (Henry Mandipaka) and (Marshall Mandipaka) who has been a constant source of love, support, and encouragement throughout my life. And to my late Mother who instilled in me the value of hard working. Your legacy lives on in my heart, and I hope this work will make you proud. This work is dedicated to you both, with gratitude and love.

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## **ABSTRACT**

In Zimbabwe, a significant number of farmers have ventured into small-scale pig production. However, despite the increase in pig production, farmers continue to face challenges in marketing and profitability, which hinder the sustainability and growth potential of this enterprise. The primary aim of this study is to analyze the marketing channels and profitability of small-scale pig enterprises in Zimbabwe, using the Bindura University Piggery Project as a case study. The researchers collected data through key informant interviews and structured questionnaires, which were then subjected to quantitative analysis, including the calculation of means and sums, to provide a comprehensive understanding of the start-up capital requirements. To measure the profitability of the small-scale piggery projects, the researchers employed the gross margin analysis, while descriptive analysis, including frequency and means, was used to examine the marketing channels utilized by the Bindura University piggery project. The major findings of the study indicate that the Bindura University Dining Hall represents the largest sales channel, accounting for 31.1% of the total sales, followed by farm gate sales (25.2%) and butcheries (22.2%). This suggests a balanced approach to market reach. Furthermore, the results of the gross margin analysis revealed a 46.57% gross profit margin ratio, indicating favorable return metrics and effective cost management as well as revenue generation. The study concludes that the profitability of the pig production enterprise at the Bindura University farm demonstrates a healthy financial performance, with a good gross profit margin and benefit-cost ratio, indicating efficient cost management and strong revenue generation. Based on these major findings, the study recommends that training programs should be provided to small-scale pig farmers to enhance the skills of the labor force and ensure adequate staffing levels. Additionally, the study suggests that farmers should improve their financial management practices, such as budgeting and cost tracking, to manage resources efficiently. These insights underscore the need for strategic investments and robust management practices to overcome the challenges faced by small-scale pig enterprises and ensure their growth and sustainability in the long run.

**Keywords:** marketing channels, profitability, Gross margin, key informant, descriptive analysis benefit-cost ratio

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## **LIST OF ACRONYMS AND ABBREVIATIONS.**

|      |                                         |
|------|-----------------------------------------|
| AFR  | Average Rate of Return                  |
| ASF  | African Swine Fever                     |
| BEP  | Break-Even Point                        |
| BUSE | Bindura University of Science Education |
| CBR  | Cost Benefit Ratio                      |
| FCR  | Feed Conversion Ratio                   |
| GDP  | Gross Domestic Product                  |
| GM   | Gross Margin                            |
| GMR  | Gross Margin Ratio                      |
| RBV  | Resource Based View                     |
| RBV  | Return On Investment                    |
| SBU  | Strategic Business Unit                 |
| TCE  | Truncation Cost Economics               |



## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background**

Agriculture is the backbone of most global economies contributing immensely to the food systems as well as the livelihoods of many. Agriculture is one of the chief sources of employment in the world employing around 1.3 billion people therefore being a chief contributor to livelihoods (Shahini et al., 2023). Agriculture also plays an important role in the country's economy contributing around 11-15% on average of the majority of the country's GDP (Raja et al., 2022). Agriculture is the main economic activity in Mashonaland Central province, playing a key part in the social and economic development through provision of affordable food and employment, contributing to poverty reduction (Musemwa 2011). If harnessed well, agriculture has the potential to improve livelihoods in the world as well as improvement in terms of food security. This however can only be achieved if key challenges affecting its productivity are addressed which include, structural barriers, infrastructure issues, economy, innovation and technological stagnation as well as policy inconsistencies in most countries (Ume et al., 2020).

Pig production is one of the most lucrative agriculture enterprises in the world and has the potential to improve livelihoods through its high employment and GDP contribution capacities. This is attributed to the fact that pig production expansion is quick owing to the production characteristics of pigs in the sense that they quickly multiply (Micheni et al., 2020). This then implies that this enterprise has also the capacity to reduce malnutrition through the production of highly protein-dense meat. Although pig production is low in Africa in terms of uptake, there is a huge potential for the success of this enterprise due to the large number of populations which is progressively growing hence the availability of market potential (Ngarava & Mushunje, 2018).

Pig production in Zimbabwe is mainly dominated by a few numbers of players which include smallholder producers as the majority (Kayonza, 2014). According to Ngarava & Mushunje, (2018), pig production in Zimbabwe has been growing steadily with an estimated 4.5 million pigs being produced annually. Zimbabwe has a strong tradition of pig farming, with the country being one of the largest pig producers in Africa. The country's

favourable climate and abundant supply of feed make it ideal for pig production (Ngarava, 2021). Pigs are primarily raised for meat and are an important source of protein for the local population. To support the growth of the industry, the government of Zimbabwe has implemented policies aimed at increasing investment in pig production and improving production efficiencies. The foreign exchange Statutory instrument together with the currency policies which have led in the introduction of new currencies is of paramount inconvenience to production.

Profitability is a key objective of every business and profitability is critical to the success of the pig production enterprise. In Zimbabwe, the majority of farmers who venture into pig production exit the sector due to failure to attain profits (Kayonza, 2014). The viability of this enterprise hinges on several factors which include feed conversion ratio, diseases and parasite control, and the economic cost of inputs such as feed, labour, construction as well as breeding stock (Dzama, 2002). The sector in the country is largely informal with poorly organized markets, limited technology and innovation access, and limited inclusivity. This has a huge bearing on the progressiveness and viability of the enterprise. It is therefore against this background that prompted the researcher to investigate the marketing channels and profitability of small-scale pig enterprises in Zimbabwe using the Bindura University of Science Education (BUSE) Farm pig project as a case study.

## **1.2 Problem Statement**

The problem at hand revolves around the need to assess and enhance the profitability of pig production at BUSE Farm. The Bindura University Piggery Project, a small-scale pig production enterprise, faces challenges in marketing and profitability, hindering its sustainability and potential for growth. Despite the pivotal role that pig farming plays in ensuring food security and economic sustainability, there is a lack of comprehensive studies addressing the specific challenges and opportunities within the university's pig production system (Shahini et al., 2023). In addition, the capacity of the project has not been growing for the past 10 years with a sow unit hovering below 5. Notwithstanding the growing demand for pork in Zimbabwe, the enterprise struggles to effectively reach and serve its target market resulting in reduced sales and revenue. This knowledge gap hampers the ability of farmers and stakeholders to make informed decisions regarding resource

allocation, management practices, and market strategies. Recent studies revealed challenges such as the inability of farmers to access high-value markets, unaffordable pig feed prices (Mavuso, 2017); the lack of storage facilities for pork products, distant markets, poor marketing structure (Maseko, 2000; Zwane, 2017) and lack of abattoirs (Masuku et al., 2011). Maseko (2000) and SNAU (2014) considered the poor marketing structure as a major factor impeding the development of the pig industry. Factors such as fluctuating market conditions, input costs, and disease management further complicate the profitability equation. Furthermore, the enterprise's profitability is uncertain due to inadequate marketing channels, inefficient production processes and unclear cost structures. Therefore, the study aims to analyse the marketing channels and profitability of small-scale pig production enterprise: A case study of Bindura University piggery project.

### **1.3 Objectives**

The main aim of the study is to analyze the marketing channels and profitability of small scale pig enterprises in Zimbabwe using Bindura University of Science Education (BUSE) farm pig enterprise as a case study.

#### **Specific Objectives**

1. To determine the challenges faced in the pig production enterprise at BUSE farm.
2. To assess the start-up capital needed for the establishment of a small-scale pig production

Enterprise in Zimbabwe.

3. To analyze the profitability of the pig production enterprise at BUSE farm.
4. To investigate the pig marketing channels used by the Bindura University Farm

### **1.4 Research Questions**

1. What are the challenges faced in the pig production enterprise?
2. What is the startup capital needed for a small-scale pig production enterprise?
3. What is the profitability of the pig production enterprise?

4. What are the pig marketing channels used by the Bindura University farm?

### **1.5 Justification**

This study on the profitability of pig production at Bindura University is justified by its potential to address critical gaps in knowledge and contribute to the enhancement of agricultural sustainability. Pig farming is a significant component of the agricultural sector, playing a vital role in food security and economic development. However, the specific challenges and opportunities within Bindura University's pig production system have not been thoroughly investigated, hindering the ability of farmers and stakeholders to make informed decisions. By conducting this study, we aim to provide valuable insights into the economic dynamics, resource utilization, and market conditions affecting pig farming at the University. The findings have the potential to guide strategic decisions, improve management practices, and inform policy interventions, not only within the university context but also by offering lessons applicable to broader agricultural settings. Ultimately, this research seeks to contribute to the overall improvement of small scale pig farming practices, fostering economic viability and sustainability in the face of dynamic challenges.

### **1.6 Delimitation**

This study is delimited by specific parameters to focus on key aspects relevant to marketing channels and the profitability of pig production at Bindura University. Firstly, the scope of the research is confined to the pig farming operations within the university, excluding external pig farms in the surrounding area. The study primarily centres on the economic dimensions, resource utilization, and market conditions specific to Bindura University's pig production system. Additionally, the timeframe for data collection and analysis is delimited to a specified period, ensuring a snapshot perspective that reflects the current conditions. Furthermore, while considering factors influencing profitability, the study acknowledges that external macroeconomic factors may impact pig farming but are beyond the direct scope of this research. The study is also limited to examining the existing practices and challenges within the university, rather than proposing specific interventions or implementing changes. These delimitations aim to maintain the study's focus on pertinent aspects of pig production at Bindura University, providing a well-defined scope for meaningful analysis and insights.

## **1.7 Limitations**

The execution of this study faces limitations related to cost, time, and logistics, which impacted the extent of data collection and analysis, potentially limiting the research's depth and breadth. Financial constraints restricted the range of data gathered, while time limitations, bound by the availability of resources and academic timelines, affected the investigation into the dynamic nature of pig production profitability. Logistic challenges, such as access to specific data or facilities, also influenced the study's scope and thoroughness. Additionally, the competing priorities of students at Bindura University, balancing coursework, exams, and other academic responsibilities, further constrained the time and effort dedicated to the research. Despite these challenges, the researcher minimized limitations by optimizing available resources, strategically planning data collection within financial constraints, prioritizing critical aspects of pig production profitability, and utilizing flexible scheduling to accommodate academic responsibilities. This approach aimed to provide valuable insights within the available parameters, addressing the constraints to the best extent possible. Despite these constraints, the study aims to provide valuable insights within the available parameters, recognizing and addressing these limitations to the best extent possible.

## **1.8 Organisation of the Research**

The organization of this research follows a structured framework consisting of five chapters. Chapter One provides the background of the study, outlining the context, significance, and objectives of the research. Chapter two delves into the literature review, synthesizing existing knowledge and theories relevant to the study topic, including discussions on pig farming profitability, marketing channels, and challenges faced by pig producers. Chapter three presents the research methodology, detailing the design, data collection procedures, and analytical techniques employed in the study. In chapter four, the results of the research are presented and discussed, highlighting key findings regarding pig marketing channels, profitability drivers, and challenges faced by pig farmers. Chapter five offers a summary of the study's findings, conclusions drawn from the analysis, and actionable recommendations for stakeholders in the small-scale pig farming industry to enhance productivity, profitability, and sustainability.

## **1.9 Chapter Summary**

In the introductory chapter of this research, the focus is on delineating the scope, objectives, and significance of the study concerning pig production at the Bindura University Farm. The chapter outlines four primary objectives namely: to identify challenges in the pig production enterprise at BUSE farm, assess start-up capital requirements for small-scale pig production ventures, analyse the profitability of pig production at BUSE farm, and investigate pig marketing channels utilized by Bindura University Farm. The significance of the study lies in its potential to contribute valuable insights into improving pig farming practices, not only within the university farm but also in the broader agricultural sector. By addressing these objectives, the research aims to enhance understanding and practices in pig production, ultimately fostering sustainable development and economic growth in the agricultural community.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter focuses on the review of the literature for the study. It focuses on the definition of key concepts of the study which includes profitability, start-up capital, and marketing channels. It then focuses on the review of literature on the challenges faced in pig production which includes production, marketing as well as institutional challenges. In addition, this section contains a section on the review of literature on the start-up capital requirement in a small-scale pig production setup. It also contains a section on profitability analysis of pig production which includes key metrics for analysis, return on investment, and gross margin analysis. This is then followed by the theoretical framework, the conceptual framework as well as the empirical framework.

#### **2.1 Definition of Key Concepts**

##### **2.1.1 Profitability**

Profitability stands as a pivotal concept within the realm of agribusiness, drawing insights from a spectrum of authors who contribute diverse perspectives to its understanding. Universally acknowledged as a fundamental objective for agribusiness entities, profitability operates as a crucial metric for evaluating the financial well-being, long-term sustainability, and potential growth trajectory of agricultural enterprises. Scholars such as Bonazzi et al., (2021); Onyekuru et al., (2020); and Raja et al., (2022) align in emphasizing that profitability transcends being a mere financial indicator; it is, in fact, the lifeblood that not only sustains but propels agribusiness enterprises forward in their developmental trajectory. According to Khaye *et al.*, (2011), profitability at its core can be conceptualized as the enterprise's capacity to generate surplus income after the deduction of all associated costs. This reflection of efficiency in resource utilization and the ability to yield positive returns on investments positions profitability as a multifaceted and paramount key performance indicator in the agricultural sector (Dorh et al., 2019). The acknowledgement

of this multifaceted nature underscores its significance, guiding agribusinesses in their strategic endeavours and contributing to the sector's overall vitality and resilience.

### **2.1.2 Start-up-capital**

The concept of start-up capital is pivotal in initiating and maintaining agribusiness enterprises. According to Onyekuru et al., (2020), start-up capital encompasses the financial resources required to launch and establish a business. It includes various components such as infrastructure development, equipment procurement, acquisition of breeding stock, and expenses related to initial operations (Ume et al., 2020a). The availability and adequacy of start-up capital significantly influence the success and sustainability of agribusiness ventures. Effectively managing start-up capital is crucial for mitigating financial risks and ensuring a smooth and viable commencement of operations (Wongnaa et al., 2023). Understanding the multifaceted nature of start-up capital is essential for devising strategic financial plans that support the long-term growth and profitability of agricultural enterprises.

### **2.1.3 Marketing Channel**

A market channel, also known as a marketing channel or distribution channel, refers to the pathway or route through which goods and services travel from producers or manufacturers to the final consumers. This pathway involves various intermediaries, such as wholesalers, retailers, distributors, and agents, who facilitate the movement, promotion, and sale of products. Studies such as Antwi & Seahlodi (2011) examined general marketing constraints to pig production but did not specifically look at those associated with different marketing channels. Aspile et al. (2016) also assessed the profitability of pig production under different scales of production without examining the possible differences in profit that could emanate from different market channels. It has been documented in the literature that, small-scale pig producers individually decide how to market the pigs (Valverde Lucio et al., 2021). Market channels play a crucial role in ensuring that products reach the right customers in a timely and efficient manner, while also adding value through activities like packaging, transportation, and storage. They can be direct, involving no intermediaries, or indirect, involving multiple intermediary levels.

## **2.1 Challenges in Pig Production**

### **2.1.1 Production Challenges**

Pig production encounters a myriad of challenges that intricately weave through every stage of the production process. Central to these challenges are persistent health concerns, with diseases like African Swine Fever (ASF) and Porcine Reproductive and Respiratory Syndrome (PRRS) casting substantial threats on both pig health and overall productivity (Hirwa et al., 2022). The dynamic nature of these diseases requires vigilant biosecurity measures and adaptive management strategies to prevent outbreaks and mitigate their impact. Concurrently, the optimization of breeding programs remains a continuous challenge, demanding the constant pursuit of methods to ensure the birth of healthy piglets and the maintenance of efficient reproduction cycles (Montsho et al., 2019). This involves a delicate balance of genetic selection, nutrition management, and reproductive health interventions.

Beyond health-related challenges, pig producers contend with the intricate task of navigating environmental factors. According to Pedersen (2018), climate variations, including temperature fluctuations and adverse weather conditions, can significantly impact pig farming. Adequate housing conditions that provide appropriate ventilation and sanitation further compound the complexities of production challenges (Banson et al., 2017). Managing these environmental factors becomes pivotal for ensuring the well-being of the pigs and the overall success of the production cycle. Additionally, pig producers face the high cost of pure breeds, which has led many farmers to practice inbreeding, consequently affecting productivity. The lack of skills and artificial insemination services in communities exacerbates these issues. Moreover, theft and the high cost of inputs such as pure breeding stock, feed, and drugs, present significant obstacles. These combined factors make pig farming a challenging endeavor, requiring strategic management to mitigate their impact on productivity and profitability.

### **2.1.2 Marketing Challenges**

Marketing challenges within the pig production industry revolve around the intricate task of efficiently bringing pig products to market while adeptly managing the inherent fluctuations within the market dynamics. According to Igbokwe et al., (2018), the industry grapples with challenges related to price volatility, intensified competition, and the establishment of resilient and effective marketing channels. Successfully navigating these challenges necessitates the formulation and implementation of robust marketing strategies that encompass product positioning, differentiation, and branding (Ngarava, 2021). In a highly competitive landscape, pig farmers must strategically position their products to stand out, emphasizing unique selling points that resonate with consumers.

In pig production, several challenges hinder effective marketing and distribution, mirroring those found in cattle marketing. Firstly, frequent power cuts disrupt operations, impacting storage and processing facilities and compromising product quality. Moreover, inadequate market access and distant markets limit producers' reach, constraining sales opportunities, and revenue generation. Additionally, the absence of proper storage and slaughter facilities further exacerbates product spoilage and hygiene concerns, undermining market competitiveness. Access to market information gives farmers knowledge about prevailing prices in various markets (Urquieta, 2009). Limited access to market information is one of the marketing constraints in developing countries (World Bank, 2011). A majority of marketing systems in developing countries are characterised by transaction costs, poor access to appropriate and timely information and high transport costs (Arua, 2007). Poor market infrastructure may increase risks for all market participants or shift risks to participants who are less able to manage them. Transaction costs amongst other factors influence the choice of marketing outlets used by smallholder farmers (Siyaya, 2013). High transportation costs, exacerbated by poor road conditions, escalate operating expenses, diminishing profit margins and hindering market penetration efforts. These challenges highlight the need for tailored marketing strategies and infrastructural investments to address common issues across livestock sectors and enhance market access and profitability.

### **2.1.3 Institutional Challenges**

In pig production, institutional challenges emanate from a complex interplay of regulatory frameworks, policies, and the broader landscape of institutional support. Within this sector, pig farmers grapple with multifaceted issues, encompassing adherence to stringent animal welfare regulations, navigating land-use policies, and securing access to essential financial resources (Kayonza, 2014). Compliance with evolving regulatory standards, particularly in the realm of animal welfare, necessitates continuous adjustments to production practices to align with ethical considerations and legal requirements. Small-scale pig producers also face challenges stemming from bureaucratic complexities and regulatory uncertainties. Changes in government policies and regulations can introduce significant operational uncertainties for these farmers, impacting their day-to-day production practices and potentially even restricting their ability to access key markets (Ume et al., 2020). An example is the procurement and investment decisions which are authorised by the authorities away from the farm, hence these causes delays in execution of some of the urgent project demands which are deemed as less urgent.

Furthermore, the absence of robust institutional support, including insufficient extension services and limited research initiatives, poses significant hurdles to the industry's potential for adopting innovative and sustainable practices (Micheni et al., 2020). Pig farmers require adequate resources, guidance, and research-driven insights to enhance productivity and promote environmentally sustainable practices. Collaborative efforts are imperative to address these institutional challenges effectively. Alignment between pig farmers, government bodies, and relevant stakeholders is crucial to creating a conducive environment that supports the growth and development of the pig production sector (Ume et al., 2020).

## **2.2 Start-up Capital Requirements in Small-Scale Pig Production**

### **2.2.1 Source of Finance**

The acquisition of startup capital is a fundamental component in establishing and sustaining small-scale pig production enterprises (Ngarava & Mushunje, 2018). Various sources of finance play pivotal roles in providing the necessary funds for initial investments. Traditional sources, such as personal savings and family contributions, remain foundational for many small-scale pig farmers. Additionally, loans from financial institutions, agricultural cooperatives, and government grants constitute crucial external sources of finance (Ngarava & Mushunje, 2019). Collaborative financing models, where farmers pool resources, are emerging as innovative approaches to collectively secure start-up capital. Support from development partners, such as NGOs, also plays a significant role in providing financial assistance and resources, further enhancing the ability of farmers to access necessary funding and improve their agricultural practices. Collaborative financing models, where farmers pool resources, are emerging as innovative approaches to secure start-up capital collectively. Moreover, small-scale pig farmers can also explore partnerships with private investors as an additional source of startup capital. These private investment relationships can help diversify the available financial options and provide access to funding that may not be accessible through other channels (Onah et al., 2022).

### **2.2.2 Key Requirements for Start-up**

Establishing a sow unit in pig production demands meticulous attention to key requirements to ensure operational efficiency and productivity (Hirwa et al., 2022). Infrastructure forms the backbone of a sow unit, necessitating the construction of suitable housing facilities equipped with farrowing crates, gestation stalls, and feeding areas. Ensuring optimal ventilation, temperature control, and hygiene measures are essential to promote sow health and minimize disease risks (Banson et al., 2017). Additionally, acquiring high-quality breeding stock with desirable genetic traits is paramount for reproductive success. This entails sourcing sows from reputable breeding farms or suppliers, preferably breeds known for their prolificacy and growth characteristics like Landrace or Large White.

Furthermore, effective management of feed, healthcare, labour, and transportation logistics is critical for the success of a startup sow unit. Providing balanced diets tailored to the nutritional needs of gestating and lactating sows ensures optimal reproductive performance and piglet development (Parwati & Suyasa, 2017). Access to veterinary drugs and healthcare services is indispensable to maintain sow health and manage disease outbreaks effectively. Adequate labour, comprising skilled personnel for daily husbandry tasks, is essential for proper care and management practices (Dorh et al., 2019). Moreover, efficient transportation logistics for inputs and pigs to the market are vital to prevent disruptions in production and ensure product quality and market competitiveness. By addressing these key requirements comprehensively, a startup sow unit can establish a solid foundation for sustainable pig production and maximize its potential for success in the industry.

## **2.3 Profitability Analysis of Pig Production**

### **2.3.1 Metrics for Assessing Profitability in Pig Farming**

Assessing profitability in pig farming necessitates a meticulous examination of various metrics that serve as critical indicators of financial performance and sustainability (Banson et al., 2017). Gross Margin Analysis stands out as a pivotal aspect in this assessment, offering valuable insights into the efficiency of production processes by examining the disparity between total revenue and variable costs. By thoroughly investigating the gross margin, pig farmers can make informed decisions aimed at optimizing resource utilization, reducing costs, and enhancing overall profitability (Onyekuru et al., 2020). Another crucial metric, the Feed Conversion Ratio (FCR), provides insights into the efficiency with which feed is converted into pork, enabling farmers to identify areas for improvement in feed management and ultimately reduce production costs. Additionally, the Break-Even Point (BEP) serves as a fundamental metric indicating the production volume at which total revenue equals total expenses, guiding farmers in setting production targets and ensuring financial sustainability.

Return on Investment (ROI) and Net Profit Margins emerge as critical metrics in pig farming financial analysis, offering insightful perspectives into the economic health and viability of pig production enterprises (Khaye et al., 2021). ROI enables farmers to evaluate the success of their capital allocations and guide strategic decision-making, while Net

Profit Margins provide insights into the efficiency of operations in converting revenue into profit (Adewumi et al., 2016). By analysing these metrics, pig farmers gain a holistic understanding of the financial landscape, empowering them to navigate the complexities of the industry with strategic foresight and financial acumen (Dorh et al., 2019).

### **2.3.3 Factors Influencing Profitability in Pig Farming**

Profitability in pig farming is influenced by a myriad of interconnected factors that can be categorized into distinct themes, encompassing production management, market dynamics, technology utilization, and sustainability practices.

#### **Production**

Effective production management in pig farming encompasses various aspects, each playing a vital role in determining the overall success and profitability of the enterprise. At the heart of small-scale pig farming lies the critical issue of feed efficiency. The judicious utilization of feed resources directly influences the production costs incurred by these enterprises, with profound implications for their overall profitability. Optimizing feed efficiency is a cornerstone of sustainable and viable small-scale pig farming operations (Wongnaa et al., 2023). Implementing optimized feeding practices and meticulous nutritional management is imperative for achieving cost-effective pig production.

Another critical facet is Disease Management, where the implementation of robust biosecurity measures and effective disease prevention strategies becomes paramount. These measures are crucial for maintaining pig health, as disease outbreaks can significantly impact production efficiency, affecting both the quantity and quality of pork produced (Igbokwe et al., 2018). Lastly, focusing on Reproductive Performance is essential. The reproductive efficiency of breeding stock plays a pivotal role in determining the overall productivity of a pig farming enterprise. Implementing efficient breeding programs contributes to the establishment of a steady and profitable production cycle (Onyekuru et al., 2020).

## **Market-Related Factors**

Focusing on market dynamics in pig farming, two key aspects which are pricing strategies and market access and distribution play pivotal roles in shaping the profitability and success of pig farming enterprises (Onyekuru et al., 2020). The adaptability of pricing strategies is paramount, requiring pig farmers to navigate the dynamic landscape of changing pork prices, consumer demands, and competitive dynamics. This flexibility is essential for optimizing revenue in response to market fluctuations. Equally crucial is the establishment of efficient Market Access and Distribution channels (Hirwa et al., 2022). Ensuring streamlined access to markets and establishing robust distribution networks are vital for reaching consumers effectively. Strategic partnerships, effective branding, and a keen understanding of market trends are essential components that contribute to the successful placement of pig products in the market.

## **Technology**

Technological factors play a pivotal role in influencing the profitability of pig production, contributing to enhanced efficiency, precision, and sustainability. The adoption of advanced technologies, such as precision farming techniques and data-driven decision-making, facilitates optimized resource utilization. The use of RAC in the finishing diet of pigs results in increased rate of gain, improved muscling, reduced back fat, heavier carcass weights, and a greater percentage of fat-free lean (Apple et al., 2007). Automated systems for feeding, monitoring, and environmental control enhance operational efficiency, minimizing labour costs and improving overall productivity (Hirwa et al., 2022). Genetic selection, enabled by technological advancements, allows pig farmers to develop breeds with improved health, growth rates, and feed conversion efficiency, directly impacting profitability (Banson et al., 2017). Moreover, the integration of Internet of Things (IoT) applications provides real-time monitoring of pig health and environmental conditions, enabling early detection of issues and preventive measures. These technological innovations contribute to increased precision in farming practices, reduced resource wastage, and improved overall production outcomes, ultimately shaping a technologically advanced and profitable landscape for pig farming enterprises (Kayonza, 2014).

## **2.4 Pig Marketing Channels**

The concept of marketing channels in agribusiness refers to the pathways through which agricultural products move from producers to consumers. These channels play a pivotal role in connecting farmers with end-users and influencing the accessibility and visibility of agricultural products in the market (Wongnaa et al., 2023). Marketing channels encompass various intermediaries and entities involved in the distribution and promotion of agricultural products, including wholesalers, retailers, and even direct-to-consumer approaches (Adewumi et al., 2016). The choice of marketing channels profoundly affects the market reach, pricing, and overall success of agribusiness enterprises. Effective understanding and utilization of marketing channels are critical for optimizing product distribution, maximizing market exposure, and ultimately enhancing the economic viability of agricultural ventures.

### **Abattoirs**

Abattoirs serve as primary collection points where pigs are slaughtered and processed for distribution to downstream markets. One advantage of abattoirs is their ability to ensure compliance with food safety and hygiene standards, thus assuring consumers of product quality (Khaye et al., 2021). However, reliance on abattoirs may lead to reduced control over pricing and product handling, potentially impacting profitability for producers. Using abattoirs poses significant risks for farmers, primarily due to the potential condemnation of animals, which serves as a major deterrent. The fear of having their animals rejected or condemned at the abattoir due to health or quality concerns leads many farmers to avoid this channel altogether. Moreover, most abattoirs are situated in peri-urban areas, far from the farms of small-scale pig producers. This geographical distance results in high transportation costs, further disincentivizing farmers from utilizing abattoirs for their pig production. These combined factors underscore the challenges and risks associated with relying on abattoirs as a channel for processing and selling pigs.

## **Auctions**

Auctions provide a platform for producers to sell pigs to the highest bidder, offering flexibility in pricing and market access. This channel facilitates transparent price discovery and competition among buyers, potentially resulting in favourable returns for producers (Wongnaa et al., 2023). However, the unpredictability of auction prices and the need to transport pigs to auction sites may introduce logistical challenges and additional costs for producers.

Auctions present their own set of challenges for pig farmers, with one significant issue being the limited number of buyers attending auctions. This scarcity of buyers can severely restrict the prices that farmers may obtain for their pigs, especially if there are only a few bidders competing. The reduced competition among buyers often results in lower prices for the pigs being sold, impacting the profitability of farmers who rely on auctions as a primary sales channel. This challenge highlights the importance of addressing market dynamics to ensure fair and competitive pricing for farmers selling their pigs through auctions.

## **Farm Gate Sales**

Farm gate sales involve direct transactions between producers and consumers at the farm premises. This channel offers producers greater control over pricing, product quality, and customer relationships. By eliminating intermediaries, producers can capture a larger share of the retail price, maximizing profitability (Aminu & Akhigbe-Ahonkhai, 2017b). However, limited market reach and the need for infrastructure to accommodate direct sales may constrain the scalability of this channel. In addition, reduced transport cost since buyers cater for their transport costs. However, in most cases some of the buyer who normally buy are intermediaries who in most cases want to take advantage of the farmers who in most cases have limited market information hence they normally offer lower prices. In addition, some of the buyers are neighbours, friends and relatives who in most cases buy on credit and do not normally honour to their promise hence resulting the farmers losing their pigs.

## **Butcheries**

Butcheries serve as retail outlets where consumers can purchase fresh and processed pork products. Partnering with butcherries allows producers to tap into established distribution networks and reach a wider consumer base (Onah et al., 2022). Additionally, butcherries may offer value-added services such as meat processing and packaging, enhancing product appeal. However, producers may face challenges in negotiating favourable pricing terms and ensuring product visibility among competing brands. There is also a challenge that comes with the use of the butcherries as a marketing channel which includes delays in payment. This leads to delays in the procurements of key inputs for the project such as feed and vaccines which are demanded on time.

## **Restaurants**

Restaurants and canteens represent another important channel for pork sales, catering to consumers seeking prepared meals and dining experiences. Collaborating with restaurants enables producers to showcase their products in culinary creations, enhancing brand recognition and consumer appeal (Hirwa et al., 2022). However, maintaining consistent supply volumes and meeting stringent quality and safety standards demanded by the food service industry can pose operational challenges for producers. There is also a challenge that comes with the use of the restaurants as a marketing channel which includes delays in payment. This leads to delays in the procurements of key inputs for the project such as feed and vaccines which are demanded on time.

## **Processors**

Partnering with meat processors allows producers to sell pigs for further processing into value-added products such as sausages, bacon, and ham (Banson et al., 2017). This channel offers opportunities for product diversification and premiumization, potentially commanding higher prices and margins. However, producers may need to adhere to specific product specifications and regulatory requirements imposed by processors, necessitating close collaboration and quality assurance measures.

## **2.5 Theoretical Framework**

### **Resource-Based View (RBV) Theory**

The Resource-Based View theory can be applied to analyze the competitive advantage and economic sustainability of pig production at Bindura University farm. This theory emphasizes the importance of strategic resource management for achieving and sustaining a competitive edge (Hartanto & Arifin, 2023; Mweru & Maina, 2016). In the context of this study, the theory can be used to assess the unique resources available to the university, such as academic expertise, land, and infrastructure, and how effectively these resources are leveraged for successful pig farming. Understanding the resource-based dynamics will shed light on the university's capacity to generate start-up capital, manage operational costs, and ultimately enhance profitability.

### **Institutional Theory**

Institutional theory provides a lens through which to examine the impact of institutional factors, such as policies, regulations, and cultural norms, on the pig production enterprise at Bindura University. By considering the institutional environment, the study can explore how university policies and external regulations influence decision-making, resource allocation, and overall performance in an enterprise (Lewis et al., 2019). Understanding the institutional context is crucial for identifying challenges and proposing solutions that align with the broader socio-economic and regulatory frameworks.

### **Transaction Cost Economics (TCE)**

Transaction Cost Economics can be applied to analyze the efficiency and effectiveness of transactions within the pig production enterprise. This theory focuses on the costs associated with transactions between different entities, such as the university, suppliers, and markets. By applying TCE, the study can assess the transaction costs related to acquiring resources, managing relationships with external partners, and navigating market dynamics (Ketokivi & Mahoney, 2016; Nagle et al., 2020). This analysis will contribute to understanding the economic implications of various transactions, informing strategies to optimize resource utilization and enhance overall profitability in pig farming.

## **2.6 Conceptual Framework**

The conceptual framework for this study on the profitability of pig production at Bindura University of Science Education (BUSE) integrates key components that collectively contribute to the economic sustainability of the pig farming enterprise. The framework encompasses three primary pillars: start-up capital assessment, profitability analysis, and challenges identification. In the start-up phase, considerations such as infrastructure, equipment, breeding stock, and feed costs are crucial for understanding the financial requirements. The profitability analysis involves examining metrics like return on investment and net profit margins, providing insights into the financial health of the enterprise. Additionally, the framework acknowledges the challenges inherent in university-based pig farming, including academic priorities, resource constraints, and institutional policies. The identification of challenges and subsequent exploration of successful mitigation strategies will contribute to a comprehensive understanding of the economic dynamics within the university setting. By integrating these key elements, the conceptual framework establishes a structured approach for evaluating and enhancing the economic viability of pig production at BUSE.

## **2.7 Empirical Framework**

Onyekuru, Ukwuaba, and Aka, (2020) carried out a study to ascertain pig profitability in Nigeria and included a total of 60 farmers purposively selected in the area. The study specifically described the socioeconomic characteristics of pig farmers, examined the factors influencing revenue from pig production, estimated the costs and returns in pig production, and examined the problems faced by pig farmers in the area. Primary data were collected from the selected farmers with the aid of a structured questionnaire. Data were analyzed using descriptive statistics, net income, and multiple regression models. This study however focuses in addition to pig profitability, start-up capital requirements, and also marketing channel analysis. In addition, it also focuses on a case study of Bindura University of Science Education rather than inclusion of a descriptive or explorative design and does not use regression but rather uses Gross Margin Analysis.

In addition, Wongnaa *et al.*, (2023) carried out a study on profitability, market outlets and constraints in pig production in Ghana. The study addressed the significant concern of

small-scale pig producers' access to profitable marketing outlets. Through data collected from 398 small-scale pig farmers in selected districts across six regions in Ghana, the research explored the available market outlets, their profitability, factors influencing farmers' choices, and constraints in the marketing of small-scale pig farming. Utilizing descriptive statistics, income statements, and a multivariate probity model, the study reveals that small-scale pig farmers in Ghana engage in various market outlets, including direct sales to consumers, retailers, commission agents, and sales through farmer associations. However, this study employed descriptive statistics to identify the challenges affecting profitability and also included the start-up capital objective to identify the capital requirements of a small-scale pig production project. The study also focused on a case of BUSE rather than employing an explorative and descriptive design of farmers.

Nabikyu and Kugonza, (2016) carried out a study on, the profitability of selected piggery businesses in peri-urban communities of Kampala in Uganda. The study in Wakiso district, surrounding Kampala city in Uganda, aimed to identify the drivers of profitability in pig farming. Using a sample of 100 pig farms with a random and purposive approach, data were collected through a pretested questionnaire. Factors affecting production and management included a lack of organizational strategies for achieving economies of scale, limited access to market information, inadequate quality standards, feed shortages during the dry season, disease risks like African swine fever, and restricted access to extension services, agricultural insurance, credit, and financial services. This study however focuses in addition to pig profitability, start-up capital requirements, and also marketing channel analysis. In addition, it also focuses on a case study of Bindura University of Science Education rather than including a descriptive or explorative design and uses Gross Margin Analysis.

## **2.8 Chapter Summary**

This chapter focused on the review of the literature of the study which included exploration of key concepts (start-up capital, profitability, and market channels). In addition, this section also delved into the literature on the challenges faced in pig production, the start-up capital required, the market channels available as well as the profitability metrics and determinants. This section also contained the theoretical framework as well as the

conceptual framework. The empirical framework was also included which focused mainly on a review of similar literature from other authors.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

This chapter of this research delves into the methodological framework employed to achieve the study's objectives effectively. It contains a comprehensive exploration of the research design, data collection procedures, and analytical techniques utilized. This chapter provides a detailed roadmap of how the study was conducted, offering insights into the steps taken to gather, analyze, and interpret the data about pig production at the Bindura University Farm. This chapter aims to instil confidence in the research process and facilitate a clear understanding of how the study was executed.

#### **3.1 Description of Study Area**

Data collection took place at Bindura University Farm, located in Glen Avillin and wholly owned by Bindura University of Science Education, slated to become a standalone Strategic Business Unit (SBU). Glen Avillin Farm spans approximately 534 hectares in Agro-ecological Region IIb, with seasonal rainfall ranging from 750 to 1000 mm per annum and a confined season from November to March. While the land is conducive to large-scale intensive crop and livestock production, erratic rainfall patterns and seasonal droughts can pose challenges to dry land cropping. However, the proximity to the perennial water source of Pote River enables year-round irrigation. Positioned strategically for sustainable intensive farming, Bindura University Farm has the potential to serve as a hub for practical and viable commercial farming, allowing the testing and application of modern farming methodologies. With an arable area of around 300 hectares, including 140 hectares for irrigation, the farm supports various crops, such as maize, sorghum, wheat, barley, soya beans, and horticulture. The remaining 240 hectares, comprising wet grassland and hills, are suitable for intensive livestock enterprises like dairy, beef, sheep, pigs, and poultry. The farm also dedicates 50 hectares for teaching, learning, and research activities for the Faculty of Agriculture and Environmental Science. The farm additionally operates

broiler, pig, beef, goat, and fisheries projects, with plans underway to further upscale these enterprises into a productive and profitable business units.

### **3.2 Research Design**

The research design for this study adopted a case study approach, concentrating on Bindura University of Science Education (BUSE) as the singular case. A case study design is particularly apt for investigating the marketing channels and profitability of pig production at BUSE, offering an in-depth exploration of the complex interplay of factors within the university's unique context. This design enabled a comprehensive examination of the startup capital requirements, profitability metrics, and challenges faced in the pig farming enterprise at BUSE. Utilizing a case study methodology allows for a nuanced understanding of the specific dynamics, practices, and outcomes associated with pig farming within the university setting (Hancock et al., 2021).

### **3.3 Sampling Procedure**

The study employed a purposive sampling procedure to select participants for data collection at Bindura University Farm. Purposive sampling involves selecting individuals or cases based on specific characteristics or criteria that align with the research objectives (Mishra & Alok, 2022). In this case, participants were selected deliberately to ensure representation from key stakeholders involved in pig production at the university farm. The sample included farm managers, agricultural experts, and individuals responsible for decision-making in the pig farming enterprise. These includes the lectures (Three respondents) in the animal science and economics departments, piggery general hand (five respondents) and the section manager (one respondent) bringing it to a total of nine respondents.

The relevance of purposive sampling in this study lies in its ability to capture insights and perspectives from individuals with direct involvement and expertise in the pig production system at Bindura University Farm. By intentionally selecting participants who possess in-depth knowledge of the start-up capital requirements, profitability metrics, and challenges faced, the study aims to obtain rich, context-specific data that provides a holistic understanding of the economic dynamics within the university's pig farming operations.

Purposive sampling enhances the study's validity by ensuring that the selected participants are well-positioned to provide meaningful insights, thereby strengthening the overall credibility and applicability of the research findings to the specific context of the study (Palys, 2018).

### **3.4 Data Collection Procedure**

The data collection for this study was conducted using a semi structured interview guide. Prior to the main data collection phase, a pilot survey was conducted targeting one lecturer and one general hand (who were not included in the final data collection process) in order to refine the questionnaire and ensure its effectiveness. The finalized guide was then administered face-to-face by the researcher, both at the pig farms and at the university. The researcher personally conducted all interactions and data collection activities to maintain consistency and reliability throughout the process. During the face-to-face interviews, the researcher explained the purpose of the study and obtained informed consent from the participants. The questionnaire covered various aspects related to pig farming, including production methods, challenges faced, profitability, marketing strategies, and demographic information. Probing questions were used to ensure comprehensive data collection. In addition, secondary data was collected from industry reports, academic journals, and government publications related to pig production. This data provided valuable insights into industry standards, market trends, and best practices, helping to contextualize the findings from the primary research conducted at BUSE. Such secondary sources were instrumental in benchmarking the performance of the BUSE pig production enterprise against broader industry norms and identifying potential areas for improvement and innovation.

To ensure effective data collection, the researcher employed several strategies. Firstly, the researcher went through the research guide numerous times to ensure familiarity with the questionnaire and interviewing techniques. Additionally, a structured approach was followed during data collection to maintain consistency across interviews. Any ambiguities or uncertainties arising during the interviews were addressed promptly to ensure accurate responses. Data was collected from the lectures, the general hands at the piggery section as well as the section manager using the interview guide. Overall, the data collection process

was conducted meticulously to gather reliable and comprehensive information regarding pig production and related factors. The face-to-face administration of interview guide as well as review of project documents allowed for in-depth interactions with participants, ensuring a thorough understanding of the subject matter and enhancing the quality of the data collected. These interviews were done to the general hands, the project manager as well as lecturers in the Animal science department and Agricultural Economics department for technical aspects of the project.

### **3.4.1 Data Collection Instruments**

The study employed a combination of secondary data and key informant interviews as data collection methods.

#### **Secondary data collection**

#### **Key informant interviews**

Key informant interviews were conducted with individuals possessing extensive knowledge and expertise in pig production at Bindura University Farm. These key informants included farm managers, agricultural experts, and decision-makers involved in the pig farming enterprise which involves researchers and lectures at the university as well as the farm manager. The interviews allowed for an in-depth exploration of critical aspects such as start-up capital requirements, profitability metrics, and challenges faced in pig production. Additionally, structured questionnaires were administered to gather quantitative data from a broader participant base, including lectures, 2 farm general hand and staff at the farm directly involved in the day-to-day activities of the pig farming operations. The structured questionnaires featured carefully designed questions to elicit specific information related to financial aspects, operational challenges, and participants' perceptions (Bostley, 2019). The utilization of both key informant interviews and secondary data is advantageous as it provides a comprehensive and well-rounded dataset, combining qualitative insights from experts with quantitative responses from a wider sample (Marczyk et al., 2015). This methodological approach ensures a thorough examination of the economic dynamics of pig production at Bindura University Farm, offering a nuanced understanding of the factors influencing profitability.

### 3.6 Data analysis

The first objective was meant to determine the challenges faced in the pig production enterprise at Bindura University Farm, a quantitative analysis was used to analyse the data collected in the study. Statistical techniques, such as frequency distribution and means, were utilized to identify the prevalence and interrelationships of challenges, providing a holistic view of the factors hindering the profitability of the pig production enterprise.

The second objective focused on assessing the start-up capital needed for a small-scale pig production enterprise, and a detailed financial analysis was conducted. This involved examining the costs associated with infrastructure development, equipment acquisition, breeding stock, and feed expenses. The data collected through key informant interviews and structured questionnaires was subjected to quantitative analysis, including means and sums, to provide a comprehensive understanding of the start-up capital requirements.

The third objective involved analysing the profitability of the pig production enterprise at Bindura University Farm, a multifaceted approach was adopted. Financial metrics such as return on investment (ROI), net profit margins, and cost-effectiveness ratios were calculated based on the financial data gathered. Comparative analysis was employed to assess the profitability of the pig farming enterprise over specific periods, considering revenue streams, operational costs, and other relevant financial indicators.

The following formulas were used under profitability analysis.

- **Gross Margin (GM):** Gross Margin represents the difference between total revenue and total variable costs. It is calculated as:  
$$GM = \text{Total Revenue} - \text{Total Variable Costs}$$
- **Gross Margin Ratio (GMR):** Gross Margin Ratio is the ratio of gross margin to total revenue, expressed as a percentage. It is calculated as:  
$$GMR = \frac{GM}{\text{Total Revenue}} \times 100$$
- **Cost Benefit Ratio (CBR):** Cost Benefit Ratio represents the ratio of the benefits (revenue or returns) to the costs (investments or expenditures). It is calculated as:  
$$CBR = \frac{\text{Total Revenue or Returns}}{\text{Total Costs}}$$

- **Net Income:** Net Income is the total revenue minus total costs (fixed and variable). It is calculated as:  $\text{Net Income} = \text{Total Revenue} - \text{Total Costs}$
- **Average Rate of Return (ARR):** Average Rate of Return is the ratio of net income to the initial investment, expressed as a percentage. It is calculated as:  $\text{ARR} = \text{Net Income} / \text{Initial Investment} \times 100$

The fourth objective, focusing on assessing the pig marketing channels, was analysed using quantitative data collected through structured questionnaires. Statistical techniques such as descriptive analysis which include frequency and means were employed to examine the various marketing channels utilized by pig farmers. Descriptive analysis provided insights into the frequency and distribution of different marketing channels among respondents.

### 3.6 Ethical Considerations

Ethical considerations for this study on the profitability of pig production at Bindura University Farm are paramount and adhered to established ethical guidelines. Informed consent was obtained from all participants, ensuring they were fully aware of the study's purpose, procedures, and potential implications. Participant confidentiality was rigorously maintained, with all collected data anonymized to protect the privacy of individuals. The study sought approval from relevant ethical review boards to ensure compliance with ethical standards and safeguard the welfare of participants. Furthermore, the research prioritized the humane treatment of animals involved in the pig farming enterprise, aligning with ethical principles of animal welfare. Transparency, integrity, and respect for the well-being of both human participants and animals were integral throughout the research process, contributing to the ethical rigour and credibility of the study outcomes.

## **CHAPTER FOUR**

### **FINDINGS PRESENTATION AND DISCUSSION**

#### **4.1 Brief description of the BUSE piggery project.**

The piggery project at BUSE is a well-structured and managed enterprise, featuring a 5-sow unit with diverse breeds, including Duroc, Landrace, Mashona, and Large White mixes. The infrastructure is designed to support efficient pig production, with dedicated facilities for breeding, feeding, and housing the animals. The project employs five general hands responsible for daily operations and one project manager who oversees the technical aspects and ensures adherence to best practices. The overall farm manager supervises the entire farm, ensuring smooth coordination between different departments. Feed is mixed on-site to ensure consistency and quality, with essential pre-mixes procured from reputable suppliers such as Feed Mix and Profeeds. This approach helps maintain a balanced diet for the pigs, crucial for their growth and health.

Vaccination and veterinary needs are met through reliable suppliers like Vet Distributors, ensuring the pigs receive timely and effective health interventions. Transportation of inputs, such as feed and veterinary supplies, and outputs, including pigs and pork products, is managed by road, allowing for flexible and timely logistics. To ensure the meat's quality and freshness, the farm is equipped with chilling facilities where the pork is stored until it is ready for market distribution. This holistic management approach, which includes on-site feed production, robust veterinary care, and efficient logistics, positions the piggery project for sustainable success and high productivity. The integration of these elements ensures the enterprise can meet market demands while maintaining high standards of animal welfare and product quality.

## **4.2 Challenges faced in the pig production enterprise at BUSE farm.**

### **4.2.1 Production Challenges**

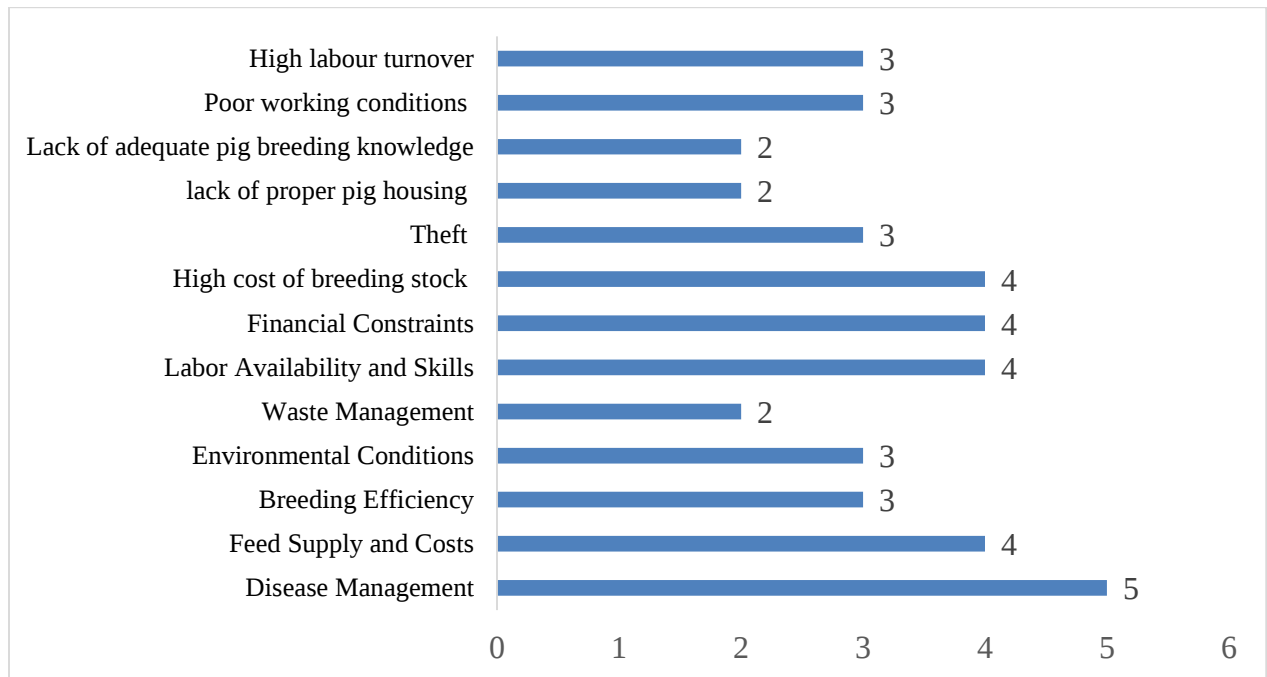
Disease management emerged as the most severe challenge, receiving a maximum severity score of 5. This high rating indicates the critical impact of disease on pig mortality rates and overall farm productivity. Effective disease management is crucial to prevent significant financial losses and ensure the health of the herd. According to Nabikyu et al. (2016), rigorous veterinary care and biosecurity measures are necessary to mitigate these risks, underscoring the importance of addressing disease management to sustain the enterprise.

Feed supply and costs, labor availability and skills, financial constraints, and the high cost of breeding stock all had equal severity scores of 4. These challenges are interconnected and equally critical to the operation's success. Feed supply and costs significantly affect the profitability of pig production, as feed constitutes a major portion of the operating expenses (Ngarava & Mushunje, 2018). Similarly, labor availability and skills are essential for maintaining efficient farm operations, while financial constraints can hinder investment in necessary resources. The high cost of breeding stock impacts the initial setup and ongoing breeding efficiency, making it a substantial concern for the farm (Raja et al., 2022).

Breeding efficiency, environmental conditions, theft, poor working conditions, and high labor turnover each received a severity score of 3. Breeding efficiency and environmental conditions are vital for maintaining a healthy and productive herd (Nabikyu et al., 2016). Theft poses a risk to both the financial and operational aspects of the farm, while poor working conditions and high labor turnover can lead to disruptions in farm activities and additional training costs. Addressing these issues is important for the stability and growth of the enterprise, as highlighted by Ngarava & Mushunje (2018).

Waste management, lack of proper pig housing, and lack of adequate pig breeding knowledge were rated with lower severity scores of 2. While these challenges are less severe compared to others, they still require attention to ensure overall farm efficiency and animal welfare. Proper waste management and pig housing contribute to a healthy living

environment for the pigs, while adequate breeding knowledge is necessary for optimizing reproduction rates and maintaining genetic quality (Raja et al., 2022). These findings reflect the multifaceted challenges faced by the pig production enterprise and emphasize the need for strategic interventions across various aspects of farm management.



**Figure 1. Production challenges affecting pig profitability.**

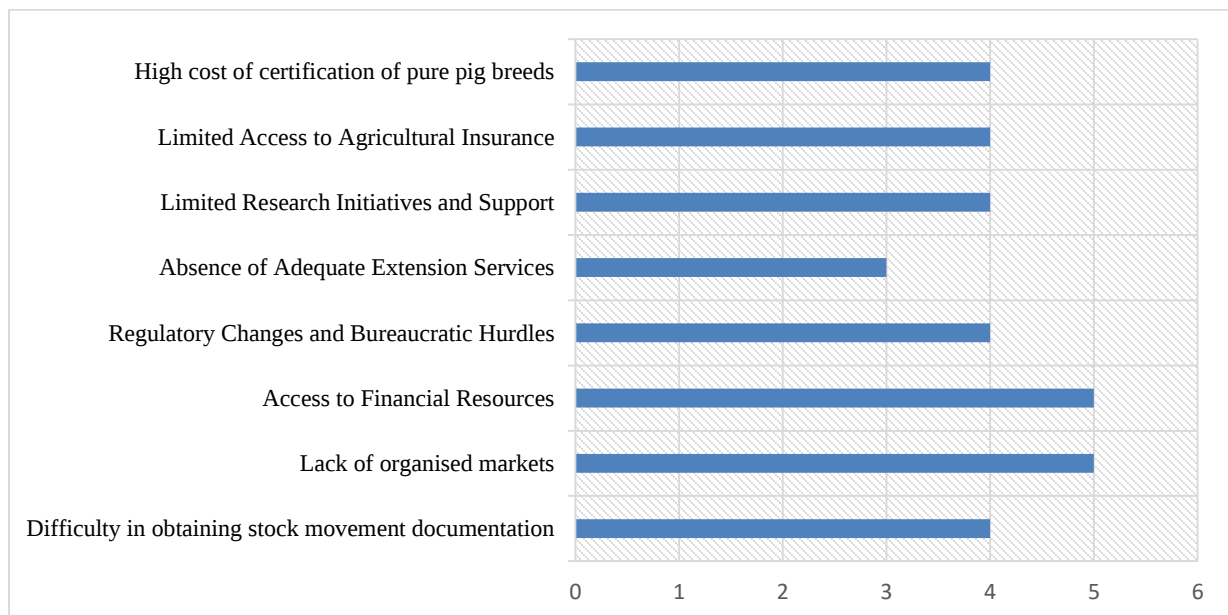
#### **4.1.2 Institutional Challenges**

Lack of organized markets and access to financial resources both emerged as the most severe institutional challenges, each receiving a severity score of 5. The lack of organized markets significantly hampers the ability of farmers to sell their products efficiently and at competitive prices, ultimately affecting their profitability (Nabikyu et al., 2016). Similarly, access to financial resources is critical for farmers to invest in essential inputs and infrastructure, making it a substantial barrier when not readily available (Ngarava & Mushunje, 2018).

Difficulty in obtaining stock movement documentation, regulatory changes and bureaucratic hurdles, limited research initiatives and support, limited access to agricultural insurance, and the high cost of certification of pure pig breeds all had equal severity scores

of 4. Difficulty in obtaining stock movement documentation creates delays and complicates the logistical aspects of pig farming (Raja et al., 2022). Regulatory changes and bureaucratic hurdles can introduce uncertainty and additional costs, further straining farm operations (Nabikyu et al., 2016). Limited research initiatives and support hinder the adoption of innovative farming practices and technologies, while limited access to agricultural insurance leaves farmers vulnerable to risks and financial instability (Ngarava & Mushunje, 2018). The high cost of certification for pure pig breeds adds another financial burden, affecting breeders' ability to maintain high-quality stock (Raja et al., 2022).

The absence of adequate extension services received a severity score of 3. This challenge impacts the ability of farmers to access necessary training and support for improving their farming practices and productivity. Extension services play a crucial role in disseminating knowledge and best practices to farmers, and their absence can significantly limit the potential for improvement and innovation in pig farming (Nabikyu et al., 2016). Addressing these institutional challenges requires coordinated efforts to streamline processes, improve market access, and provide financial and technical support to farmers.



**Figure 2. Institutional challenges affecting pig profitability**

#### **4.1.3 Marketing Challenges**

## **Price Volatility**

Price volatility, lack of access to profitable markets, and currency instability emerged as the most severe marketing challenges, each receiving a severity score of 5. Price volatility significantly impacts the predictability of revenues, making it difficult for farmers to plan and sustain their operations (Nabikyu et al., 2016). Similarly, the lack of access to profitable markets limits farmers' ability to achieve fair prices for their products, thereby affecting their profitability (Ngarava & Mushunje, 2018). Currency instability further exacerbates financial uncertainty, complicating budgeting and financial planning for farmers (Raja et al., 2022).

Market fluctuations, poor storage and slaughter facilities, high cost of transport to markets, and competition from alternatives all had equal severity scores of 4. Market fluctuations can lead to unpredictable demand and supply conditions, making it challenging for farmers to maintain stable sales (Nabikyu et al., 2016). Poor storage and slaughter facilities affect the quality and shelf life of pork products, reducing their marketability (Ngarava & Mushunje, 2018). High transport costs to markets and competition from alternative products such as poultry or beef further strain the financial viability of pig farming (Raja et al., 2022).

Distant markets, poor road conditions, long distances to markets, low purchasing power of customers, and low demand in the market each received a severity score of 3. Distant markets and poor road conditions increase logistical challenges and costs, making it harder for farmers to reach buyers efficiently (Nabikyu et al., 2016). The long distance to markets and the low purchasing power of customers can limit sales volumes and profitability (Ngarava & Mushunje, 2018). Additionally, low market demand poses a significant challenge, as it reduces the potential sales and revenue for pig farmers (Raja et al., 2022). Addressing these marketing challenges requires strategic interventions to stabilize prices, improve market access, and enhance infrastructure and facilities to support the pig farming industry.

**Table 1. Marketing challenges affecting pig profitability**

| <b>Marketing Challenge</b>            | <b>Severity Rating</b> |
|---------------------------------------|------------------------|
| Price Volatility                      | 5                      |
| Market Fluctuations                   | 4                      |
| Lack of Access to Profitable Markets  | 5                      |
| Distant Markets                       | 3                      |
| Poor Storage and Slaughter Facilities | 4                      |
| High Cost of Transport to Markets     | 4                      |
| Poor Road Conditions                  | 3                      |
| Long distance to the markets          | 3                      |
| The low purchasing power of customers | 3                      |
| Currency instability                  | 5                      |
| Competition from alternatives         | 4                      |
| Low demand in the market              | 3                      |

#### **4.2 Startup capital needed for a 5 sow unit pig production enterprise.**

The startup cost structure for this business reveals that pen construction and breeding sows are the most significant investments, accounting for 48.43% and 25.83% of the total costs, respectively. This is similar to the findings of Szymanska et al., (2015) who also had construction and breeding stock as significant costs, and highlighted that these expenses underscored the importance of a well-built pen to ensure a safe and durable environment for the livestock, and high-quality breeding sows, which are crucial for the productivity and profitability of the venture. The high percentage allocated to these items indicates that the success of the business heavily relies on the quality and functionality of these investments. Therefore, it is vital to focus on durable construction and selecting genetically superior breeding sows to ensure long-term benefits (Parwati & Suyasa, 2017). This is only for the 5 sows for up until they conceive which is approximately three month periods. From there the cost structure then changes.

The remaining costs, including feed (9.04%), fencing (4.04%), labour (3.63%), feed troughs (3.23%), sitting costs (3.23%), and water troughs (2.58%), while smaller in comparison, are essential for the smooth operation and efficiency of the business. Micheni et al., (2020) acknowledged that feed is a notable ongoing expense necessary for maintaining the health and growth of the livestock, impacting their overall productivity but had feed occupying a high percentage of the start cost with 14% indicating high feed costs. Fencing and labour costs, though modest, are crucial for securing the area and setting up the operation effectively (Mushunje, 2018). Additionally, proper feed and water troughs are critical for the daily management and well-being of the animals (Parwati & Suyasa, 2017). Balancing these investments carefully will be key to establishing a sustainable and productive business, ensuring that all aspects of the setup are well-coordinated and functional.

***Table 2. Start-up capital structure for a 5 sow unit***

| <b>Item</b>                   | <b>Unit</b> | <b>Quantity</b> | <b>Unit Cost</b> | <b>Total Cost</b>   | <b>% total cost</b> |
|-------------------------------|-------------|-----------------|------------------|---------------------|---------------------|
| Sitting cost                  | Unit        | 1               | US\$200.00       | US\$200.00          | 3.23                |
| Pen construction              | Unit        | 1               | US\$3,000        | US\$3,000.00        | 48.43               |
| Fence                         | m2          | 100             | US\$2.50         | US\$250.00          | 4.04                |
| Labour                        | man-days    | 15              | US\$15.00        | US\$225.00          | 3.63                |
| Water troughs                 | Unit        | 8               | US\$20.00        | US\$160.00          | 2.58                |
| Feed troughs                  | Unit        | 8               | US\$25.00        | US\$200.00          | 3.23                |
| Breeding Sows (serviced)      | Unit        | 5               |                  | US\$1,600.00        | 25.83               |
| Feed                          | 50 kgs      | 16              | US\$35.00        | US\$560.00          | 9.04                |
| <b>Total Start-up Capital</b> |             |                 |                  | <b>US\$6,195.00</b> | <b>100</b>          |

### **4.3 Profitability of pig production enterprise at BUSE farm.**

Table 4.3 shows the profitability analysis of the pig production enterprise for five sow unit. The revenue for the business primarily comes from selling pig carcasses which is estimated for 45 mature pigs slaughtered for meat for the market considering a high percentage furrowing of 90% per sow, with a total quantity of 1023.5 kilograms at a unit cost of \$3.20 per kilogram, resulting in a total revenue of \$3,275.20. The price per kilogram is similar to the findings of Onah et al., (2022) who had a wholesale market price of \$3.20 per kilogram. Parwati & Suyasa, (2017) had a slightly lower market price per kilogram of \$2.80 which is mainly attributed to a very high supply in the area of study. This figure indicates the potential earnings from the main product of the business, which is essential for assessing profitability. Revenue generation is a critical aspect, reflecting the business's capacity to convert its production into financial gain, which is essential for sustainability and growth (Szymanska et al., 2015).

**Table 3. Profitability analysis of 5 sow production at BUSE Farm**

| <b>Item</b>                             | <b>Unit</b> | <b>Quantity</b> | <b>Unit cost</b> | <b>Total \$</b>      |
|-----------------------------------------|-------------|-----------------|------------------|----------------------|
| <b>Total Revenue</b>                    |             |                 |                  |                      |
| Pig carcass/ per each sow unit          | kgs         | 4781.5          | 3.2              | <b>US\$15,300.80</b> |
| <b>Total Expenditure</b>                |             |                 |                  |                      |
| <b>Fixed Costs</b>                      |             |                 |                  |                      |
| Pig sty repairs and construction        | Unit        | 1               | US\$750.00       | US\$750.00           |
| Other fixed costs                       | Unit        | 1               | US\$700.00       | US\$700.00           |
| <b>Total fixed costs</b>                |             |                 |                  | <b>US\$1,450.00</b>  |
| <b>Variable costs</b>                   |             |                 |                  |                      |
| Feed                                    | kgs         | 12500           | US\$0.35         | US\$4,375.00         |
| Transport                               |             |                 |                  | US\$155.00           |
| Labour                                  | man         | 14              | US\$70.00        | US\$980.00           |
| Security                                | man         | 2               | US\$420.00       | US\$840.00           |
| Vaccines                                | Lot         | 5               | US\$315.00       | US\$1,575.00         |
| Other variable costs                    |             |                 |                  | US\$250.00           |
| <b>Total variable costs (TVC)</b>       |             |                 |                  | <b>US\$8,175.00</b>  |
| <b>Gross Profit Margin (GPM)</b>        |             |                 |                  | <b>US\$7,125.80</b>  |
| <b>Total Cost (TC)</b>                  |             |                 |                  | <b>US\$9,625.00</b>  |
| <b>Net Income</b>                       |             |                 |                  | <b>US\$5,675.80</b>  |
| <b>Gross Profit Margin Ratio (GPMR)</b> |             |                 |                  | <b>46.57%</b>        |
| <b>Benefit Cost Ratio (BCR)</b>         |             |                 |                  | <b>1.7</b>           |
| <b>Average Rate of Return (ARR)</b>     |             |                 |                  | <b>\$0.63</b>        |

On the expenditure side, as reflected in the revised Table 4.3, the business incurs both fixed and variable costs. Fixed costs include pig sty repairs and construction at \$750.00 and other fixed costs at \$700.00, totaling \$1,450.00. This is different from the findings of Parwati & Suyasa (2017), who reported high maintenance costs per sow unit of \$350.00, primarily due to the high cost of building materials in their area. Variable costs are more substantial, amounting to \$8,175.00, which includes expenses such as feed (\$4,375.00), transport (\$155.00), labor (\$980.00), security (\$840.00), vaccines (\$1,575.00), and other variable costs (\$250.00). The total expenditure, combining fixed and variable costs, is \$9,625.00. Szymanska et al. (2015) had slightly lower feed costs, which is a significant expense in production, at \$0.25 per kg on average. This discrepancy is attributed to the high cost of

feeds and supplements in Zimbabwe compared to the authors' study area. The cost of vaccines is also higher for the farm compared to findings by Parwati & Suyasa (2017), who reported a lot price of \$225. This difference is due to the high cost of vaccines owing to imports in Zimbabwe compared to the researchers' setting, making overall production costs higher in this setting.

After accounting for all costs, the gross profit margin (GPM) stands at \$7,125.80, with a gross profit margin ratio (GPMR) of 46.57%. This indicates a healthy profit relative to revenue, showing efficient cost management and strong revenue generation. However, this is slightly lower compared to the findings of Parwati & Suyasa (2017), who had a GPMR of 40.1%, owing to the lower cost of production per sow unit, which was 10.5% less compared to the BUSE farm. In contrast, Onah et al. (2022) reported a higher GPMR of 43.2%, due to the high market price and high demand for pork in their study area. The net income is \$5,675.80, highlighting the actual profit after all expenses are deducted. Additionally, the benefit-cost ratio (BCR) is 1.7, suggesting that for every dollar spent, there is a return of \$1.70, and the average rate of return (ARR) is \$0.63. These metrics collectively suggest that the business is profitable, with a strong return on investment, indicating a well-managed operation that effectively converts costs into revenue and profit.

#### **4.4 Pig marketing channels used by the Bindura University Farm**

The marketing channels for the business reveal a diversified approach to reaching various customer segments. Bindura University Dining is the primary marketing channel, accounting for 33.7% of total sales, with 1,613.2 kgs sold at an average price of \$3.20 per kg. This channel was selected due to its proximity, reducing transportation costs and ensuring fresh delivery of pork. Additionally, the university offers a stable and reliable market with consistent demand, providing a predictable revenue stream. According to Nabikyu et al. (2016), close and stable markets are crucial for minimizing transportation challenges and ensuring timely payments, which enhances cash flow management for the farm.

Boarding schools represent 8.4% of total sales, with 401.2 kgs sold at an average price of \$3.45 per kg. This channel is favored due to its relatively higher price per kg, as schools are willing to pay a premium for quality meat to meet dietary standards for students. The regular demand from schools aligns with the academic calendar, providing periodic bulk orders that help in planning production cycles. As highlighted by Ngarava & Mushunje (2018), targeting institutional buyers like schools can stabilize sales and provide higher margins due to bulk purchasing.

Local supermarkets, contributing 6.5% of total sales with 311.7 kgs sold at an average price of \$3.80 per kg, are chosen for their ability to reach a broader consumer base. Supermarkets offer better prices and have flexible payment options, which can be advantageous for maintaining cash flow. Furthermore, the visibility and credibility associated with supermarket sales can enhance the farm's reputation, as noted by Raja et al. (2022), who emphasize the importance of diversified marketing channels to optimize revenue.

Butcheries account for 21.0% of total sales, with 1,003.1 kgs sold at an average price of \$3.35 per kg. This channel is selected for its balance between price and convenience. Butcheries provide a consistent demand and often have long-standing relationships with suppliers, facilitating smoother transactions and repeat business. The slightly lower price compared to supermarkets is offset by the reliability and volume of orders. Nabikyu et al. (2016) suggest that such stable and longstanding business relationships are beneficial for consistent revenue streams.

Farmgate sales make up 23.6% of total sales, with 1,129.4 kgs sold at an average price of \$4.00 per kg. This channel offers the highest convenience and minimal transportation costs, as customers come directly to the farm. The premium price reflects the direct sale nature, allowing for higher margins. Farmgate sales also foster customer relationships and loyalty, providing immediate feedback on product quality. According to Ngarava & Mushunje (2018), direct sales can significantly enhance profitability due to lower intermediary costs and higher price retention.

Sales to lectures and students comprise 6.8% of total sales, with 322.9 kgs sold at an average price of \$4.50 per kg, the highest among all channels. This market is selected due to the convenience and close-knit community within the university, which simplifies logistics and fosters trust. The premium price is justified by the convenience and the assurance of quality meat directly from the farm. As Raja et al. (2022) discuss, niche markets like internal university sales can command higher prices and provide a reliable, though smaller, revenue stream.

These overall findings are supported by Onah et al., (2022) who also had diversified pig markets and indicated the importance of diversified sales channels in mitigating market risks associated with relying on a single market segment and can provide a buffer against fluctuations in demand within specific sectors. However, Parwati & Suyasa, (2017) maintained a single market which was butcheries, and indicated that according to the business model, these were able to pay and it was easy for business planning since they had specialized in that one single market. By maintaining a balanced distribution strategy, the business can ensure steady revenue streams and reduce vulnerability to market changes.

***Table 4. Market analysis of pig enterprise for BUSE Farm***

| <b>Marketing Channel</b>   | <b>Kgs Sold</b> | <b>Percentage of total</b> | <b>Average Price/kg</b> |
|----------------------------|-----------------|----------------------------|-------------------------|
| Bindura University Dinning | 1613.2          | 33.7                       | US\$3.20                |
| Boarding Schools           | 401.2           | 8.4                        | US\$3.45                |
| Local Supermarkets         | 311.7           | 6.5                        | US\$3.80                |
| Butcheries                 | 1003.1          | 21.0                       | US\$3.35                |
| Farmgate                   | 1129.4          | 23.6                       | US\$4.00                |
| Lectures and Students      | 322.9           | 6.8                        | US\$4.50                |
| <b>Total</b>               | <b>4781.5</b>   | <b>100.0</b>               |                         |

#### **4.5 Chapter Summary**

The results section highlights the business's diversified marketing channels and institutional challenges in pig farming. Bindura University Dining represents the largest sales channel with 31.1% of total sales, followed by farm gate sales (25.2%) and butcheries (22.2%), indicating a balanced approach to market reach. Smaller channels like boarding schools, local supermarkets, and sales to lecturers and students further diversify the revenue streams. Despite the promising sales distribution, pig farming faces significant institutional challenges, such as difficulty obtaining stock movement documentation, lack of organized markets, limited access to financial resources, and regulatory hurdles. The profitability analysis showcases strong financial performance, with a robust gross profit margin ratio of 46.57% and favorable return metrics, indicating effective cost management and revenue generation. These issues, coupled with inadequate extension services, limited research support, restricted access to agricultural insurance, and high certification costs for pure breeds, necessitate streamlined administrative processes, enhanced market structures, improved financial inclusion, simplified regulations, and strengthened research and extension services to boost farmers' resilience and productivity.

## **CHAPTER FIVE**

### **SUMMARY CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Summary**

The pig production enterprise at Bindura University of Science Education (BUSE) faces several challenges. Disease management is the most critical, necessitating robust veterinary support to prevent significant losses. Feed supply and costs also pose substantial issues, reflecting the need for a consistent and economical feed source to maintain profitability. Other challenges include breeding efficiency, environmental conditions, and waste management, each requiring specific strategies for improvement. Labour availability and financial constraints further complicate operations, emphasizing the need for skilled labour and better financial management to support growth and sustainability.

The startup capital for a small-scale pig production enterprise involves significant investment in pen construction and breeding sows, which constitute nearly 75% of the total costs. These investments are critical for ensuring the safety and productivity of the livestock. Other essential costs include feed, fencing, labour, and equipment, each contributing to the overall operational efficiency. Proper allocation of these funds is crucial for establishing a sustainable business foundation, with a focus on durable construction and high-quality breeding stock to ensure long-term benefits.

The profitability analysis of the 5-sow production enterprise at BUSE indicates a healthy financial performance. The profitability analysis reveals a robust financial performance for the piggery business. Total revenue stands at \$15,300.80, driven by the effective utilization of multiple marketing channels. Fixed costs are \$1,450.00, including pig sty repairs and construction (\$750.00) and other fixed costs (\$700.00). Variable costs amount to \$8,175.00, with major expenses including feed (\$4,375.00), labor (\$980.00), and vaccines (\$1,575.00). The total expenditure is \$9,625.00. After accounting for these costs, the gross profit margin (GPM) is \$7,125.80, and the gross profit margin ratio (GPMR) is 46.57%, indicating efficient cost management and strong revenue generation. The net income is \$5,675.80, reflecting the actual profit after all expenses are deducted. The benefit-cost ratio

(BCR) of 1.7 suggests that for every dollar spent, there is a return of \$1.70, demonstrating a strong return on investment. The average rate of return (ARR) is \$0.63, indicating that the business is not only profitable but also well-managed, with a substantial conversion of costs into revenue and profit. These financial metrics collectively underscore the business's capability to generate significant returns, ensuring its long-term viability and success in the competitive pig farming industry

## **5.2 Conclusion**

The findings from the pig production enterprise at BUSE highlight significant challenges such as disease management, feed supply, labour availability, and financial constraints, all of which critically impact profitability and sustainability. Despite these obstacles, the start-up capital analysis underscores the importance of substantial investments in pen construction and high-quality breeding sows, essential for long-term success. Profitability analysis reveals a healthy financial performance with a good gross profit margin and benefit-cost ratio, indicating efficient cost management and strong revenue generation. These insights underscore the need for strategic investments and robust management practices to overcome challenges and ensure the enterprise's growth and sustainability.

## **5.3 Recommendations**

Based on the findings, the following recommendations are proposed to enhance the sustainability and profitability of the pig production enterprise at BUSE:

### **Strengthen Disease Management**

Implement comprehensive veterinary support and regular health monitoring to prevent and control diseases. Investing in vaccinations and biosecurity measures can reduce mortality rates and improve overall herd health.

### **Optimize Feed Supply and Costs**

Develop partnerships with local feed suppliers to ensure a consistent and economical feed source. Explore own feed production given that the farm can produce major composition of

animal feed which are soya beans and maize and have experts in feed formulation in the Department of Animal Science. Exploring cheap alternatives of protein source such as Moringa is also key.

#### Improve Breeding Efficiency

Focus on improving breeding practices by selecting high-quality breeding stock and utilizing advanced breeding techniques such as artificial insemination. AI allows breeders to select superior sires with desirable traits such as disease resistance, growth rate, and meat quality, regardless of geographical limitations or logistical constraints. By using high-quality semen from elite males, AI ensures genetic diversity and reduces the risk of inbreeding, thereby improving overall breed health and vigor. This can enhance productivity and ensure a steady supply of market-ready pigs.

#### Enhance Environmental and Waste Management

Invest in infrastructure to manage environmental conditions effectively, such as proper ventilation and temperature control. Additionally, establish efficient waste management systems to minimize environmental impact and comply with regulatory standards.

#### Address Labour and Financial Constraints

Provide training programs to enhance the skills of the labour force and ensure adequate staffing levels. Improve financial management practices, such as detailed budgeting and cost tracking, to better manage resources and plan for future investments.

#### Allocate Start-up Capital Wisely

Ensure that the majority of start-up capital is invested in critical areas like pen construction and high-quality breeding sows. Prioritize durable construction and reliable equipment to reduce long-term maintenance costs.

#### Monitor Financial Performance

Regularly assess the financial performance of the enterprise using key metrics like gross profit margin and benefit-cost ratio. Use these insights to make informed decisions and adjust strategies as needed to maintain profitability.

Implementing these recommendations can help mitigate challenges, optimize operations, and ensure the long-term success and profitability of the pig production enterprise at BUSE.

For further study, it is recommended to conduct a comprehensive analysis of the impact of advanced technological interventions on the efficiency and profitability of pig production enterprises. This could include investigating the benefits of automated feeding systems, precision farming techniques, and advanced breeding technologies. Additionally, exploring the economic viability and environmental sustainability of integrating renewable energy sources, such as biogas production from pig waste, could provide valuable insights. These studies should aim to identify best practices and scalable solutions that can be adopted by small-scale and large-scale pig producers to enhance productivity, reduce costs, and minimize environmental impact.

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## APPENDICES

### *Appendix 1. Questionnaire*

Good day Sir. I am Mitchell Mandipaka a BSc Agricultural Economics and Management student doing research into the economics of pigs and their various marketing channels case study of Bindura University of Science Education pig farming project. I would kindly ask for information from your records on the following provided guides. Your positive response and feedback is greatly appreciated.

|                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>All information provided by interviewee will be treated as STRICTLY CONFIDENTIAL for mutual benefit of both the researcher and the respondents.</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|

Questionnaire number..... Enumerator name.....

Farm Name..... Position of respondent.....

Name of respondent..... Date.....

| A. Farm Characteristics                                           |           |  |
|-------------------------------------------------------------------|-----------|--|
| 1. When did the pig project start?                                |           |  |
| 2. How much land is occupied by BUSE farm (ha)?                   |           |  |
| 3. How much land is allocated for the piggery unit (ha)?          |           |  |
| 4. How many workers are employed in the pig project?              | Permanent |  |
|                                                                   | Seasonal  |  |
| b. What are the working hours of the employees per day? (Hrs.)    |           |  |
| c. How many leave days are allocated per worker per month? (days) |           |  |

|                                                         |                     |           |             |            |            |    |
|---------------------------------------------------------|---------------------|-----------|-------------|------------|------------|----|
| 5. What is the average salary? (USD)                    |                     |           | Permanent   |            |            |    |
|                                                         |                     |           | Seasonal    |            |            |    |
| 6. What is your level of education?                     | 1=Never<br>Attended | 2=Primary | 3=secondary | 4=Tertiary | 5=informal |    |
| 7. Is there a foreman?                                  |                     |           | Yes         |            | No         |    |
| 8. Is there a manager in charge of the piggery project? |                     |           |             | Yes        |            | No |

|                                                                                   |                        |                             |                       |                      |  |
|-----------------------------------------------------------------------------------|------------------------|-----------------------------|-----------------------|----------------------|--|
| <b>B. Production information</b>                                                  |                        |                             |                       |                      |  |
|                                                                                   |                        |                             |                       |                      |  |
| 9. What is the average number of pigs produced per year at BUSE farm?             |                        |                             |                       |                      |  |
| 10. What is the average sows kept at BUSE                                         |                        |                             |                       |                      |  |
| 11. What is the number of Boer kept at BUSE?                                      |                        |                             |                       |                      |  |
| 12. What is the average number of piglets weaned per sow per year?                |                        |                             |                       |                      |  |
| 13. What is the growth rate of pigs at BUSE farm (from weaning to market weight)? |                        |                             |                       |                      |  |
| 14. What is the average market weight of pig sold at BUSE farm?                   |                        |                             |                       |                      |  |
| 15. What breed(s) of pigs are kept at BUSE farm?                                  | 1=Duroc x<br>Hampshire | 2=Large White<br>x Landrace | 3=Duroc x<br>Pietrain | 4=Duroc x<br>Dallard |  |
| 16. How do you select breeding stock at BUSE farm?                                |                        |                             |                       |                      |  |
| 17. What is the average breeding rate of sows at BUSE farm?                       |                        |                             |                       |                      |  |
| Feed and Nutrition,                                                               |                        |                             |                       |                      |  |

|                                                                                |                        |                             |                        |                                                              |    |
|--------------------------------------------------------------------------------|------------------------|-----------------------------|------------------------|--------------------------------------------------------------|----|
| <b>18. What type of feed do you use for pig production at BUSE farm?</b>       | 1=commer<br>cial feeds | 2=Straight<br>feeds         | 3=Mixed<br>concentrate | 4=other(speci<br>fy)                                         |    |
| <b>19. What is the average cost of feed per pig per year?</b>                  |                        |                             |                        |                                                              |    |
| <b>20. How do you ensure the nutritional needs of pigs are met at BUSE?</b>    |                        |                             |                        |                                                              |    |
| <b>21. How many bags of Creep feeds per year?</b>                              |                        |                             |                        |                                                              |    |
| <b>22. How many bags of Growers per year?</b>                                  |                        |                             |                        |                                                              |    |
| <b>23. How many bags of Finisher per year?</b>                                 |                        |                             |                        |                                                              |    |
| <b>24. How many feed troughs</b>                                               |                        |                             |                        |                                                              |    |
| <b>25. How many water troughs?</b>                                             |                        |                             |                        |                                                              |    |
|                                                                                |                        |                             |                        |                                                              |    |
| <b>Health and Diseases Management</b>                                          |                        |                             |                        |                                                              |    |
| <b>26. What diseases management practices are used at BUSE farm?</b>           | 1=vaccination          | 2=sanitation and<br>hygiene | 3=other(specify)       |                                                              |    |
| <b>27. How do you monitor and control disease outbreaks at BUSE farm?</b>      |                        |                             |                        |                                                              |    |
| <b>28. What is the average mortality rate of pigs at BUSE farm?</b>            |                        |                             |                        |                                                              |    |
|                                                                                |                        |                             |                        |                                                              |    |
| <b>Records Keeping And Monitoring</b>                                          |                        |                             |                        |                                                              |    |
| <b>29. Do you keep records of pig production and performance at BUSE farm?</b> |                        |                             |                        | Yes                                                          | No |
| <b>30. What performance indicators do you monitor and track at BUSE farm?</b>  | 1=slaughte<br>r weight | 2=weaning<br>weight         | 3=Birth<br>weight      | 4=reproductive<br>performance(farrowing rate<br>litter size) |    |

|                                                                                |                           |                         |                            |                                   |
|--------------------------------------------------------------------------------|---------------------------|-------------------------|----------------------------|-----------------------------------|
|                                                                                |                           |                         |                            |                                   |
| <b>Housing and Management</b>                                                  |                           |                         |                            |                                   |
| <b>31. What type of housing system is used at BUSE farm?</b>                   | 1=intensive indoor system | 2=semi-intensive system | 3=extensive outdoor system | 4=other(specify)<br>Tobacco burns |
| <b>32. How do you manage the environment and welfare of pigs at BUSE farm?</b> |                           |                         |                            |                                   |
| <b>33. What space allocation per pig at BUSE farm?</b>                         |                           |                         |                            |                                   |
| <b>34. How many pens in the project?</b>                                       |                           |                         |                            |                                   |
| <b>35. How many for breeding?</b>                                              |                           |                         |                            |                                   |
| <b>36. How many pens for piglets?</b>                                          |                           |                         |                            |                                   |
| <b>37. What is the catering water ponds available?</b>                         |                           |                         |                            |                                   |
|                                                                                |                           |                         |                            |                                   |

|                                   |  |
|-----------------------------------|--|
| <b>B. START-UP CAPITAL NEEDED</b> |  |
|-----------------------------------|--|

|                                                                                                                    |                                                                      |                           |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------|
| <b>38. What is the estimated initial investment required to establish a small-scale pig production enterprise?</b> |                                                                      |                           |
| <b>39. What are the major start-up costs?</b>                                                                      |                                                                      |                           |
| <b>40. Are there any specific requirements?</b>                                                                    |                                                                      |                           |
| <b>41. What are the ongoing capital requirements?</b>                                                              |                                                                      |                           |
| <b>42. How do you expect to finance the start-up cost?</b>                                                         |                                                                      | 1=savings 2= grant 3=loan |
| <b>43. What are the key factors that influence the start-up capital</b>                                            | 1=size of operation 2=location 3=breed selection 4= others( specify) |                           |
| <b>44. What is the expected payback period for the investment?</b>                                                 |                                                                      |                           |

| C. Marketing channels used for sale |        |                |                      |                                         |                                                                                                         |  | The main reason to use the market                                                                                                                                                                                                              |
|-------------------------------------|--------|----------------|----------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Breeds                              | Number | Average Weight | Average market price | Average pigs sold in the last 12 months | Marketing Channel used                                                                                  |  | 1=convenience<br>2=reduce market cost<br>3price transparency<br>4=less negotiation<br>5=less risks<br>6=stable demand<br>7=long term relationship<br>8=quality feedback<br>9trust and reputation<br>10=niche market access<br>11=quick payment |
|                                     |        |                |                      |                                         | 1= Auctions<br>2=Abattoirs<br>3= Butcheries<br>4= Private sales<br>5= Speculators<br>6=Other ( specify) |  |                                                                                                                                                                                                                                                |

|                               |         |  |  |  |  |  |                                                      |
|-------------------------------|---------|--|--|--|--|--|------------------------------------------------------|
|                               |         |  |  |  |  |  | 12=no intermediaries<br><br>13=more profit retention |
| Duroc<br><br>x<br><br>Dallard | Boer    |  |  |  |  |  |                                                      |
|                               | Sow     |  |  |  |  |  |                                                      |
|                               | Piglets |  |  |  |  |  |                                                      |
| Large White                   | Boer    |  |  |  |  |  |                                                      |
|                               | Sow     |  |  |  |  |  |                                                      |
|                               | Piglets |  |  |  |  |  |                                                      |
| Duroc                         | Boer    |  |  |  |  |  |                                                      |
|                               | Sow     |  |  |  |  |  |                                                      |
|                               | Piglets |  |  |  |  |  |                                                      |

|                                       |                |  |  |  |  |  |  |
|---------------------------------------|----------------|--|--|--|--|--|--|
| <b>Landrace</b>                       | <b>Boer</b>    |  |  |  |  |  |  |
|                                       | <b>Sow</b>     |  |  |  |  |  |  |
|                                       | <b>Piglets</b> |  |  |  |  |  |  |
| <b>Duroc<br/>x<br/>Pietrain</b>       | <b>Boer</b>    |  |  |  |  |  |  |
|                                       | <b>Sow</b>     |  |  |  |  |  |  |
|                                       | <b>Piglets</b> |  |  |  |  |  |  |
| <b>Large white<br/>x<br/>Landrace</b> | <b>Boer</b>    |  |  |  |  |  |  |
|                                       | <b>Sow</b>     |  |  |  |  |  |  |
|                                       | <b>Piglets</b> |  |  |  |  |  |  |
| <b>Mukota</b>                         | <b>Boer</b>    |  |  |  |  |  |  |
|                                       | <b>Sow</b>     |  |  |  |  |  |  |
|                                       | <b>Piglets</b> |  |  |  |  |  |  |

|                                                                                |                                                         |             |
|--------------------------------------------------------------------------------|---------------------------------------------------------|-------------|
| <b>C. Challenges being faced in the piggery farming project?</b>               |                                                         |             |
| <b>45 .Rank these challenges according to severity( Rank 1 as most severe)</b> |                                                         |             |
|                                                                                | <b>Challenges</b>                                       | <b>Rank</b> |
|                                                                                | Unavailability of high genetic potential breeds of pigs |             |
|                                                                                | Lack of capital to purchase commercial feeds            |             |
|                                                                                | Lack of adequate knowledge                              |             |
|                                                                                | Lack of standard pens for pig breeding                  |             |
|                                                                                | Poor grazing land                                       |             |
|                                                                                | Few watering ponds in the paddock                       |             |
|                                                                                | Vandalism of infrastructure                             |             |
|                                                                                | Stock theft                                             |             |
|                                                                                | Poor wages                                              |             |
|                                                                                | High cost of artificial insemination                    |             |
|                                                                                | Predators (snakes, and other wild animals               |             |
|                                                                                | High costs of vaccines and drugs                        |             |
|                                                                                | High stuff turnoff                                      |             |
|                                                                                | Poor working conditions                                 |             |
|                                                                                | Unavailability of drugs                                 |             |
| Lack of motivation due to poor salaries                                        |                                                         |             |

|                    |                                                     |  |
|--------------------|-----------------------------------------------------|--|
| <b>PRODUCTION</b>  |                                                     |  |
| <b>MARKETING</b>   | Certification process for pure pig breeds is costly |  |
|                    | Lack of vet services                                |  |
|                    | Lack of organised market                            |  |
|                    | Lack of access to finance                           |  |
|                    | Difficulty in obtaining a police clearance          |  |
|                    | Difficulty in obtaining a stock movement permit     |  |
| <b>INSTITUTION</b> | Few number of buyers                                |  |
|                    | Lack of marketing infrastructure                    |  |
|                    | Low market prices                                   |  |
|                    | Long distance to the market                         |  |
|                    | Lack of transportation resources                    |  |
|                    | High levels of competition                          |  |
|                    | Pandemic triggered supply and demand challenges     |  |
|                    | Low volume/ few number of pigs                      |  |
|                    | Low purchasing power of consumers                   |  |
|                    | High cost of transportation                         |  |
|                    | High market prices of pure breeds                   |  |

| D.PROFITABILITY OF PIG PRODUCTION           |                                 |             |                  |               |                     |              |
|---------------------------------------------|---------------------------------|-------------|------------------|---------------|---------------------|--------------|
| 46. Do you practice value addition?         |                                 | Yes         |                  | No            |                     |              |
| 47. If yes then specify?                    |                                 |             |                  |               |                     |              |
| 48. Compute the table below                 |                                 |             |                  |               |                     |              |
| Gross margin for pig at Bindura Enterprise. |                                 |             |                  |               |                     |              |
|                                             | Qty                             | Unity Price | Quantity x Price | Total Revenue | Total Variable Cost | Gross Margin |
| Pig sales                                   |                                 |             |                  |               |                     |              |
| Variable Cost                               |                                 |             |                  |               |                     |              |
| Cost of Pigs                                |                                 |             |                  |               |                     |              |
| Creep feed                                  |                                 |             |                  |               |                     |              |
| Feed (Grower)                               |                                 |             |                  |               |                     |              |
| Feed(Finisher)                              |                                 |             |                  |               |                     |              |
| Vaccines                                    | Porcine Circovirus Type 2(PCV2) |             |                  |               |                     |              |
|                                             | Porcine Parvovirus              |             |                  |               |                     |              |

|                                   |                                                          |  |  |  |  |  |  |
|-----------------------------------|----------------------------------------------------------|--|--|--|--|--|--|
|                                   | <b>Porcine Reproductive and Respiratory Syndrome(PRR</b> |  |  |  |  |  |  |
|                                   | <b>Mycoplasma hyopneumoniae</b>                          |  |  |  |  |  |  |
| <b>Drugs</b>                      | <b>Antibiotics (macrolides, and penicillins)</b>         |  |  |  |  |  |  |
|                                   | <b>Anthelmintics (benzimidazoles and macrocyclic)</b>    |  |  |  |  |  |  |
|                                   | <b>Lonophores</b>                                        |  |  |  |  |  |  |
|                                   | <b>Growth Promoters</b>                                  |  |  |  |  |  |  |
|                                   | <b>Iron dextran</b>                                      |  |  |  |  |  |  |
|                                   |                                                          |  |  |  |  |  |  |
| <b>Labor cost</b>                 |                                                          |  |  |  |  |  |  |
| <b>Fuel and energy cost</b>       |                                                          |  |  |  |  |  |  |
| <b>Construction cost</b>          |                                                          |  |  |  |  |  |  |
| <b>Water troughs</b>              |                                                          |  |  |  |  |  |  |
| <b>Feed troughs</b>               |                                                          |  |  |  |  |  |  |
| <b>Bedding and supplies costs</b> |                                                          |  |  |  |  |  |  |
| <b>Marketing cost</b>             |                                                          |  |  |  |  |  |  |
| <b>Breeding stock costs</b>       |                                                          |  |  |  |  |  |  |
| <b>Transport cost</b>             |                                                          |  |  |  |  |  |  |

|                      |  |  |  |  |  |  |
|----------------------|--|--|--|--|--|--|
| <b>Miscellaneous</b> |  |  |  |  |  |  |
|----------------------|--|--|--|--|--|--|

|                    |
|--------------------|
| <b>H. COMMENTS</b> |
|                    |

Thank you