# AN ANALYSIS OF THE PROFITABILITY OF PIG PRODUCTION IN BINDURA DISTRICT.

**A dissertation submitted in partial fulfillment of the requirements of the Bachelor of Agricultural Science Honours Degree in Agricultural Economics and Management.**


**Bindura University of Science Education**


**Faculty of Agriculture and Environmental Science**

**Department of Agricultural Economics, Education and Extension**

**BY**

**TARUME TATENDA BLESSING**

**(B1852053)**


**30 MAY 2022**

**RELEASE FORM**

**AUTHOR:** **TARUME TATENDA BLESSING**

**Reg Number**: **B1852053**

Degree: Bachelor of Agricultural Science Honours (Agricultural Economics and management)

Project title: an analysis of the profitability of pig production in Bindura **District**.

Permission is hereby granted to **Bindura University of Science Education Library** to produce a single copy of this dissertation and lend such copy for private, scholarly, or scientific research only.

Signed.....

**Permanent Address:** Dumukwa St 65\67 Old Mabvuku, Harare

**Date:** **30-05-2022**

**APPROVAL FORM**

**Name:** **Tarume Tatenda Blessing**

Signature:

Date: 30-05-2022

I have supervised the research project of the above-mentioned student and I am convinced that the research project:

**a) Can be submitted**

Project Supervisor: Mr V.T Munyati Signature _____

**Date: 30-05-2022**

**b) Is authorized for marking**

Project Supervisor: Mr V T Munyati Signature _____

**Date: 30-05-2022**

I certify that I have checked the Research Project and I am satisfied that it conforms to the Department of Agricultural Economics Guidelines for Project Preparation and Presentation. I, therefore, authorize the student to submit this dissertation for marking.

Quality Controller: _____ Signature _____

**Date: 30-05-2022**

Official Stamp\Date Received In The Department Of Agricultural Economics.

## DECLARATION

I hereby declare that the research project entitled **"An analysis of the profitability of pig production in Bindura district"**, submitted to the Bindura University of Science Education, Department of Agricultural Economics, Education and Extension is a record of original work done by me **Tatenda B Tarume** under the guidance and supervision of V.T Munyati and this work is submitted in partial fulfillment of the requirements for the reward of the Bachelor of Agricultural Science Honours Degree in Agricultural Economics and Management.

**DEDICATION**

My family is the inspiration for this dissertation. May the Almighty God bless you?

**ACKNOWLEDGMENTS**

The researcher would like to give thanks to the Almighty God for the life and great blessings he gave to me during the research period. The researcher also wishes to express her gratitude and appreciation to the project's supervisor, Mr. V T Munyati, who provided the study with direction. All other Agricultural Department lecturers, as well as everyone else who contributed to this study by providing thoughts and information during the research study, deserve special recognition. The researcher also acknowledges the contributions of fellow Agricultural Economics and Management students from the Bindura University of Science Education's class of 2022. Finally, the researcher wants to express her gratitude to her parents, Mr. and Mrs. Tarume, not forgetting her little brothers blessed and Brian as well as Charity Mashlanzi her close friend, for their financial and social support.

**ABSTRACT**

In Zimbabwe, a lot of individuals are venturing into pig farming. Regardless of an increase in pig production, farmers in the Bindura district are failing to maximize their profits and improve their living standards. Many researchers were mainly focusing on the production of pork neglecting the return per dollar invested by the farmers. The researcher has observed gaps in the literature, therefore, this study intends to fill the identified gaps by analyzing the profitability of pig farming in Bindura District. Primary data was acquired from 60 randomly selected pig farmers in Bindura District using structured questionnaires. Secondary data was gathered from Bindura AGRITEX, Bindura VET, feed companies, and the Ministry of Agriculture.

Descriptive statistics which includes frequencies and percentages were used to analyze demographic data. To find out the level of return per dollar invested in pig production, the researcher used the Gross Margin Budget to show the average return per dollar invested. The researcher adopted multiple linear regression to determine the factors that affect the profitability of pig production. It was estimated using the OLS method using the SPSS version 2020. To determine the constraints faced by the pig farmers in Bindura District, the researcher used the Likert scale method. The outcome of linear regression shows that the selling price and the number of pigs owned significantly affect the return per dollar invested positively ($P<0.05$). However, the use of biosecurity affects the return per dollar invested negatively ($P< 0.05$). This is because materials that are used for biosecurity will increase the variable costs and, as a result, it reduces the revenue of pig farmers in Bindura District. High cost of feed, high cost of veterinary drugs, and shortage of slaughtering facilities were the main production challenges amongst constraints associated with pig farming in Bindura District. The total revenue, total variable cost, and gross margin were $USD 182, USD$91 and USD$ 91, respectively per month per porker.

Conclusively, the study found that pig farming was profitable in Bindura district. Therefore from the identified challenges, the researcher recommends that the government should formulate pricing policies that allocate viable pork prices to avoid the exploitation of farmers by middlemen who purchase porker at very low prices at the farm gate. Farmers are also encouraged to use crossbreeds with tolerance to diseases since the drugs and vaccines required for pig production are expensive.

**Keywords:** Variable costs, fixed costs, gross margin, productivity, profitability, SPSS, Ordinary Least square

**TABLE OF CONTENTS**

Contents

**List of tables**

**List of figures**

# CHAPTER ONE

## 1.0 INTRODUCTION

### 1.1 Background

Worldwide, pork became the most consumed meat from domesticated animals. Demand for pork has been rising in recent decades as a result of changes in consumption patterns as incomes increase in developing countries with fast-growing economies. Together with poultry, the pig sector is the fastest-growing livestock subsector which increased by 1 billion in 2015, doubling the number in the 1970s. Many people are venturing into pig farming, except for those countries where pig consumption is frowned upon due to cultural and religious reasons. . (FAO, 2016)

Agriculture still accounts for a relatively large share of GDP in most African countries. Livestock production can help to alleviate poverty in many ways, including by increasing food production, providing a source of income and a method of capital accumulation, creating job possibilities, and providing crop inputs and services. Small-holder pig farmers, particularly in rural regions with low farm infrastructure and limited biosecurity, dominate the pig production system across Africa. Many limits plague Africa's production system, with marketing serving as a detrimental challenge limiting the expansion of pig production. The sale of live pigs at auctions by farmers, traders, or middlemen is the most common method of pig marketing in Africa. Weka et al, 2020).In Africa, the 27 least developing Countries have 45.4% of the population but contributed 64.2% to pig slaughter and 56.3% to pig meat production. (World of pigs, 2020).

According to (Marongwe et al., 2012) as referenced by (Charles et al., 2017), Zimbabwe has an agro-based economy, with over 70% of the population rely on agriculture for a living, either directly or indirectly. Between 2012 and 2016, agriculture contributed an average of 9.9% to the Gross Domestic Product (GDP). Around 40% of agricultural goods are exported, with the remaining 60% being used as raw materials in the manufacturing industry. The agriculture sector in Zimbabwe has the greatest challenge which includes low production, lack of agricultural inputs, lack of finance, high input costs, and frequent droughts have all impacted the agricultural sector's performance throughout the years. Zimbabwe's economic development is mostly fuelled by the agricultural sector's expansion. (Zimstat, 2019).

According to (MAMID, 2014), which was quoted by (Mutambara, 2013), agriculture was one of the primary contributors to GDP in Zimbabwe in 1999, accounting for roughly 19 percent. The agriculture industry generated 14 percent of GDP in 1980, growing to 20.4 percent in 2001, but decreased to 12.5% and 12.2%

in the years 2015 and 2016 respectively. Agriculture is also Zimbabwe's major employer, employing more than 70% of the country's workforce (MAMID, 2014).

The Ministry of Agriculture, (2004) highlighted the criticality of animal production for domestic consumption in Zimbabwe. Inside the SADC location, Zimbabwe has been regarded to be the breadbasket of the region due to the excessive level of agricultural output. In Zimbabwe, livestock accounts for 15% to 25% of total agricultural output with the pork subsector accounting for 3.5 percent of total livestock assets, with 88 percent of subsistence community farmers dominating the sector (Chazovachii 2012, FAO 2014, Tawonezvi et al. 2004). In recent years, the Zimbabwean meat sector has faced substantial limits and challenges, including diminishing demand, unregulated imports, a shortage of funding for production and processing, rising feed costs, increased compliance expenses, and low earnings (LMAC, 2014).

Zimbabwe's pig population reached 272,206 thousand heads in 2020. Though the number of pigs in Zimbabwe has fluctuated significantly in recent years. (Knoema, 2020). According to (Mutambara, 2013), the reason was caused by the uncompetitiveness of Zimbabwean pork products, particularly on the foreign market. Low-quality standards, poor breeds, uncompetitive pricing, and insufficient market access all contributed to this. Furthermore, both endogenous and exogenous factors influenced competitiveness within the sector, with price being one of the external factors that influence the business (Ngarava & Mushunje, 2019)

Zimbabwe produced 10,107 thousand tonnes of pig meat. Zimbabwe's pig meat production has been fluctuating drastically in recent years. Pig farming may serve a critical role for small-scale farmers, not simply in terms of income generation. Pigs are an asset that represents wealth or a good agricultural diversification project from an economic standpoint, but traditional ceremonies and beliefs in some regions center on the pig as an asset to their belief system from a sociological perspective. (FAO, 2012)

The national sow herd was estimated at 60 351 sows, with roughly 20 351under the commercial pig sector. Annual pig slaughter figures at abattoirs have continued to rise, from 173 694 pigs in 2018 to 178 668 pigs in 2020, an increase of 11%. Abattoir slaughters of commercial pigs fell by 7.3 percent in 2020, from 192 747 pigs in 2019 to 178 668 pigs in 2020. (FAO, 2021)

Pork sales increased following the pandemic that hit mutton and goat meat sales. Zimbabwe recorded an increase in pork production in 2019 due to higher demand. Data showed that slaughtered pigs totaled 196 173, an increase of 6, 7% compared to the prior period. The increase in pork production was due to higher consumer demand for the product. Pig slaughters in the last quarter of the year 2021 were 53168, an increase of 5, 42% from 50 434 head slaughtered in the third quarter. The slaughters were also 4, 67% higher than slaughters in the same period. The central bank of Zimbabwe concluded that the higher performance was partly due to improved availability of feeds, in line with the higher locally produced cereal and oilseed output in 2021. (RBZ, 2022)

Communal farmers in the Bindura district, according to (AGRITEX, 2021), own the majority of pig enterprises. The sow herd in Bindura is expected to rise by 5622, with roughly 3490 belonging to the communal pig production sector. (Vertinary, 2021). Since the fast-track land reform, communal farmers in the Bindura district have been regarded as one of the key contributors to livestock growth in the area. Even though they are facing a lot of challenges, the majority of them continue to use the local breed (mukota), which is not economically productive. Their sow herd is also still small. To boost piggery productivity, it is important to emphasize the necessity of allocating and distributing enough resource inputs, investing in research, and removing roadblocks to optimal resource usage and utilization at the farm level.

The specific objectives of this study includes analyzing the profitability of pig production in the Bindura district, analyzing factors affecting returns currently earned by the pig producers, determining the marketing margins in pig production in Bindura District, and also defining the main constrictions challenging pig producers in Bindura District

**1.2 Research problem statement**

Zimbabwe's pork sector had hit a rough patch, with producers shutting down due to viability challenges. Pig slaughters fell by 5% in 2020, to 183,888, as producers faced challenges ranging from inferior breeds to a shortage of finance, as well as expensive feed and drug prices. As a result, monthly pig slaughters in 2020 was 15 324, down from 16 152 in 2019. (Nyoni, 2021)

Pig producers in Zimbabwe have been experiencing very low profits due to the challenges they are experiencing. These include poor breeds, poor access to credit, an increase in feed and drug costs, disease outbreaks, and marketing policy bottlenecks as well as a shortage of electricity, most piglets die from pneumonia.

The production of pork is low in Bindura District due to low profitability which is a product of the challenges raised above. If those challenges are to be addressed definitely, pork production will increase in Mashonaland Central and as well as in Bindura District.

This research, therefore, intends to analyze the profitability of pig farming, the determinants of pig profitability, and challenges being faced in Bindura District.

**1.3 Research questions**

1. What are the returns currently earned by the pig producers in the Bindura district?
2. What are the factors affecting the profitability of the pig farmers in the Bindura district?
3. What are the main constraints facing pig producers in the Bindura district?

**1.4 Objectives of the study**

### 1.5 Main objective

The main objective of this study is to analyze the profitability of pig production in the Bindura District

### 1.6 Specific objectives

1. To determine the profitability of pig production in the Bindura District
2. To analyze factors affecting the profitability of pig production in Bindura District.
3. To define the main constraints faced by pig producers in Bindura District.

### 1.7 Significance of the study

The main reason why people should invest in the piggery enterprise is that pigs multiply fast. This is because a sow can have on average a litter size of between 10 to 20 piglets at a time. Pigs have also a gestation period of two and half times a year. This means that one sow, which costs about usd$200, can produce up to 18– 38 piglets in a year. These piglets which reach a market size of 90 kg in nine to eleven months can sell for up to USD$297 each.

Pig production, therefore, is considered a profitable business. Regardless of these benefits, farmers in the Bindura district are failing to maximize their profits rather some are abandoning the business. Therefore, this study will seek to provide and avail information about the profitability, challenges being faced and factors influencing profitability levels of pig farming in the Bindura district.

### 1.8 Limitation of the study

- Lack of funds since the research was self-sponsored.
- Some farmers did not want to disclose accurate information since they consider it confidential.
- Lack of transport because some of the farms are far from the main roads and inaccessible.

### 1.9 Organisation of the study

This research project has five chapters. The first chapter is composed of the research background, problem statement, research questions of the study, research objectives of the study, the significance of the study, limitations of the research study, and the outline of the research project. In the second chapter, relevant literature was reviewed. In Chapter three, the research region and map, as well as an explanation of the methodology employed during the study, are presented. Data presentation and discussion are presented in the fourth chapter. Lastly, chapter five contains the research conclusion and recommendations.

# CHAPTER TWO

## 2.0 Literature Review

### 2.1 Introduction

The main objective of this chapter is to give an outline of pig profitability worldwide as well as in Zimbabwe. This chapter includes reviews of literature concerning the current state of pig profitability, factors affecting pig production, and the constraints being faced by pig producers in Bindura District, Zimbabwe, and worldwide.

### 2.2 Definition of Terms

**2.2.1 Socio-economic factors**: These are personal and socio-cultural characteristics that relate to the innovativeness of the farmer (Rogers, 1995). Relating to this study they will include age, gender, level of education of pig farmers, pig breed, and access to credit. (Vapulus, 2018). They can also be described as lifestyle indicators and components of financial viability or social standing for piggery producers.

**2.2.2 Profit:** Profit is defined as a reward gained by an entrepreneur as a result of combining all of the factors of production to meet the needs of an individual in the economy who is facing uncertainties. (Profi*t* Management, 2016).This was also supported by (Bragg, 2021) who stated that it is a positive amount remaining after subtracting costs incurred from the gross revenue generated over a given period. It was also further explained as a measure of the positive gain from an enterprise after subtracting all expenses. (Evans, 2020). Therefore, profit is the benefit experienced by the farmer after deducting all the production expenses incurred in a specified period.

**2.2.3 Gross margin:** Gross margin reveals the amount that an entity earns from the sale of its products and services after deducting the variable expenses. (Mature, 2019). The gross margin of the farm activity is the difference between the gross income earned and the variable costs incurred in the production process. (Fani et al., 2015). This, therefore, means that gross margin is the sum of money the farmers get after deducting the variable expenses.

### 2.3 Theoretical Framework

#### 2.3.1 Theory of profit maximization

The traditional neoclassical theory of profit maximization is the main theory behind this study. This theory assumes that profit maximization is the main goal of any enterprise and that all piggery producers want to maximize the return per dollar that they are earning and minimize their production costs. This is because

profits can be used to measure the viability and feasibility of an enterprise. The profit maximization theory indirectly caters for the social welfare of a business, which includes labor payments. (Academics, 2019)

### 2.3.2 Theory of Cost minimization

The researcher saw it worthy to include the traditional theory of cost minimization in this study because, for the pig producers to maximize their profits, cost should be minimized. This is because every firm's objective is to choose the best combination of inputs to produce a certain level of output at minimum cost. (Bhattacharya, 2001). Therefore, relating to this study, pig producers should make sure that they select the best input combination that minimizes the production cost so that they maximize their returns.

## 2.4 Conceptual Framework

According to (Camp, 2001) as cited by (Adom, 2018) conceptual framework is a structure believed by the researcher that can accurately explain the natural progression of the research project. The conceptual framework illustrates the relationship between the explanatory variables involved in the study and how they influence the dependent variable. Many factors affect pig profitability in Zimbabwe which are social, economic, religious, and political. These factors include use of vaccines, herd size, price of pork per kilogram, the weight of carcass, distance to the market, and cost of feed as well as pig breed used. Therefore, the determinants raised above-influenced pig profitability. These factors may lead to a decrease or increase in revenue which consequently either increases or decrease the profits of the pig producers in the Bindura district. The conceptual framework in the figure below illustrates the factors that affect the profitability of pig farming in the Bindura District

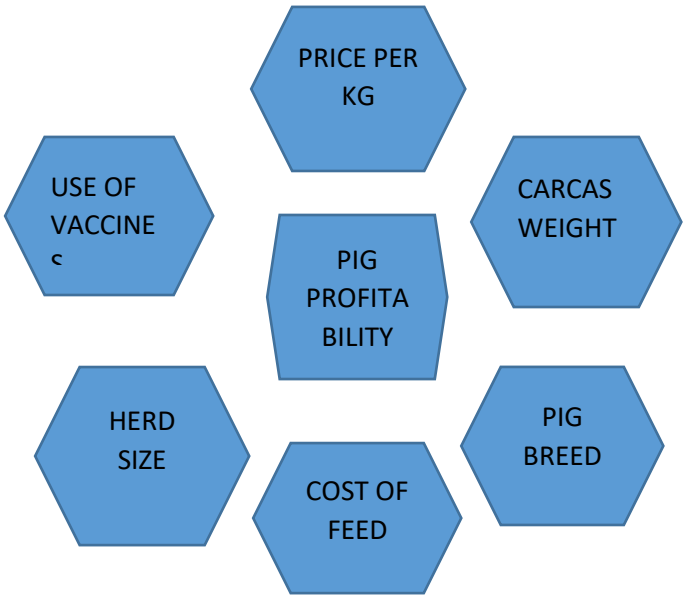


Figure 1: a conceptual framework

Source: survey, 2022

## 2.5 Trends in pig production output

### 2.5.1 National trends

The national sow herd was estimated at 60 351 sows, with roughly 20 351 under the commercial pig sector. Annual pig slaughter figures at abattoirs have continued to rise, from 173 694 pigs in 2018 to 178 668 pigs in 2020, an increase of 11%. Abattoir slaughters of commercial pigs fell by 7.3 percent in 2020, from 192 747 pigs in 2019 to 178 668 pigs in 2020. (FAO, 2021) .The total number of pigs slaughtered for the first eight months to August 2017 was 102,254, a decline of 9% over the same period in 2016. Assuming that slaughters will occur at the same rate as in 2016, the full-year slaughter was estimated to be 153 000. (LMAC, 2017).

### 2.5.2 Pig Production

**Annual pig slaughter trends at Abattorirs(2013-2019)Annual pig slaughter Trends At Abattoirs from (2013-2019)**

| Year | Total Pigs Slaughtered |
|---|---|
| 2019 | 192 747 |
| 2018 | 173 694 |
| 2017 | 155 181 |
| 2016 | 167 026 |
| 2015 | 140 445 |
| 2014 | 130 523 |
| 2013 | 145 747 |

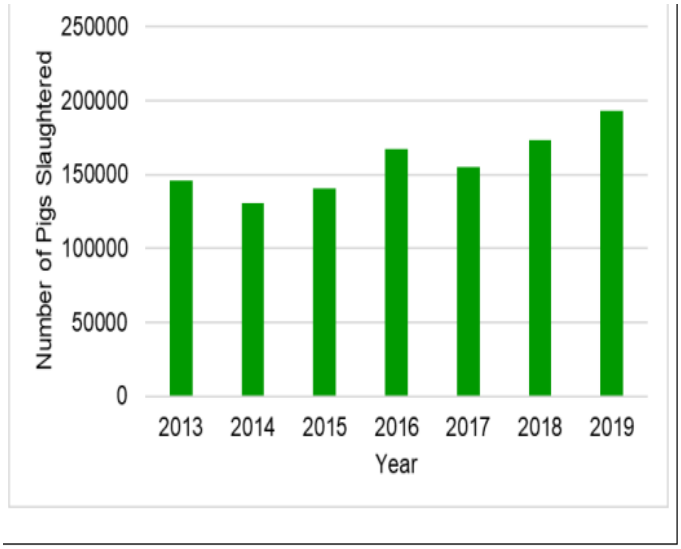


**Figure 2: pig production trends**

Source: MINISTRY OF LANDS, AGRICULTURE, WATER AND RURAL RESETTLEMENT, (2020).

## 2.6 Domestic prices of pork

The market prices for pork were low before 2019, a kg of pork was going for US$4.86 and USD$6.67 in 2017 and 2018 respectively. The prices of pork in Zimbabwe per tonne for the years 2016, 2017, 2018, and 2019 were US$ 4,500.00, US$ 4,857.14, US$ 6,666.67, and US$ 2,873.79 respectively. A study also supported the hypothesis by WAMUCII (2021) that in 2019, Zimbabwe sold 103 tonnes of pork. For 2019

alone, the interest in pork in Zimbabwe has increased by 3333.333% compared to the year 2018. (Wamucii, 2021)

### 2.7 Zimbabwe pork export trend

(Wamucii, 2021) proposed that in 2019 the export price of pigs changed to $2.91 per kilo, by -5 6.311%. Zimbabwe gained USD$0.30m after an increase in pork exports by 1371.43% for the year 2017and 2019. The total values in export for pork in Zimbabwe were US$ 9, US$ 34, US$ 20, and US$ 296 in US dollar thousand for the years 2016, 20,17, 2018, and 2019 accordingly.

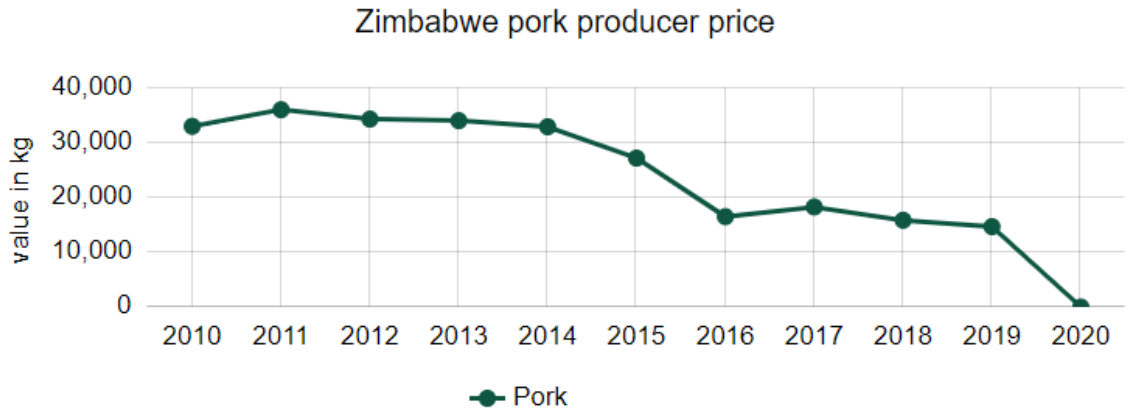


**Figure 3: Zimbabwe producer Pork prices**

SOURCE: S, Wamucii, (2021)

### 2.8 Empirical review on pig profitability

A study in China showed that there was an increase in the production of pigs in 2020, the total number of pigs in inventory increased by 31% to 406.63 million. The total import value of pork also increased by 108.3% to 4.39 million tonnes. In 2020, the average price for the pig increased by 60.36 % to the year 2019. The profit of one of the leading pig breeding companies was 3.24 billion also increased. This shows that pig production is a viable business if well managed and many people in China are investing in the sector since they have seen more profits. (Jilin Agricultural and Rural Affairs Bureau, 2022)

More so, according to (Aminul et al, 2017) a study conducted in Nigeria to measure the profitability and technical efficiency of pig production in Ekiti State, revealed that pig production in the study area is economically profitable. Although there is room for improvement, it is capable of creating employment, increasing income, and improving the standard of living of the local people. For the sake of improvement. The study recommends that farmers should familiarize themselves with the media and attend workshops to be aware of new developments in the pig industry. (Taha, 2021)

In addition, pigs are also recognized as key contributors to both food and financial security for Swaziland's rural people. Due to low domestic production output and rising demand, it may be argued that the pig sector is currently economically rewarding. Although the market environment is still uncompetitive and the anticipation of an increase in pork will lead to a decrease in pork producer prices. (Ndwandwe et al, 2018). It was also noted that pig production is associated with high variable costs such as Artificial insemination costs, feed costs, and health costs. (Hedija & Kuncová, 2021)

Furthermore, economic studies have demonstrated that the traditional production system is inefficient and unprofitable due to poor feed conversion, high death rates, low reproduction rates, and poor final outputs. However, African experiences demonstrate that traditional pig farming is static and that the traditional sector is more sustainable than the intensive one. (Lekule and Kvsgaard, 2003)

It was revealed by the study in Nigeria that an intensive pig production system is economically profitable. This type of production system increases the production costs since the feed was the most expensive resource when pigs are enclosed and given purchased feed. The researcher recommended that since feed is constituting the larger part of pig production costs therefore farmers should substitute purchased feed with kitchen waste. The study also recommends that the state should establish marketing channels that enable the producers to maximize their profits. Also producers especially the smallholder farmers should create groups and societies which enable cross-pollination of ideas. In addition, the high mortality rate of piglets should be reduced by the adoption of furrowing crates. (Ezeibe, 2010).

More so, (Olorinde et al, 2003) in their study, concluded that pig farming produces better profit margins than poultry. This was a result of the high demand for pork compared to chicken because the people in the study area were Christians. The study also highlighted that feed costs composed a large percentage of pig production costs. This corroborates with (Westernbrink, 1995) who articulated that feed cost is higher when pigs are under an intensive production system. Another by (Devandra and Fuller, 1979) also noted that high feed cost is a detrimental constraint in the production of pigs. Although, it is economically viable to feed pigs with purchased feed since the nutrients contained are known (Ezeibe, 2010).

**2.9 Empirical review on constraints**

Pig producers in the study area experience challenges when marketing their pigs. Lack of funding, high transportation costs, absence of uniformity, lack of a functioning abattoir, lack of storage facilities, and lack of price information were the top marketing issues highlighted by respondents. It has been suggested that pig butcheries offer farmers cheap and exploitative pricing, according to (FAO, 2012) cited (Levy, 2014). The traders' biggest challenge is the high expense of transportation. Slaughtering facilities, particularly in rural markets, are woefully inadequate. In addition, market storage facilities are insufficient. Meat is perishable,

but the pig markets in the research area lack refrigeration facilities to keep unsold products and inadequate standardization. According to the study conducted in Uganda, diseases were identified as a major challenge, especially among farmers in sub-country resulting in high mortalities. This caused a significant decrease in the stock of the farmers in the rural area. High feed cost was also a challenge that was highlighted by the pig farmers in Uganda which made them adopt the use of kitchen waste as feed. In addition (Khem et al, 1997) and (Babovic et al, 2011) reported an increase in feed costs as one of the major challenges in the pig enterprises, which as a result leads to a reduction in profits. (Nabikvu, 2016)

More so, a study in Nigeria showed that the pig framers experienced difficulties in securing institutional loans, high cost of feed, disease outbreaks, and pilfering which ranked lowest in the constraints faced by farmers in the study. Inadequate finance can restrict farmers from expanding their scale of production. This view was the major constraint of the animal industry, especially in developing countries. Financial inadequacies have led to the low-growing of animal industries. Low-income earners who dominate the animal industry are not able to cope with the demands of the industry especially when production is not at its optimum level. Arbitrary cost of feed and feed ingredients can hinder pork production. Also, feed cost and the price of feed ingredients have a substantial impact on profitability in pig production. Higher feed prices can quickly convert profits into losses. (Das, 2020)

According to (Montsho & Moreki, 2012) homologated that the main constraint which affected the pig farmers was high feed prices since Botswana is not self-sufficient in the production of grains. According to (Chabo et al., 2000), it was highlighted that feed costs accounted for about 80% of the overall production costs. It was also supported by the study of (Galeboe et al., 2009) showed that approximately three-quarters of the respondents cited high feed costs to be a major constraint in pig production as well as the lack of capital of the farmers. Due to high feed costs, pig farmers are adopting other alternatives to reduce feed production costs. As a result, the use of kitchen waste as feed will reduce the pig's growth rate and profit.

They went on and talked about inadequate slaughter facilities for the pig farmers. It was also noted that the pig producers in Botswana faced the challenge of poor and lack of slaughter facilities. This was because the only slaughter facilities they had, were located in towns. Therefore some of the farmers in rural areas could not access the facilities. Therefore this challenge resulted in small-scale farmers slaughtering their pigs locally or on farms under unhygienic conditions. It can be concluded that the inadequacy of slaughter facilities is a major contribution to low profits in Botswana (Montsho & Moreki, 2012).

Moreover, a study in Ethiopia observes that the major constraints to pig production in the study area were feed unavailability, shortage of water facilities, high drug costs, lack of pig experts, and high disease prevalence. These constraints ha a great influence on the productivity and profitability of pigs. According to (Ayele et al, 2012), it's important to address these problems by improving their marketing skills and

information, and market infrastructure development will result in an increase in the welfare of smallholder pig producers. (Mekuriaw & Asmare, 2014)

Poor breeding management is the most important constraint which was a result of the inaccessibility of good breeding boar. This constraint has been faced by 75.40% of the respondent followed by inadequate facilities for good boar in the village and the small size of the herd. Other constraints such as lack of knowledge about the time of mating, poor results after mating, insufficient time to take care of mating, and individual personal barriers. These results were in line with (Sharma & Gautam, 2010) and (Bidwe et al., 2009).

### 2.10 Empirical Review on factors that affect pig profitability

In a study that was carried out in Swaziland, Eswatini stated that the factors influencing pig farmers' profitability were pig production experience, access to market information, access to extension services, and target market. (Taha, 2021). Institutional arrangements and management factors influenced the profit efficiency of smallholder pig farming in Tharaka-Nithi County. (Micheni et al., 2020)

Furthermore, a study in Kenya also homologated that gender is a factor that affected pig profitability. This was because almost 90% of the pig farmers were males falling in the middle age group. Literacy level was also a significant factor that was noted in the study because literate farmers are early adopters of new technologies (Aminu & Akhigbe-Ahonkhai, 2017).

Religion was also a factor that affected the pig profitability and results showed that all the pig farmers were Christians and also most of them owned land. The study also showed that everyone participated in pig farming. (Obayelu et al., 2017). It was also discovered that many households adopted the intensive production system and they had small sow units and most of them preferred the large whites and landrace pig breed type. (Kithinji, 2018)

### 2.12 Research Gap

Many researchers were mainly focusing on the production of pork neglecting the return per dollar invested by the farmers. The researcher has observed gaps in the literature. This is because there is little current literature on the profitability of pigs in the Bindura District. More so, there has not been a study targeting constraints faced by the current pig producers in the Bindura district. This study, therefore, intends to fill the identified gaps in the literature on the highlighted research gaps and recommend the farmers in Bindura District the best practices to be undertaken to improve pig profitability.

## CHAPTER THREE

### 3.0 Introduction

This chapter outlines the procedures which were followed to conduct this study including the description of the study area. This chapter explains the data collection procedure, analysis, and presentation methods used including the analytical framework.

### 3.1 Research Site

### 3.2 Map

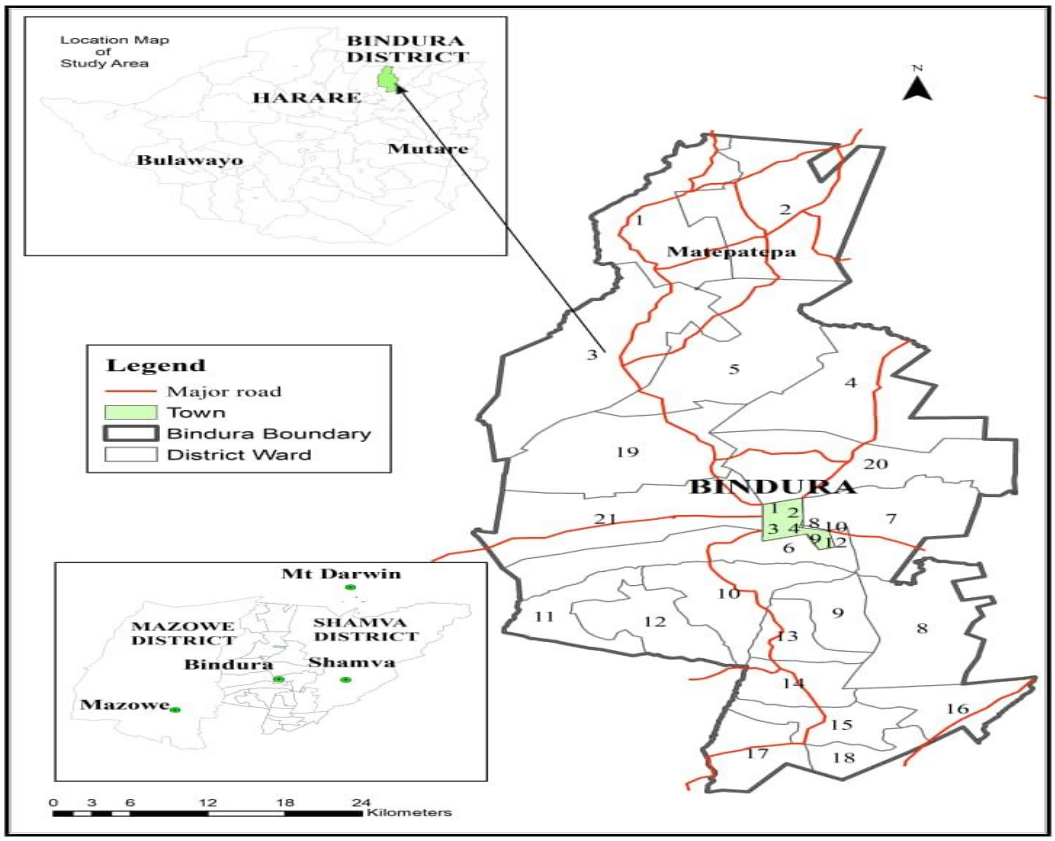


**Figure 4: Research area map**

Source: research survey, 2022

The study was conducted in Bindura a district in Mashonaland Central, Zimbabwe. Bindura is one of seven districts in the Mashonaland Central province of Zimbabwe. Its geographical coordinates are 17° 17' 47" South, and 31° 19' 47" East. There are 21 wards in the Bindura district in Zimbabwe. Bindura lies 1092m

above sea level. The district is in agro-ecological zone ii where the climate is warm and temperate. In winter, there is much less rainfall than in summer. The average temperature in Bindura is 19.4 °C | 67.0 °F. The rainfall is around 850 mm | 33.5 inches per year, November is the hottest month of the year. The temperature in November averages 22.7 °C | 72.9 °F. In July, the average temperature is 13.9 °C | 57.0 °F. It is the lowest average temperature of the whole year while the hot season lasts for nearly three months, from September 18 to November 30, with an average daily high temperature above 83°F. The cool season lasts for 2 months, from May 30 to August 2, with an average daily high temperature below 75°F.

### 3.3 Research Design

The researcher has decided to adopt the descriptive research design method. According to (Ary, 2010) stated that research design is the researcher's plan of how to proceed to gain an understanding of some group or some phenomenon in its context. According to (Gay, 1992), data is collected in descriptive research to test hypotheses or to answer questions about the existing state of the subject field. This will ensure the analysis of the profitability of pig farming, the challenges they face in pig production, and the determinants of profitability in pig farming in pig farming in Bindura District.

Under the descriptive research design, the study will focus mainly on the quantitative research approach. It was hypothesized by (Farnsworth, 2019) as cited by (Ali, 2021) that quantitative research tools consist of different types of questionnaires, surveys, structured interviews, and behavioral observations which are based upon explicit coding and categorization schemes. The quantitative approach will be used to acquire information mainly from the pig farmers through questionnaires concerning the profitability of pig farming, the determinants of pig production, and constraints facing the pig producers in the Bindura district.

### 3.4 Sample size

A questionnaire was used to acquire household information such as the profitability of pig production, the factors affecting the profitability of pig production, and the main constraints challenging pig producers in the Bindura District. The sample size was calculated using the Rao soft sample calculator. The researcher firstly acquired information from Agritex Bindura, Vet Bindura, and input supply companies e.g. Gains. These findings showed that the population size was approximately 70 stock owners in Bindura District. The study, therefore, used the Rao soft sample calculator to calculate the sample size based on the approximate number of pig farmers, at a 95% probability level and a margin of error of 5%, and a response distribution of 50%.

**Equation 1: Rao soft sample calculator**

$$n = \frac{N}{(1 + Ne^2)}$$

$$= \frac{70}{(1 + 70(0.05^2)}$$

=60

Where n = sample size, N = total population and e = error tolerance =0.05. The total population for the study is at a 95% probability level. Therefore, the sample size obtained from the calculations was 60 pig farmers in Bindura.

### 3.5 Sampling technique

For the primary data survey, the purposive sampling technique which is based on the researcher's personal judgments was employed. The researcher chose the purposive sampling technique because it's said to be cost-effective and time-effective compared to any other sampling techniques. Bindura district was selected because of its great participation in pig production. At ward level, 5 wards out of 21 wards were also purposively selected which were wards 6, 9, 10, 13, and 14. Four villages were then randomly selected from the five wards which were Hari huru, Jeta, Mutora, and Mudzengerere. From each village, a simple random sampling method using a hat bucket method was used. The advantage of using simple random sampling is that everyone has got a chance to be chosen and 15 farmers were selected from each village giving a total of 60 farmers. The target population comprised all farmers who were participating in pig production in Bindura District.

### 3.6 Data collection methods

### 3.7 Primary data collection

According to (Thakur, 2020), primary data is defined as the information that has been obtained for the first time and is hence unique. Therefore, it is data that has been gathered from first-hand experience (Buchanan, 1981). The researcher used both formal and informal household surveys. The questionnaires were self-administered to a total of 60 households, due to financial constraints the researcher did not exceed the number of respondents. The data collecting process started by contacting the relevant institutions which were AGRITEX Bindura, VET Bindura, and feed companies like GAINS. The researcher contacted the Livestock Vet Officer Mrs. Chipamuriwo seeking the total number of pig stock owners and their distribution in Bindura and also by giving the contacts of pig producers that operate in the district. Data was collected through questionnaire administering.

Two fellow students (enumerators) were engaged and trained by the researcher to undertake the research. The researcher gathered technical assistance and transport from the local extension workers in the area. Furthermore, the survey was designed to gather information on household demographic characteristics. Questionnaires assisted to collect data in relationship with factors affecting pig production, market characteristics, extension services, access to financial services and investment strategies, and profit made as

well as constraints faced. Primary data of this study was obtained using pretested questionnaires and interviews among farmers and extension officers. Interviews were also done with local butcheries to find out the consumer prices of pork. The quantitative data were collected through the administration of a household questionnaire, a total of 60 households, thus relying on farmers' perceptions for data on social and economic challenges they are facing. Before field surveys, pre-tests of the questionnaires were undertaken to improve the questionnaire design and enhance the quality of responses to be obtained from the farmers.

### 3.8 Secondary data collection

Secondary data is information gathered from a source that has previously been published using different sources for instance books and journals. (Buchanan, 1981). Secondary data was also used in the study and it was acquired and gathered through reviewing literature from journals and engaging AGRITEX Bindura and VETERINARY Bindura. The researcher also consulted feed companies like Gains on information about the number of farmers who have engaged in pig farming and the constraints they are facing.

### 3.9 Data Analysis methods

**Table 1: Data analysis methods**

| Objective | Data obtained | Data analysis |
|---|---|---|
| 1. Analyzing profitability | Variable and fixed costs, output prices, and Revenue | Gross margin |
| 2. Factors affecting profitability | Independent variables | Multiple linear regression |
| 3. Constraints being faced by pig farmers | Qualitative | Likert scale |

### 3.10 Objective 1: Profitability Analysis in Bindura District

One of the oldest and most basic analytical techniques in farm management is gross margin analysis. It's been used in a lot of economic studies to assess the profitability of farming practices. Since 1960, the concept of gross margin as a contribution to marginal costs and has been frequently used in farm management. (Fani et al., 2015). Gross margin reveals the amount that an entity earns from the sale of its products and services, after the deduction of expenses incurred during the production period. (Mature,

2019). Therefore gross margin is obtained after deducting the total variable costs from the gross income obtained by the pig farmers.

### 3.10.1 Gross margin formula:

**Gross margin= Ps ×Q -∑ (Pq Xq)**

Gross margin=(Ps)unit price of a porker × (Q)quantity sold –the sum of (Pq)price per quantity of variable costs and (Xq)the quantity of the variable.

Johnson (1985) stated that gross margin is the gross income from an enterprise less its operating expenses (variable cost). As mentioned by Musvongo (2013) in the studies they used the gross margin analysis in determining the profitability of pigs. Gross margin, on the other hand, is not actual profit because it excludes fixed and overhead costs. It is used as a unit of analysis in determining the economic performance of an enterprise and provides a measure of its viability and contribution to household income.

## 3.11 Objective 2: Factors affecting pig production profitability in Bindura district

## 3.12 Regression model

Regression analysis is a statistical tool used to examine the relationship between a quantitative response variable and one or more explanatory variables. (2015). This was also supported by (Sykes & Sykes, 1993) who stated that it is a tool for the investigation of relationships between explanatory variables. Usually, the researcher seeks to know the influence of an explanatory variable upon the dependent variable or the relationship between explanatory variables.

To determine the factors affecting piggery profitability, multiple linear regression analysis was used. According to Onoja et al., (2012) citing Greene (2008) it was revealed that the principal objective of regression analysis is to determine the factors that affect the dependent variable. Linear regression using Ordinary Least Squares (OLS) is a major method used to determine the socio-economic factors that affect the profitability of pig production.

The ordinary least square linear regression model was employed for use in this study.

$$\mathbf{Y = \beta 0 + \beta 1 X1 + \beta 2 X2 + \beta 3 X3 \ldots\ldots\ldots\ldots + \mu i}$$

Where:

| | |
|---|---|
| Y | Revenue to pig producer (in usd$) |
| X1 | Age of the farmers (years) |
| X2 | Biosecurity measures (number) |

| | |
|---|---|
| X3 | Gender (male=1, female =0) |
| X4 | Weight of carcass (in kgs) |
| X5 | Herd size (number) |
| X6 | Price per kg (in usd$) |
| X7 | Reproduction type (tradition=1, artificial=0) |
| X8 | Access to credit (yes=1, no =0) |
| X9 | distance to market (number) |
| $B0$ | Constant |
| $\beta 1 - \beta 9$ | Parameter estimates |
| $\mu$ | Error term |

### 3 .13 Objective 3: Constraints faced by pig farmers in Bindura District

**Table 2: Likert Scale**

| Problem being experienced | Serious challenge | challenge | I don't know | Not a challenge | Not a Serious Challenge |
|---|---|---|---|---|---|
| High feed cost | | | | | |
| Poor breeding stock | | | | | |
| Diseases | | | | | |
| Rating | -2 | -1 | 0 | 1 | 2 |

#### 3.13.1 Likert scale

The Likert scale was developed in the early 90s by the researcher called Rensis Likert. He planned to gauge people's feelings and determine how much they agreed or disagreed with a statement. (Artino & Sullivan, 2013). A Likert scale is a type of ordered scale in which respondents select the option that best represents their point of view. It was defined as a psychometric response scale that was mostly used in questionnaires

to measure a participant's preferences or degree of agreement with a statement or set of claims. As a result, respondents are asked to rate their level of agreement with a specific proposition on an ordinal scale. (2020, Bertram & Bertram.) The researcher used this scale to analyze the challenges being faced by pig farmers in Bindura District. The challenges which were highlighted include high feed and drug costs, diseases, and high transport costs.

### 3.14 Summary

The study was conducted in the Bindura district in Mashonaland Central, Zimbabwe. The purposive sampling technique was used to select the 60 farmers who were participating in pig farming. The study used both secondary and primary data. Secondary data was gathered through reviewing literature from journals and engaging AGRITEX Bindura and VETERINARY Bindura as well as feed companies. The primary data was attained through survey questionnaires which were self-administered by the researcher and friends. SPSS and Microsoft excel were the packages used by the researcher for data analysis. The Likert scale technique was used to analyze the constraints being faced, gross margin analysis to find out the profitability levels whilst linear regression analysis was used to determine the factors affecting the profitability of pig production in the Bindura district.

# CHAPTER FOUR

## 4.0 Data Presentation and Discussion

### 4.1 Introduction

This chapter looks at the presentation and the analysis of the findings of this research project. Descriptive data were analyzed using percentages and frequency distribution. Multiple regression analysis was carried out to measure the effect of the explanatory variables on the profitability of pig farming. The first section of this chapter looks at the demographic information of the pig farmers whilst the second section focuses on the profitability of pig farming which was analyzed using Gross Margin Budget and the last section focuses on the challenges faced by pig producers and was analyzed using Likert scale.

**Table 3: Demographic data**

| VARIABLE | FREQUENCY | PERCENTAGE% |
|---|---|---|
| Location | | |
| Hari-huru | 13 | 21.7% |
| Jeta | 16 | 26.7% |
| Mudzengerere | 16 | 26.7% |
| Mutora | 15 | 25% |
| Land Ownership | | |
| Owned | 37 | 71.7% |
| Rented | 23 | 28.3% |
| Age of respondents | | |
| 20-30 | 30 | 50% |
| 30-40 | 11 | 18.3% |
| 40-50 | 9 | 16.7% |
| 50+ | 10 | 15% |
| Gender | | |
| Female | 22 | 36.7% |
| Male | 38 | 63.3% |
| Participation in Seminars | | |

| | | |
|---|---|---|
| Yes | 31 | 51.7% |
| No | 29 | 48.3% |
| How do you make decisions | | |
| Analysis | 35 | 58.3% |
| Experience | 25 | 41.7% |
| Distance to market | | |
| 0- 5 | 15 | 25% |
| 5-10 | 16 | 26.67% |
| 10-15 | 29 | 48.3 |
| Religion | | |
| Christianity | 34 | 90% |
| Other | 26 | 10% |
| How do you market your pigs | | |
| Slaughter locally | 21 | 35% |
| Middlemen | 19 | 31.7% |
| contracted | 20 | 33.3% |
| Are you a member of a group | | |
| Yes | 26 | 43.3% |
| No | 34 | 56.7% |
| Feed source | | |
| Kitchen waste | 21 | 35% |
| Purchase | 19 | 31.7% |
| Own produce | 20 | 33.3% |
| Use of vaccines | | |
| Yes | 40 | 66.7% |
| No | 20 | 33.3% |
| Education level | | |
| Primary | 21 | 35% |
| Secondary | 19 | 31.7% |
| Tertiary | 20 | 33.3% |
| Pig breed | | |
| Exotic | 29 | 48.3% |

| | | |
|---|---|---|
| Indigenous | 31 | 51.7% |
| Reproduction type | | |
| Traditional | 31 | 51.7% |
| Artificial | 29 | 48.3% |
| Heat detection of sows | | |
| Yes | 29 | 48.3% |
| No | 31 | 51.7% |
| Access to credit | | |
| Yes | 29 | 48.3% |
| No | 31 | 51.7% |
| Biosecurity use | | |
| Yes | 29 | 48.3% |
| No | 31 | 51.7% |

### 4.2.1 Location of the pig farmers

The researcher randomly selected four locations where the data was collected from. The locations were Hari-huru, Jeta, Mudzengerere and Mutora. Hari-huru contains 13 farmers which were involved in pig farming which is 21.7% of the sample size. Jeta contains 16 farmers which drew 26.7%, also Mudzengerere contains similar farmers as Jeta and lastly, Mutora contains 15 farmers who are participating in pig production which is 25% of the total sample. From the collected data, it shows that Jeta and Mudzengerere had 53.4% and this is where most pig farmers are located in the Bindura district.

### 4.2.3 Land Ownership

Of the 60 pig farmers interviewed in this study, 71.7% of them own the land which is more than half of the sample. Those who rent the land consist of 23 farmers of the sample population. Only 28.3% did not own the land. This is because many people benefited from land resettlement programs in Zimbabwe.

### 4.2.4 Age of the Respondents

The table above shows the age distribution of pig farmers in the Bindura district which was the researcher's study area. The majority of the pig farmer's age is between 20 -30 years and constituted 50% whilst the age range of 30-40 constituted 18.3%. This shows the age range where most pig producers in the Bindura district

are mostly clustered. The age range of 40-50 constitutes 16.7% of the pig farmers in the district highlighting how youths and young people are in pig production in the area. The age category above 50 years constitutes only 15% of the pig farmers. This shows that at an old age many communal farmers will not be able to participate in pig production since pig production is labor-intensive.

**4.25 Gender of Pig Farmers**

The table above gives the distribution of pig farmers in the Bindura district by gender. Results obtained from the study illustrated that 63.3 % of respondents are male while 36.7% of the population are female. This suggests that they are more male pig farmers involved in pig farming and agriculture as a whole.

**4.2.6 Pig production Seminars/workshops attendance**

51.7 % of the pig producers in the Bindura district highlighted that they attend seminars or workshops, whilst 48.3 % of the farmers highlighted that they do not attend workshops. Although, more than half of the sample size is participating in seminars the number of those who are not attending is still high. This could be attributed to less information about any workshops being offered or attended to or due to the lack of workshops being held in the Bindura district.

**4.2.7 How do you make decisions?**

Basis of decision making is how the farm manager decides on which course of action to undertake for the total population .58.3% of the respondents highlighted that they undertake analysis and estimation when making their decisions whilst 41.7% of the percentage of the population highlighted that they base their technical decision on experience. This is because many pig farmers are youths and young age population who do not have the experience in pig production.

**4.2.8 Religion of pig producers**

The table above shows the distribution of pig farmers in the Bindura district by religion. It shows that 90% of the respondents are Christians, and 10% of the sample population is comprised of followers of other religions. This shows that more Christians are participating in the production of pigs.

**4.2.9 How do you market your pigs?**

Of the 60 farmers in the total sample, 35% of the population slaughter their pigs locally and sell them in the local market, this might be attributed due to financial challenges. They do not have money to transport their pigs to the abattoir and pay for the slaughter fee. Those who market their pigs to the middlemen consist of 31.7% and lastly 33, 3% are contracted. These are mainly those with a bigger sow unit.

### 4.2.10 Members of group or society

56.7 % of the pig producers in the Bindura district availed that they were not part of any cooperative, group, or society. Whilst 43.3% of the producers highlighted that they belong to groups where ideas, knowledge, and problems concerning pig farming are shared and solved. From the results obtained, a large percentage of the pig farmers do not belong to any group. The reason might be because they are asymmetric information in Bindura district or they do not know the importance of joining the cooperative.

### 4.2.11 Feed source

Of the 60 selected farmers in Bindura district kitchen waste constitute 35% of the total sample population. Those who purchase feed for their pigs are 31.7% of the total sample and lastly those who produce their feed consist of 33.3% of the total population. Kitchen waste indicated the highest percentage because many smallholder farmers in the Bindura district can't afford to buy feed from the feed companies due to financial challenges.

### 4.2.12 Use of vaccines

The pig producers in the Bindura district were asked by the interviewer to highlight whether they use vaccines or not. Those who said yes were 40 and constituted 66.7% whilst those who said no were 20 with a total percentage of 33.3 %. The researcher noticed that a larger percentage is using vaccines and approximately a third of the population is not using vaccines. This is because the cost of purchasing animal drugs is high in Bindura and also in all other parts of the country.

### 2.2.13 Education Level

Out of 60 pig farmers in the sample size, the primary level respondents were 21 which consists of 35% of the total population. This contains the highest level of farmers in the Bindura district. This shows that a large number of pig farmers in Bindura are not educated since most of them are communal farmers. Secondly, the secondary level consists of 19 farmers which were 31.7% of the total population, and 20 farmers showed that they fall under the tertiary category showing that educated people are venturing into pig farming as well.

### 4.2.14 Pig breed

The respondents were asked by the interviewer to indicate whether they use exotic breeds or indigenous breeds. From the collected data, it shows that 29 pig producers which consist of 48.3% used exotic breeds and 31 pig farmers used indigenous breeds which is 51.7% of the total population. Farmers who use

indigenous breeds had the highest percentage compared to those who use exotic breeds. The reason is the high cost of the exotic breeds and also that they require good management practices.

### 4.2.15 Reproduction type

Out of the 60 pig producer's respondents, 31 farmers still use the traditional mating system which is 51.7% of the total population. However, farmers in Bindura who have adopted the A. I mating system are 29 and they consisted 48.3% of the total sample size. This could be attributed to the high cost of semen doses from the known and trusted research institutes e.g. Pig Industry Board and Colcom Zimbabwe.

### 4.2.15 Heat detection of sows

The pig producers were asked by the researcher to highlight whether they perform heat detection of sows or not. The results show that 31 farmers which consist of 51.7% of the sample size do not perform heat detection. Whilst 48.3% do perform heat detection. Therefore, a larger percentage of the population does not perform heat detection. This is because of a lack of knowledge about the benefits of heat detection and also some of the communal farmers do not take pig farming as a business.

### 4.2.16 Access to credit

51.7% of the farmers stated that they did not have access to credit through loans or government schemes in the Bindura district whilst 41.3% of the pig producers stated that they have access to credit through financial institutions mainly because they have collateral in form of title deeds and movable assets.

### 4.2.17 Biosecurity use

The pig producers in the Bindura district disclosed that 51.7% do not use biosecurity measures and 29 farmers which consist of 48.3% are using biosecurity measures. This might be a result of a lack of information about the importance of conducting the biosecurity measures and also because they do not afford to buy the chemicals needed for biosecurity measures.

## 4.3 Profitability of pig production in Bindura District

**Table 4: Gross Margin Budget**

| Variable factors(per porker) | | Average costs(per porker) |
|---|---|---|
| Piglet stock | | 25 |
| Feeding | | 30 |
| Vaccinations | | 5 |

| | | |
|---|---|---|
| Labor cost | | 18 |
| Water | | 5 |
| Cost of transportation | | 5 |
| Miscellaneous | | 3 |
| Total variable cost | | 91 |
| | | |
| Fixed costs | | |
| Land\rentals | | 10 |
| Equipment | | 6 |
| other | | 4 |
| Total fixed costs | | 20 |
| | | |
| Total costs | | 111 |
| Revenue | | |
| Output (kgs) | | 70 |
| Unit price($USD) | | 2.6 |
| Total Revenue | | 182 |
| Gross margin(GM) | | 91 |
| Net profit(NP) | | 71 |
| ROI | | 0.64 |
| BCR | | 1.74 |

The results indicated that on average, the weight of a porker in Bindura District was 70 kgs. Moreover, the average gross income obtained by pig farmers was USD$182. The table above clearly indicated that the average gross margin level obtained by farmers was UDS$91 per porker. The pig farmers of Bindura district earned an average return per dollar invested of 0.64 USD$ per porker. This signifies that the returns were sufficient to cover the initial dollar invested in the procurement of variable factors of production. All these figures show that the returns from pig production in the Bindura district were sufficient to cover for initial investment costs incurred. On average the total production and marketing cost incurred by the pig farmers was USD$111.

The benefit-cost ratio (BCR) is a concept used for project evaluation. A project with a benefit-cost ratio less than one, equal to one, or greater than indicate loss, break-even, or profit respectively. Also, the rate of return on investment was 1.74 which indicates that on every USD1.00 invested in pig production, USD0.174 will be attained as profit.

Due to different sales volumes in the production of pig production, in the course of the study, it was found that on average selling 1 porker would generate a net profit of USD$71 which implies that pig production in the study area is profitable and viable. Finally, since the BCR is greater than 1 (1.74) it is a profitable enterprise that would be worth investing in.

### 4.4 Factors that affect profitability in Bindura District

Linear regression was applied to analyze the factors affecting pig farming in Bindura District with revenue as the dependent variable and social, economic, demographic, and institutional factors as explanatory variables.

**Table 5: Model summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .984[a] | .968 | .964 | 199.6857 |

a. Predictors: (Constant), distance to market, price per kg, gender, biosecurity use, age, pigs owned, weight

Determination of coefficient (r-square) measures the goodness of fit in the model. Therefore, the model is of good fit if the r square is greater than 50%. The regression model explains that 96,8% of the changes in the dependent variable are determined by the following factors; gender, age, price per kg, weight, number of pigs sold, distance to market, biosecurity measures, and heat detection.

More so, adjusted r square measures the accuracy of the linear models. It identifies the percentage of variance in the target field that is explained by the independent variables. It also estimates the fit of the linear regression model. This implies that the model is of good fit since it is above 50%.

Lastly, for a model to be accurate, the difference between r square and adjusted r should not be more than 15%. This, therefore, implies that the research model is of good fit since the difference is within the range.

**Table 6: Anova table**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 63357145.722 | 7 | 9051020.817 | 226.988 | .000[b] |
| | Residual | 2073468.321 | 52 | 39874.391 | | |
| | Total | 65430614.043 | 59 | | | |

a. Dependent Variable: revenue

b. Predictors: (Constant), distance to market, price per kg, gender, biosecurity use, age, pigs owned, weight

The significance level of the model should be between 0 and 0.05 at a 95% confidence level. This implies that this research model is significant since it falls within the expected range (0.000) as shown by the table above.

**Table 7: coefficient table**

| Explanatory variables | B value | Standard error | T value | Significance level |
|---|---|---|---|---|
| (Constant) | -849.489 | 241.864 | -3.512 | .001** |
| weight | 8.168 | 5.734 | 1.424 | .860 |
| Price per kg | 272.106 | 124.943 | 2.178 | .034** |
| Pigs owned | 23.175 | 1.856 | 12.484 | .000** |
| Age | -1.875 | 6.128 | -.306 | .761 |
| Biosecurity use | -398.072 | 99.846 | -3.987 | .000** |
| gender | -55.177 | 55.672 | -.991 | .326 |
| Distance to market | -10.239 | 6.458 | -1.586 | .119 |

* Significance at 1% ** Significance at 5% and *** significance at 10

### 4.4.1 Pigs owned

The regression coefficient of the number of pigs on the farm has a positive coefficient indicating a direct or positive correlation to revenue. Also, it is statistically significant at 0.000 at a 5% confidence level. This shows that a unit increase in the number of pigs will increase the revenue of the pig farmers in the Bindura district.

### 4.42 Price per kg

Results have proved that the independent variable of price per kg was significant at a 5% probability level (0.34) with a positive coefficient. This means that a unit increase in price will increase the profit earned per kilogram of pork by the scale of coefficient. Therefore, price per kg has a direct influence on profitability.

### 4.4.3 Age of the farmer

The regression analysis showed that there was a correlation between age and revenue gained through pig production in the Bindura district as shown by a 0.761 significance level which was above 0.05%. It has a

negative correlation reflecting that as people grow older, their revenue will decrease because they will no longer be able to work as before since pig farming is labor-intensive.

### 4.4.4 Distance to the market

The coefficient of distance to market (-0.40) was negative and not statistically significant at a 5.0 % significance level. This is statistically accurate as distance increases, variable costs also increase due to an increase in transport costs. Economically, this will reduce the farmer's revenue, and therefore this study highlighted this effect. This implies that the higher the price of the variable costs, the lower revenue from pigs.

### 4.4.5 Biosecurity measures

The coefficient of biosecurity measures (-3,987) was negative and statistically significant at a 5.0 % significance level. This is statistically accurate as biosecurity measures increase any farm's variable cost also increases. This is because the farmer has to buy the materials needed for biosecurity measures e.g. disinfectants. This will mathematically reduce the farmer's revenue

### 4.4.6 Average slaughter weight

This is the size of the pig when it reaches slaughter age. In this study, it was revealed that the coefficients of slaughter weight had a positive influence on the farmers' revenue. This is to say that a unit increase in this variable leads to an increase in the earnings by a scale of the coefficient. The coefficient of the slaughter weight (1.42) was positive.

### 4.4.7 Gender

The data analyzed using the SPSS package shows that gender was not statistically significant at a 5% confidence level since its significance level is not within the range. (0.326).This implies that gender does not affect pig profitability. Therefore, there is no significant difference between the revenue earned by male farmers and female farmers who are participating in pig farming.

## 4.5 Challenges Faced by pig producers

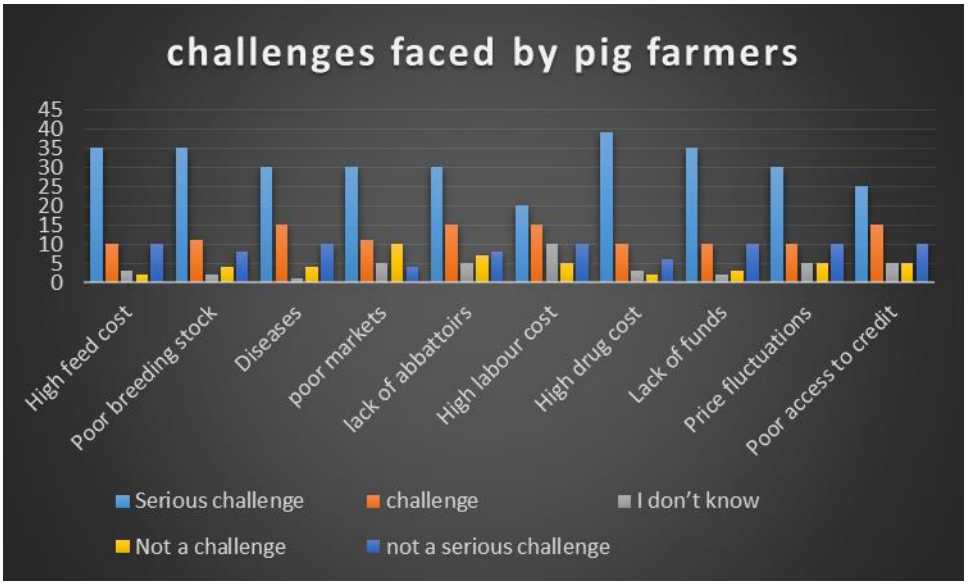


**Figure 5: Likert scale**

### 4.5.1 High feed cost, poor breeding stock, high drug cost, and lack of funds

High feed costs, poor breeding stock, and high drug costs were some of the serious production challenges faced by the pig farmers in the Bindura district. This is because according to the graph above more than 30 respondents highlighted those constraints as the most detrimental challenges. This indicated that Bindura pig farmers faced these challenges often in their day-to-day operations. This was due to fluctuations in feed prices which negatively affected the profitability of the enterprise since more than 70% of the total variable costs were due to high feed costs which caused farmers to opt for kitchen waste and produce their feed and minimize costs of feed.

### 4.5.2 Lack of funds

Information provided from the questionnaire stated that the pig farmers in the Bindura district considered a lack of funds a serious challenge. This is because more than half of the respondents highlighted it as a serious challenge. This was due to high feed costs, expensive good pig breeding stock as well as the need to buy drugs that have to be purchased for a pig enterprise to function.

### 4.5.3 Price fluctuations

Information provided from research shows that 30 respondents highlighted price fluctuations as a challenge to them. This is due to economic instability which is causing a high inflationary rate in the country. As a result, farmers are failing to purchase feed and any other necessary inputs that are required in the production of pigs.

### 4.5.4 Diseases

The pig farmers in Bindura indicated that diseases were a challenge that affected the pig farmers from the information provided by the interviewees. This indicated that they faced this challenge but not as severe as those mentioned as serious challenges. This as result will increase the mortality rate of pigs and consequently, it will affect the profitability of pig production.

### 4.5.5 Lack of lucrative markets

The respondents highlighted that half of the farmers were facing a challenge of lack of lucrative markets and some were not affected because they are contracted to means that they have already secured their market. This can be seen by many farmers selling their porkers in the local market. The reason might be because lack of market information and inability to access funds for them to advertise their products and add value to their products.

### 4.5.6 Shortage of abattoir facilities

Out of 60 farmers, half of them voted it as a challenge and the other half voted otherwise. Pig farmers in Bindura district are facing a challenge of lack of slaughtering facilities which it's a very important facility that has to be readily available for quality meat inspection. The reason might be because economic instability in Zimbabwe.

### 4.5.7 Poor access to credit

From the information provided by the respondents, it can be seen that these constraints were highlighted as challenges by less than 30 people and the researcher can conclude that these were not major challenges though some of the communal farmers were affected. Commercial pig farmers have the collateral security to access loans.

## 4.6 Discussion of results

### 4.6.1 Profitability analysis of pig production in Bindura District

The results indicated that on average, the weight of a porker in Bindura District was 70 kgs. Moreover, the average gross income obtained by pig farmers was USD$182. The table above clearly indicated that the average gross margin obtained by farmers was UDS$11 per porker. The pig farmers of Bindura district earned an average return per dollar invested of 0.64 USD$ per porker. Therefore, the returns were adequate to cover the initial dollar invested in the procurement of variable factors of production. This result concurs with (Taha, 2021) who also got a positive gross margin which was able to cover all the incurred costs. There was no negative return per dollar invested for the 60 interviewed pig production farmers in the Bindura district. On average the total production and marketing cost incurred by the pig farmers was USD$111. The

benefit-cost ratio (BCR) is one of the concepts of the discount method of project evaluation. A project with a benefit-cost ratio less than one, equal to one, or greater than indicate loss, break-even, or profit respectively. Also, the rate of return on investment was 1.74 which indicates that on every USD1.00 invested in pig production, USD0.174 will be attained as profit. Due to different sales volumes in the production of pig production, in the course of the study, it was found that on average selling 1 porker would generate a net profit of USD$71 which implies that pig production in the study area is profitable and viable. Finally, since the BCR is greater than 1 (1.74) it is a profitable enterprise that would be worth investing in. These results were also in line with (Hedija & Kuncová, 2021)'s findings that pig farming was profitable and worthy of venturing into.

### 4.6.2 Factors that affect pig profitability

The researcher found out that the number of pigs owned by a farmer is significant to the profit earned by the farmer. The regression coefficient of the variable has a positive coefficient indicating a direct or positive correlation to revenue. Also, it is statistically significant at 0.000 at a 5% confidence level. This shows that a unit increase in the number of pigs will increase the revenue of the pig farmers in the Bindura district. This concurs with (Micheni et al., 2020)'s findings in Kenya that herd size has a positive influence on the profitability of pigs. This was because it was significant at a 5% confidence level. Therefore, an increase in the herd size of pigs will increase the dollar earned by the pig farmers.

Results have proved that the independent variable of price per kg was significant at a 5% probability level (0.34) with a positive coefficient. This means that a unit increase in price will increase the profit earned per kilogram of pork by the scale of coefficient. Therefore, price per kg has a direct influence on profitability. These results corroborate with (North & Journal, 1989) who propounded that increase in price per kilogram in combination with a decrease in variable cost will lead to an increase in profits.

More so, from the results obtained, regression analysis showed that there was a correlation between age and revenue gained through pig production in the Bindura district as shown by a 0.761 significance level which was above 0.05%. It has a negative correlation reflecting that as people grow older, their revenue will decrease because they will no longer be able to work as before since pig farming is labor-intensive. The results however are in line with the research findings of (Aminu & Akhigbe-Ahonkhai, 2017) who propounded that, many pig producers should fall under the active age of 35–46 years that can effectively withstand the rigors and stress involved in pig production. These results agree with (Micheni et al., 2020)'s findings who revealed that older farmers are less willing to adopt new practices and modern inputs than younger farmers.

In addition, the results have shown that distance to the market was not significant. The coefficient of distance to market (-0.40) was negative and not statistically significant at a 5.0 % significance level. This is statistically accurate as distance increases, variable costs also increase due to an increase in transport costs.

Economically, this will reduce the farmer's revenue, and therefore this study highlighted this effect. This implies that the higher the price of the variable costs, the lower revenue from pigs. The results, however, are in line with the findings in Nigeria (Taha, 2021) where the distance to the market was not significant at a 5% significance level and it does not have a positive influence on profitability.

The findings show that the coefficient of biosecurity measures (-3,987) was negative and statistically significant at a 5.0 % significance level. This is statistically accurate as biosecurity measures increase any farm's variable cost also increases. The activities for biosecurity measures include the washing of hands, dipping shoes, and sometimes bathing. This will economically reduce the farmer's revenue. This implies that the higher the price of the variable costs, the lower the revenue earned from pig farming. According to Ekumankama (2002) and Osondu et al. (2014)'s findings as cited by (Obayelu et al., 2017) stated that as input prices increase, the level of revenue by farmers reduces.

Moreover, the slaughter weight is the size of the pig when it reaches slaughter age. In this study, it was revealed that the coefficient of slaughter weight was positive (1.42) therefore it had a positive influence on the farmers' revenue. This is to say that a unit increase in this variable leads to an increase in the earnings by a scale of the coefficient. This agrees with the results obtained in Nigeria (Bilbrey, 2012). This reveals that there is a positive relationship between profit and slaughter weight of pigs. Therefore, an increase in the weight of porkers would increase the profit of a farmer or the dollar earned by the producer and vice versa.

Furthermore, the data analyzed using the SPSS package, shows that gender was not statistically significant at a 5% confidence level since its significance level is not within the range. (0.326).This implies that gender does not affect pig profitability. Therefore, there is no significant difference between the revenue earned by male farmers and female farmers who are participating in pig farming. This corroborates with (Aminu & Akhigbe-Ahonkhai's, 2017) 's results where gender did not influence revenue. This is to say that, whether a participant is male or female does not have either a positive or negative influence on profit.

### 4.6.3 Constraints faced by pig producers in Bindura District.

The researcher used the Likert scale method to analyze the challenges faced by pig farmers in Bindura District. The results were presented using a bar graph in the table above. It shows that high feed costs, poor breeding stock, and high drug costs were the serious production challenges faced by the pig farmers in the Bindura district. This agrees with the results obtained in Jharkhand (Das, 2020).This is because more than 50% of the sample size highlighted that they faced those challenges in their daily operations. The research also found out that lack of funds, diseases, and lack of lucrative markets were a challenge to the production of pigs since half of the sample size indicated that they face them though not as severe as those mentioned above. This was also supported by research in Kenya (Levy, 2014). Lastly, poor access to credit and lack of slaughtering facilities were revealed as minor challenges since less than 50% of the population highlighted

that they rarely face the challenges. These results are contrary to the findings of (Montsho & Moreki, 2012) who stated that these were the major challenges faced by commercial farmers in Botswana.

# CHAPTER FIVE

## 5.0 Conclusion and Recommendations

### 5.1 Conclusion

The main objective of the study was to determine the profitability of producing pigs in the Bindura District, and the study indicated that on average, the farmers obtained positive returns and the returns were good enough to cover the initial dollar invested by the pig producers. This indicated that pig production qualified as a profitable livestock enterprise in Bindura District, and people are encouraged to venture into pig farming and enjoy high returns. However, some problems need to be addressed for instance high feed cost, high drug cost, and lack of lucrative markets as well as price fluctuations. The state is failing to provide adequate breeding stock for the pig farmers in the Bindura district and the only few companies in Zimbabwe which have the capacity of producing good breeds are monopolizing and charging very high prices. This as a result is demotivating a lot of potential pig farmers who want to venture into pig farming because the start-up costs are very high.

### 5.2 Recommendations

The state should give subsidies to pig producers so they to afford feed, and drugs as well as reduce the slaughtering fee for them to be able to cover all the production and marketing costs incurred in the production of pigs.

The government should provide financial support to the local pig breeders and educational support from colleges and universities. This will reduce the burden imposed on farmers by importing breeding stock from other countries.

The government should also formulate pricing policies that allocate viable prices/kg of pork to curb the exploitation of farmers by speculators who purchase porker at very low prices at the farm gate. This resulted in a low return per dollar invested obtained by pig farmers.

Farmers are encouraged to select improved breeds most recommended are crossbred with tolerance to diseases since the drugs and vaccines required for pig production are expensive.

Moreover, half of the interviewed farmers are advised to seek continuous farmer capacity building through seminars, workshops, cooperatives, extension services, and even visits and tours which improve their knowledge and experience in the management and marketing of pig farming practices.

Farmers are also recommended to take the advantage of improved technology and engage in the use of Internet platforms that provide farmers with up-to-date extension service advice and marketing information. For example, the Agro Alerts WhatsApp groups and Zim trade.

### 5.3 Area for Further Research

This study recommends further research on the value chain and value addition analysis of pig production to profitability in the Bindura District

**REFERENCES**


- Academics, D. (2019). *Profit Maximization Theory and Value Maximization Theory*. *4*(6), 284–289.
- Ali, A. (2021). Quantitative Research Tools. *IARS' International Research Journal*, *1*(May). https://doi.org/10.13140/RG.2.2.30033.25442.
- Aminu, F. O., & Akhigbe-Ahonkhai, C. E. (2017). Profitability and Technical Efficiency of Pig Production in Nigeria: the Case of Ekiti State. *Agricultura Tropica et Subtropica*, *50*(1), 27–35. https://doi.org/10.1515/ats-2017-0004.
- Bertram, D., & Bertram, D. (2016). *… is the meaning of life* .
- Bhattacharya, P. J. (2001). *The Theory of the Firm II Cost Minimization — Cost Minimization —*. 1–5.
- Bilbrey, G. (2012). *Allen D . Leman Key factors affecting the profitability of swine production companies*. *39*, 46825.
- Buchanan, M. E. (1981). Methods of data collection. *AORN Journal*, *33*(1). https://doi.org/10.1016/S0001-2092(07)69400-9.
- Charles, K., Vincent, T. M., & Augustine, G. (2017). Knowledge and perceptions of plant viral diseases by different stakeholders in Zimbabwe's agricultural sector: Implications for disease management. *African Journal of Agricultural Research*, *12*(21), 1832–1840. https://doi.org/10.5897/ajar2016.11550.
- Das, B. (2020). *CONSTRAINTS ENCOUNTERED BY PIG FARMERS IN ADOPTION OF IMPROVED*. *April*.
- Evans, E. (2020). *Are profit and profitability the same Thing ? 1*. *March*, 1–4.
- Fani, R., Choumbou, D., Odoemenem, I. U., Oben, N. E., State, B., & State, B. (2015). *Gross Margin Analysis and Constraints Faced by Small Scale Rice Producers in the West Region of Cameroon*. 108–112.
- FAO. (2012). Livestock Country Reviews. In *FAO Animal Production and Health Livestock Country Reviews. No. 3. Rome. Authors'*.
- FAO. (2021). *Food security and agricultural livelihoods in the context of COVID-19: Monitoring Report - May 2021* (Issue May).
- Hedija, V., & Kuncová, M. (2021). Relationship between efficiency and profitability: The case of the Czech swine sector. *Spanish Journal of Agricultural Research*, *19*(1), 1–11. https://doi.org/10.5424/sjar/2021191-16876.
- Kithinji, R. K. (2018). *Factors influencing pig production in Embu west, Embu county, Kenya*. 72.
- Levy, M. (2014). *Challenges and Opportunities of Small-Holder Pig Production and Marketing in*

*Western Kenya* .

- Mature, F. (2019). *Gross Margin Analysis rice. The inputs required to produce the crop. Factsheets for Rice Gross Margins, East Africa Factsheets for Rice Gross Margins, East Africa*.
- Micheni, P. K., Nyariki, I. S., & Kosgei, G. K. (2020). Factors Affecting Profitability of Agribusiness Activities: A Case Study of Smallholder Pig Farming in Tharaka-Nithi County, Kenya. *Asian Journal of Agricultural Extension, Economics & Sociology*, *38*(10), 33–42. https://doi.org/10.9734/ajaees/2020/v38i1030428.
- Montsho, T., & Moreki, J. C. (2012). *Challenges in commercial pig production in Botswana*. *8*(4), 1161–1170.
- Mutambara, J. (2013). A preliminary review of regulatory constraints affecting the pig industry in Zimbabwe. *Livestock Research for Rural Development*, *25*(3), 62–67.
- Obayelu, A. E., Ogunmola, O. O., & Sowande, O. K. (2017). *Economic Analysis and the Determinants of Pig Production in Ogun State, Nigeria*. 61–70. https://doi.org/10.1515/ats
- *Profit management*. (n.d.). 1–25.
- Sullivan, G. M., & Artino, A. R. (2013). Analyzing and Interpreting Data From Likert-type Scales. *Journal of Graduate Medical Education*, *5*(4), 541–542. https://doi.org/10.4300/jgme-5-4-18.
- Sykes, A. O., & Sykes, A. O. (1993). *An Introduction to Regression Analysis An Introduction to Regression Analysis*. *20*.
- Taha, A. M. (2021). *GSJ : Volume 9, Issue 6, June 2021, Online : ISSN 2320-9186*. *9*(6), 402–421.
- Thakur, K. S. (2020). Concept and Sources of Primary and Secondary Data. *Faculty of Commerce School of Commerce & Business Studies Jiwaji University, Gwalior 474002 (INDIA)*, *474002*.
- Averin, A. D., Yakushev, A. A., Maloshitskaya, O. A., Surby, S. A., Koifman, O. I., & Beletskaya, I. P. (2017). Synthesis of porphyrin-diazacrown ether and porphyrin-cryptand conjugates for fluorescence detection of copper(II) ions. *Russian Chemical Bulletin*, *66*(8), 1456–1466. https://doi.org/10.1007/s11172-017-1908-3.
- Hawkins, C.J. (1973). Neo-Classical Theories of Profit Maximisation: Origins. In: Theory of the Firm. Macmillan Studies in Economics. Palgrave, London. https://doi.org/10.1007/978-1-349-01060-8_2
- Busetto, L., Wick, W. & Gumbinger, C. (2020) How to use and assess qualitative research methods. *Neurol. Res. Pract.* 2.
- Chakrabarti, et al (2020) constraints encountered by pig farming in the adoption of improved management practices in Jharhand.
- Devotha G. Nyambo, Edith T. Luhanga, Zaipuna Q. Yonah, "A Review of Characterization Approaches for Smallholder Farmers: Towards Predictive Farm Typologies", *The Scientific World Journal*, vol. 2019, Article ID 6121467, 9 pages, 2019. https://doi.org/10.1155/2019/6121467

- FAO. (2021). *Food security and agricultural livelihoods in the context of COVID-19: Monitoring Report - May 2021* (Issue May).
- Kithinji, R. K. (2018). *Factors influencing pig production in Embu west, Embu county, Kenya*. 72.
- M, C, D M Carambas (2005). Analysis of Marketing Margins in Eco-Labeled Products.
- M.K. Ajala1 & A.O.K. Adesehinwa, (2008). Analysis of Pig Marketing in Zango Kataf Local Government Area of Kaduna State, Nigeria.
- Michael K. Wohlgenant (2001), Marketing margins: Empirical analysis,
- Ngarava, S., & Mushunje, A. (2019). Pricing Strategies in Pork-based Agribusinesses: Evidence from Zimbabwe. *Southern African Business Review*, *23*. https://doi.org/10.25159/1998-8125/3883.
- P. K. Micheni, et al, (2020). Factors Affecting Profitability of Agribusiness Activities: A Case Study of Smallholder Pig Farming in Tharaka-Nithi County, Kenya.
- Nabikyu J and Kugonza D R 2016: Profitability analysis of selected piggery businesses in peri-urban communities of Kampala Uganda. *Livestock Research for Rural Development. Volume 28, Article #95*. Retrieved February 17, 2022, from http://www.lrrd.org/lrrd28/5/nabi28095.htmlNjuki, J., Pali, P., Mburu, S., and Poole, J. (2010). Pig Production, Management, and Marketing in the North East Indian State of Nagaland. International Livestock Research Institute Nairobi.
- Yeshambel Mekuriaw and Bimrew Asmare (2014). Assessment of Pig Production and Constraints in Mecha District, Amhara Region, Northwestern Ethiopia.
- S, C. Fakudze (2021). GSJ: Volume 9, Issue 6, June 2021, Online: ISSN 2320-9186 www.globalscientificjournal.com .Factors influencing the profitability of pig production.
- Uddin, Irenonsen and I., Osasogie (2016).T1 - Constraints of Pig Production in Nigeria: A Case Study of Edo Central Agricultural Zone of Edo State.
- Sandile Birthwell Ndwandwe 1 and Ruey-Chee Weng 2, (2018). Competitive Analyses of the Pig Industry in Swaziland.
- World of pigs, (2020). https://www.pigprogress.net/world-of-pigs/the-contrasting-worlds-of-pig-meat-production.
- Vapulus, (2018).https://www.vapulus.com/en/socioeconomic-definition-and-factors.Socio-economic Definition and factors.

**QUESTIONNAIRE FOR THE STUDY**

Questionnaire serial number ……

Date of interview / /

I'm Tarume B Tatenda; an undergraduate student within the Department of Agriculture Economics at Bindura University of Science and Education. As part of the degree program, students are supposed to be involved in field research and produce a dissertation covering their areas of interest. I am conducting a study on the analysis of the profitability of pig production in the Bindura district. **NOTE** that all information provided by the interviewee is **STRICTLY CONFIDENTIAL** for the mutual benefit of both the researcher and the respondents. I will be grateful if you could assist me in filling out this questionnaire in an honest manner.

Thank you in advance.

**The questionnaire comprises four sections.**

**SECTION A: Interviewee background**

1. Location and ward ……..

2. Distance to closest market …… km, to place……

3. Land ownership a. Owned [ ] b. Rented [ ]

4. Age of farmer 20-30 [ ] 30-40 [ ] 40-50 [ ] above 50 [ ]

5. Gender: Male [ ] Female [ ]

6. Participation in seminars, workshops and conferences: Yes [ ] No [ ]

7. Usually how do you make decisions? a. Experience [ ] b. Analysis [ ]

8. Total number of pigs owned……Sows……Boars……other…….

9. Occupation: Formal [ ] Non formal [ ]

10. Religion: Christianity [ ] Muslim [ ] other……..

11. How do you market your pigs? Contracted [ ] Traders [ ] Slaughter locally [ ] Middlemen [ ]

12. Source of animal? Research farms [ ]. Government [ ]. Other farms [ ]

13. Are you a member of a cooperative YES [ ] NO [ ]

14. Feed source a) own produce [ ] b) Purchase [ ] c) Farm and kitchen waste [ ]

15. Use of Medicines for Pig Treatment YES [ ] NO [ ]

16. Use of Vaccines YES [ ] NO [ ]

17. Pig breed reared Exotic [ ] Indigenous [ ]

18. Heat detection of sows/gilts YES [ ] NO [ ]

19. Education level Primary level [ ] b) Secondary level [ ] (c) Tertiary level, [ ] (d) Informal [ ]

20. Reproduction type: Traditional [ ] Artificial insemination [ ]

21. Biosecurity use? YES [ ] NO [ ]

**SECTION B: Profitability**

Variable Cost

| No. | Items | Amount/Number Utilized Per Month | Cost Per Unit |
|---|---|---|---|
| 1 | Breeding stock | | |
| 2 | Feeding | | |
| 3 | Vaccination | | |
| 4 | Drugs | | |
| 5 | Labor cost | | |
| 6 | Cost of Transportation | | |
| 7 | Water | | |
| 8 | Others / Miscellaneous | | |

Fixed Cost

| | | |
|---|---|---|
| Rentals / Land | | |
| Equipment | | |
| Permanent labor | | |

Total costs per month…,……

Revenue

| Category | Number Sold Per Month | Price Per Unit |
|---|---|---|
| Sows | | |
| Boars | | |
| Gilts | | |
| weaners | | |
| Litters (Waste Product) | | |

Total revenue per month……

**Section C: Constraints faced by pig producers in Bindura district:**

Likert Scale

| Problem being experienced | Serious challenge | challenge | I don't know | Not a challenge | Not a Serious Challenge |
|---|---|---|---|---|---|
| High feed cost | | | | | |
| Poor breeding stock | | | | | |
| Diseases | | | | | |
| Lack of lucrative markets | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Shortage of slaughtering facilities | | | | | |
| High labor cost | | | | | |
| High drug cost | | | | | |
| Lack of funds | | | | | |
| Price fluctuations | | | | | |
| Poor access to credit | | | | | |
| Ratings | -2 | -1 | 0 | 1 | 2 |

THANK YOU!!!!!!!!