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AN INVESTIGATION ON THE RECURRENCE OF OCCUPATIONAL ACCIDENTS IN THE PIG PRODUCTION SECTOR, A CASE OF TRIPLE C PIGS, NORTON

BY

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SUBMITTED: 20 JUNE 2025

DECLARATION

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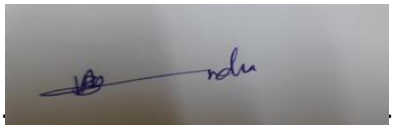
I Brighton Murandu do hereby declare that this work-related project is my original work and has not been submitted before. All the information derived from other sources is indicated in the project.

Signatureof the student...Date……15/10/2025……

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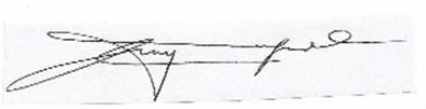

Signatureofthesupervisor…… Date……15/10/025…….

DEDICATION

I dedicate this research to my family, especially my father and mother Mr. & Mrs. Murandu who provided unwavering support throughout my entire educational journey. Their assistance and comforting presence were indispensable and I am deeply grateful for their contributions. Lastly, I dedicate this to my supervisor, departmental lecturers and classmates whose smiles and intellectual support were invaluable throughout this wonderful journey.

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ABSTRACT

- *The study aimed at examining and understand the factors contributing to the observed increase and recurrence in occupational accidents cases at Triple C Pigs. The research used stratified random sampling to select 60 participants from various workstations at Triple C Pigs which included, Mill site, Main site, Weaner, Grower, Workshop and maintenance, Artificial Insemination and HC & General and Biosecurity. Of the 60 workers who were issued with the questionnaires, only 54 responded. The questionnaire gathered information on relationship between socio-demographic details to causation of accidents, the perceived accident causes, types of injuries sustained by workers and the occupational accidents trends. Observations were also conducted to validate the questionnaire data. Descriptive statistics were used to analyze data, and the results indicated that machinery and equipment use was the most common cause of occupational accidents accounting to 35.19%, lifting and bending also contributed to the accidents with 33.33% and slips & falls and machinery accidents were the most common nature of the accidents at Triple C Pigs. It also showed that most accidents frequently occurred at any time of the day accounting for 53.7 % followed by late afternoon accounting for 31.48% and the less frequent was during the night shift with 1.85%. Proper training and refresher training for all machine and equipment operators must be frequently done and making sure that there are Standard Operating Procedures for a machine related work and the mill site must procure effective mechanical lifting aids to reduce the recurring occupational accidents.*

ACRONYMS & ABBREVIATIONS

COPD……CHRONIC OBSTRUCTIVE PULMONARY DISEASE

DALYs …….....DISABILITY-ADJUSTED LIFE YEARS

FTE……FULL-TIME EQUIVALENT

ILO……INTERNATIONAL LABOUR ORGANISATION

MSDs……. MUSCULOSKELETAL DISORDERS

NIHL……. NOISE INDUCED HEARING LOSS

OHS……...OCCUPATIONAL HEALTH AND SAFETY

PPE……PERSONAL PROTECTIVE EQUIPMENT

SHEQ…….SAFETY HEALTH AND ENVIRONMENTAL QUALITY

SOP……... STANDARD OPERATING PROCEDURE

SPSS……...SCIENTIFIC PACKAGE FOR SOCIAL SCIENCES

WHO……...WORLD HEALTH ORGANISATION

TABLE OF CONTENTS

Contents

Declaration..... i

Dedication.....ii

Acknowledgement.....iii

Abstract.....iv

Acronyms and Abbreviations..... v

List of figures.....vi

List of tables..... vii

CHAPTER ONE: INTRODUCTION 10

1.1 BACKGROUND 10

1.2 PROBLEM STATEMENT 12

1.3 JUSTIFICATION 13

1.4 AIM 13

1.5 SPECIFIC OBJECTIVES..... 14

1.6 RESEARCH QUESTION 14

1.7 CHALLENGES..... 14

CHAPTER TWO: LITERATURE REVIEW.....15

2.1 INTRODUCTION..... 15

2.2 Pig Production overview..... 15

2.3 Perceived causes of occupational accidents in pig farms..... 16

2.4 Occupational accidents trends in Pig Production Farmers..... 18

2.5 Association between socio-demographic factors with occupational accidents. 20

2.6 Occupational Hazards Reported by Pig Production Farmers 21

2.7 Accidents Pig Feed Milling Process 21

2.8 Ailments or Illnesses in the Pig Production Process 22

CHAPTER THREE: RESEARCH METHODOLOGY.....23

3.1 INTRODUCTION..... 23

3.2 STUDY AREA DESCRIPTION 23

3.3.1 STUDY DESIGN 24

3.3.2 SAMPLING AND SAMPLE SIZE 24

3.3.3 SAMPLING METHOD..... 24

3.3.4 DATA SOURCES 25
3.4 ETHICAL CONSIDERATIONS 25
3.5 QUESTIONNAIRE 25
3.6 STATISTICAL DATA ANALYSIS 26
CHAPTER FOUR: RESULTS **26**
4.2 SOCIO-DEMOGRAPHIC CHARECTERISTICS OF TRIPLE C PIGS 26
4.3 PERCEIVED ACCIDENTS CAUSES AT TRIPLE C PIGS 28
4.4 ACCIDENTS TRENDS AT TRIPLE C PIGS 28
4.5 Triple C PIGS Accidents Trends for the past 5 years **30**
CHAPTER FIVE: DISCUSSION **31**
5.1 INTRODUCTION 31
5.2 PERCEIVED CAUSES OF OCCUPATIONAL ACCIDENTS AT TRIPLE C PIGS 31
5.3 OCCUPATIONAL ACCIDENTS TRENDS AT TRIPLE C PIGS 32
5.4 RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND OCCUPATIONAL ACCIDENTS 33
5.4.1 Worker experience to the causation of occupational accidents at the farm. 33
5.4.2 Worker educational level to the causation of occupational accidents at the farm 33
CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS **35**
6.1 INTRODUCTION 35
6.2 CONCLUSION 35
6.3 RECOMMENDATIONS 35
References **36**
RESEARCH QUESTIONNAIRE FOR TRIPLE C PIGS **42**

LIST OF FIGURES

Figure 3.1 Map of Triple C Pigs……..23

Figure 4.1Gender distribution……26

Figure 4.2 Age distribution……..27

Figure 4.3 Educational levels……..27

Figure 4.4 Common causes of occupational accidents……..28

Figure 4.5 Time of the day where most accidents occur……..……...……..29

Figure 4.6 Number of times employees have experienced workplace accident…….…...29

Figure 4.7Accidents trends at Triple C Pigs…….…..……..30

CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

Agriculture is an essential source of livelihood for developing countries (Acharya, 2006). However, it can lead to poor health and is linked to the main causes of health hazards of agriculturists affected by infection, injuries, chronic exposure, and increased occupational disease (Sunisa Chaiklieng, 2023). The risk of dying in a work-related accident is greatest for those employed in the agricultural sector (Enn, 2019). The pig farming sector has traditionally been one of the most hazardous occupations for workers (Frank, 2004). The effects of ignoring occupational safety and health at work are either direct or indirect, and these consequences affect both parties involved (employee, employer and the business) (Pouliakas, 2013).OHS is described as the involvement of a worker with the machine or equipment being used at the workplace. According to Handjani et al (2022), OHS is the physical and psychological conditions of the workplace created by the organisation's work environment. The key objective of OHS is to prevent accidents at work and maximize profits for the organisation (Bayram, 2017).

According to a Global Monitoring Report published by the World Health Organisation (WHO) working together with the International Labour Organisation (ILO), the 41 pairs of occupational risk factors and health outcomes were estimated to have caused (1.84-1.92) million deaths and (88.61-90.83) million disability-adjusted life years (DALYs) globally in 2021 (Pega, 2022). All diseases included are non-communicable. Long working hours (≥ 55 hours per week) were the most common cause of death (744 924 deaths), followed by occupational particulate matter, gases, and fumes (450 381 deaths) and work-related injuries (363 283 deaths). Chronic obstructive pulmonary disease had the highest work-related mortality rate (450 381 deaths), followed by stroke (398 306 deaths) and ischemic heart disease (346 618 deaths). The WHO African Region, South-East Asia Region, and Western Pacific Region, as well as males and older age groups, have a significantly greater work-related disease burden.

In accordance with the Health and Safety Authority's 2021 Annual Review of Workplace Injury, Illness, and Fatality Statistics, which represented the most recently available data on work-

related fatalities, injuries, and ailments in Ireland, work-related fatalities, injuries, and illnesses in Ireland increased by 8% in 2021, and sectors which include fishing, agriculture, and construction, along with the transportation and storage sectors, had a greater incidence of work-related fatalities (Iskandar, 2022).

The data presented above significantly shows that workplace accidents are recorded in all over sectors from construction to agriculture sectors, where there is intensive manual labour. Back pain due to poor lifting of heavy machinery and chronic obstructive pulmonary disease (COPD) due to dust and particulates are also prevalent in the agriculture sector (Rushton, 2007).

According to Amy et al 1996, Livestock production is one the most dangerous activities that pose a significant health risks to the workers. The study showed that there were 5 highest physical occupational injuries like needle stick injuries (73%), pain from repetitive tasks (51%), injuries from handing pigs/swine postmortem (36%), back aches that associates with lifting and moving of pigs and other heavy equipment (31%) and lastly hot and cold weather related ailments (30%). These figures cleared highlighted that pig production plays a major role in the increase in occupational accidents and ailments and there is need for a significant investigation of this issue to reduce the recurrence of these occupational accidents at workplace.
Livestock farming is not an exception in the areas that are highly hazardous to workers in terms of work-related injuries and illnesses. The work has high manual labour, higher interaction with machines through cleaning the area, vaccinating and dipping the livestock's, and preparation of animal feed through the milling process. All these activities also result in workers being subjected to conditions that may cause occupational injuries like accident with moving parts of a machine, inhaling toxic dust from animal feed mills, inhaling cleaning chemicals and close contact with animals which may results in zoonotic disease transmission. On this research, the recurrence of occupational accidents from Pig farming industry has been investigated with using the Zimbabwean company Triple C Pigs as a case study.

Triple C is the largest producer of pigs in Zimbabwe, and it is a subsidiary company of the company Colcom. Workers working with animals on daily bases faces dangers of being exposed to many hazardous situations. Those who work with pigs from farm workers, slaughterhouse workers, and feed milling plant face unique hazards associated with these animals, machine they work with and their environment.

Working in the pig feed milling plant also exposes the workers to a lot of noise, feed dust, heat and moving machineries which are some of the things that might increase the risks of illnesses to the particular employees. Triple C Pigs has got a large milling plant which capacitates about 100 employees, all of them being exposed to those environmental conditions mentioned above. Meat inspectors are among those who may come into touch with special safety concerns during post-mortem meat inspection. These dangers include (i) close contact with a large number of pigs (ii) infections with pathogens that can be transmitted by close contact with live or slaughtered animals, such as Salmonella or Human Brucellosis, this can occur directly with the animals as well as indirectly through contaminated equipment, machines, or contaminated premises or air; and (iii) accidents/injuries caused by handling live animals or freshly stunned and bled animals that still exhibit unexpected reflex movements (Raynor et al., 2019). In an investigation conducted by (Taylor et al., 2020) swine Brucellosis can be transmitted to humans especially to the workers in the pig farms or slaughterhouses. Furthermore, the slaughter process is highly mechanised, and a huge number of moving, pointed, and sharp instruments are in use, which may endanger the workers. Potential dangers include structural flaws. There may also be health problems owing to constant noise and poor indoor air quality, such as low temperature and excessive humidity in the abattoir premises (Handajani et al., 2022).

After all, has been said and done, the number of occupational accidents being recorded at the farm is still a major concern. The recurrence of these occupational accidents has a financial implications to the business operations and same applies to the number of ailments being recorded by the clinic sister at the farm. Preventing ailments and accidents necessitates a constant focus on the work process.

This study uses Triple C pigs firm as a case study to investigate the recurrence of occupational accidents at the pig farm.

1.2 PROBLEM STATEMENT

Triple C Pigs is one of the largest pig producers in Zimbabwe and has been operating the SHE department for the past 4 years. Since the implementation of the safety health environment and quality department, accidents and ailment cases have been notable trends of accidents from serious injuries to minor and a variety of ailments to the workers. The problem is the recurrence

of occupational accidents and ailments at the farm despite various efforts that have been put in place by the responsible personnel.

This trend poses a significant threat to the well-being and safety of the employees, as well as the financial stability and productivity of the organization. The lack of understanding regarding the underlying causes and factors contributing to this pattern hinders the implementation of effective preventive measures and compromises the overall occupational safety standards at the farm. Therefore, a comprehensive investigation is necessary to identify the root causes and develop targeted strategies to address this alarming issue. The goal of occupational health and safety measures is to prevent or at least minimize the chances of injuries, deaths, and diseases arising from the working environment. (Davidzo et al 2022). It is vital to conduct an in-depth investigation to uncover the root causes behind this surge in occupational accidents at the farm and develop tailored interventions to safeguard the well-being of the employees, minimize financial implications, and enhance overall workplace safety practices at Triple C Pigs.

1.3 JUSTIFICATION

Despite previous efforts done to mitigate the accidents, there have been recurrence of the occupational accidents and ailments in the livestock production. Understanding the contributing factors can help develop effective preventive strategies and interventions. This investigation will help identify potential hazards and develop strategies to mitigate them effectively. Escalating injury cases not only impacts the physical well-being of the employees but also imposes financial burdens on the organization. Increased medical expenses, loss of productivity due to absences, and potential legal ramifications can significantly impact the profitability and sustainability of Triple C Pigs. By investigating this issue, the researcher aims to propose evidence-based solutions to reduce accidents, minimize costs, and enhance overall productivity of the organisation. The findings from this investigation can have implications beyond Triple C Pigs and benefit the wider pig production community involved in occupational safety. This knowledge can inform the development of preventive measures, best practices, and policies that can be implemented across the pig production sector to ensure the safety of workers nationwide.

1.4 AIM

To explore and understand the factors contributing to the observed increase in occupational accidents cases at Triple C Pigs.

1.5 SPECIFIC OBJECTIVES

1. To investigate the perceived causes of occupational accidents at Triple C Pigs.
2. To determine the occupational accident trends at Triple C Pigs.
3. To assess the relationship between the occupational accidents to socio-demographic factors/socio-economic factors.

1.6 RESEARCH QUESTION

1. What are the primary perceived causes of workplace accidents at Triple C Pigs?

2. What is the trend of workplace accidents at Triple C Pigs over the past three to five years?

3. How do socio-demographic factors influence the occurrence of workplace accidents at Triple C Pigs?

1.7 CHALLENGES

Some of the employees and staff were not willing to participate because they had already participated previously in other different study. Other respondents did not complete the questionnaires. Some of the respondents did not return the questionnaires. The researcher had to exercise patience for those who were willing.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews the existing frame of literature on the recurrence of occupational accidents in pig production farms from a variety of publishers. The first part will focus on perceived causes of occupational accidents, accidents trends and relationship between socio-demographic factors with occupational accidents. It also looks at individual, environmental and workplace factors that contribute to workplace accidents.

2.2 Pig Production overview

Pork is the second-most consumed meat in the world (Agriculture output 2020). Pig production all over the world has been rising as a way to try to provide the required food product. The demand for pork products in the world has also increased the number of occupational accidents and ailments among the workers who are involved in pig production (Karris, Groen & Greet 2003). According to the Pakistan Journal of Public Health, 2018, one-third of the world's population is engaged in the agriculture sector, which makes it the second largest source of employment worldwide. In developing countries, Agriculture holds 44% of the employment share. Livestock workers have to be in close contact with animals and different types of machinery, resulting in high risks of occupational accidents and occupational hazards/ diseases (Pakistan Journal of Public Health, 2018). Ergonomic challenges are common in the agriculture sector, which include bad working postures, repetitive movements and forceful exertions. In the USA, pig production exposed employees to serious occupational health risks such as noxious gases, agricultural dusts, elevated noise levels and zoonotic disease (Journal of Environmental Public Health, 2018).

Farmworkers are exposed to chemicals, machinery, animals, repetitive motions, extreme weather, and long work hours, all of which raise their risk of occupational injury and both acute and long-term health problems (Kraemer & Oppliger, 2017). Animals are responsible for the origin and transmission of around 60% of all human infectious illnesses. Bacteria, viruses, fungi, or parasites can cause these zoonotic illnesses, which can be transferred through inhalation, direct or indirect contact, ingestion, or various vectors (insects or mites). They may be stressed

and lack access to sufficient healthcare. Workers may be exposed to additional health and safety concerns due to the scale and density of pig farms, such as high levels of noxious gases (e.g., ammonia, methane, carbon dioxide, and hydrogen sulphide), agricultural dusts, and heightened noise levels (Kraemer & Oppliger, 2017). The potential for the origin and spread of new infections in pig farm facilities is a particular worry due to limited air spaces and waste management techniques. These exposures may cause chronic and acute respiratory conditions in swine production workers, including asthma, bronchitis, chronic obstructive pulmonary disease (COPD), coughing, hypersensitivity pneumonitis, throat irritation, sinus problems such as sneezing, noise-induced hearing loss (NIHL), and increased missed work days (Dutkiewicz et al., 2017

2.3 Perceived causes of occupational accidents in pig farms

There have been increased cases of occupational accidents in the pig production and different studies have pointed that activities for example animal handling, tractors, slips, trips and falls, machinery, chemicals, poor housekeeping as frequent direct causes of nonfatal injuries (Karttunen, 2013). Furthermore, many farm characteristics are risk factors for injuries. A particular study found that pig farmers have the highest injury risk (Hartman, 2004). Heavy workloads, in terms of hours, have also been found to be a risk factor in several studies (K. Svendsen, 2014) (Glasscock, 2006).

Machinery and equipment are significant contributors to occupational accidents in pig farms because of a combination of factors that relates to their operation, maintenance and the environment. The improper use and poor maintenance of machinery can lead to serious, property damage and fatalities (Law, 2023) (Winingham, 2019). One primary cause is the lack of proper training to the operators. Operators without sufficient training are more prone to making occupational errors that can directly lead to accidents (Solicitors, 2024). This might include poor understanding of the machinery functions, safety features and potential hazards (Falcony, 2024). Mechanical failures due to poor maintenance are said to be another factor. When equipment is not regularly serviced and inspected, malfunctions can occur leading to unexpected and dangerous situations. Improper use of machinery, such as using equipment for tasks it was not designed for, also increases the risk of accidents.

There are specific types of machinery related accidents include tractor rollovers, which are leading cause of fatalities in agriculture (Law, 2023) (Berry, 2024). Accidents also occur when workers get stuck or caught in moving parts of machinery such as augers, power take-offs (PTO). These entanglements can result in severe injuries, including amputations (Gerash Steiner Blanton, 2024). Another accident can involves struck by falling machinery parts or electrical accidents when equipment contacts power lines (Law, 2023). Lack of safety guards and failure to follow safety procedures are also significant contributing factors. Moving parts of machinery should be guarded to prevent clothing, hair, or limbs from getting caught. Additionally, failing to adhere to safety protocols, such as turning off machinery before performing maintenance or clearing blockages, can lead to serious accidents (HSE, 2022).

The significant cause of occupational accidents in pig farms is pig handling where accidents arise from a mixture of pigs' natural behaviours, the working environment and human factors. One of the major reason is the unpredictable nature of pigs (QLD, 2022). The pigs are said to be intelligent and curious, but are simply or easily stressed and frightened by new experiences (Gateway, 2018). Working with animals requires proper attention especially for pig handlers, treatment controllers and slaughterers. When stressed these pigs may become aggressive or attempt to escape, leading to injuries for handlers and some may over react during treatment time. Boars in particular can be very dangerous especially when housed alone or during mating season. Sows especially those with piglets can also be very protective an aggressive if they perceive a threat to their young (Quora, 2019).

Poor handling techniques are another major contributing factor. This includes a lack of understanding of pig behavior, using aggressive or forceful methods, and failing to provide a safe environment for moving pigs. For instance, approaching a pig from its blind spot can startle it, causing it to react unpredictably. Moving pigs in large groups or rushing them can also increase stress and the risk of accidents (Gateway, 2018). Workers may sustain musculoskeletal disorders from repetitive tasks such as lifting piglets, moving heavy animals or working in awkward postures. Another study discovered that slippery floors due to manure and urine can greatly lead to slips, rips and falls and these will results in employee injuries. According to (EFSA Panel on Animal Health and Welfare (AHAW), 2022) , inadequate handling facilities for instance, very narrow passageways or poorly designed ramps can make it difficult to move pigs in a safe way

during loading and offloading of pigs. Due to the absence of pig boards many workers have been injured by the aggressive pigs.

Disinfectants and cleaning agents are commonly used in pig farming to maintain hygiene and prevent the spread of diseases (Mutimaamba, 2024). However, poor handling of these chemicals can lead to skin and respiratory irritation if not handled with proper personal protective equipment (PPE). The use of biopharm a very corrosive and dangerous chemical that is usually used for biosecurity reasons can lead to injuries if there is poor handling during transportation, storage and improper storage of such a highly corrosive chemical can lead to accidents such as spills or accidental mixing of incompatible substances. The corrosiveness of these chemicals can lead to property damage.

Electrical hazards in pig farms can lead to severe accidents, including electrocution, burns, and fires, affecting both humans and livestock (Latham, 2025). One of the primary ways poor housekeeping leads to accidents is through slips, trips, and falls. Spilled feed, water, urine, and manure can create slippery surfaces, increasing the risk of falls. Clutter, such as tools, equipment, and discarded materials, can obstruct walkways and create tripping hazards especially in workshops (Black, 2015). Uneven or damaged flooring also contributes to these types of accidents especially in old and non-renovated infrastructure. In milling plant where there is too much accumulation of dust, can increase the risk of fire. Accumulations of dust, cobwebs, and flammable materials can serve as fuel sources, making it easier for fires to start and spread (Cross, 2012). Inadequate housekeeping practices can also contribute to biological hazards this is a result of failure to properly dispose of dead piglets or afterbirths or clean up manure can promote the growth of bacteria and other pathogens, increasing the risk of disease transmission to both workers and pigs and also lead to slippery workstations

2.4 Occupational accidents trends in Pig Production Farmers

Occupational accidents in pig farming, including in other agricultural sectors, raise serious concerns about worker safety. (Authority, Agriculture and Food Development, 2024). The frequency of these incidents differs but data show that agriculture, especially pig farming, and has a greater risk of fatal accidents than most different industries (Teagasc, 2024). Most common incidents occur while handling pigs. These involve leg wounds and impact injuries, which are commonly caused by inappropriate handling skills (Chas Cini, 2014). According to, (Chas Cini,

2014) accidents can occur at any time of the day during the workday, influenced by factors such as fatigue, time pressure, and the specific tasks being performed. Some tasks may be more risky at specific times. For example, feeding time can be particularly noisy, increasing the likelihood of noise-related problems. Loading farm pig may injure the knees, indicating that injuries are more prevalent during these activities (SHIKE, 2025). During seasonal activities, long working hours and exhaustion can make health and safety secondary, increasing the risk of accidents. According to a study carried out by (Hyeseon Chae1, 2014), the injury rate was the highest among workers who worked more than 10 hours per day, followed by those working 5-9 hours and less than 5 hours.

Another author, (Feyer, 2007), went on and argued that association between accidents and time of day is unclear. Although there is significant proof that performance is poorest in the early morning hours compared to all other times, the extent to which this is converted into accidents is unknown. He went on to point that, fatalities occurred most frequently in the late morning or early afternoon. When these data were represented in terms of the expected number of workers working, the proportion of fatalities occurring at night was more than double that throughout the course of the day. He concluded that, his findings call into question the idea that the previously observed fluctuations in performance over time are directly related to the eventual safety outcome. According to (Mason, 1979), it is seen that there are far more strain injuries recorded as having occurred on Monday morning than would be expected from the patterns revealed by the rest of the data. In another study carried out, it was emphasized that while a certain time of day cannot be categorically declared as the most risky, accident risk is likely enhanced during periods of more animal handling, high workload, and possible weariness (John Shutske, 2012).

Another livestock related studies concluded that, Occupational accidents in livestock farming, like general farming, are influenced by seasonal demands and daily routines. A large number of farm accidents occurs between nine and six in the day, with the greatest occurring around eleven and twelve o'clock (Forde, 2015). Accidents occur more frequently in the busiest periods of the day, and the amount of work is heavy (It Happens, 2024). Furthermore, a research in Central Anatolia, Turkey, found that the majority of accidents happened during work shifts. Fatigue from extended working hours, a lack of basic safety precautions, and the handling of large or unpredictable animals all add to the risk. It is also worth mentioning that injuries occur more

frequently in the afternoon and evening, regardless of the type of cattle (Dogan, 2012). As a result, while the danger is always present, specific times of the year and day, together with other risk variables, raise the possibility of accidents in cattle production (Mischa Tosswill, 2018).

In pig feed milling plants, articular duties may be more risky because of when they are performed. For instance, the start and completion of shifts, when cleaning and maintenance are frequently carried out, could provide increased dangers if lockout/tag out protocols are not rigorously observed (Kilger, 2023). Accident risk may rise during periods of intense work or when employees feel exhausted. This could occur at any time during the day, but it may be more noticeable during longer shifts or overtime hours (Chas Cini, 2014). Moving raw materials and final products involves risks. Accidents during loading and unloading, or while operating machinery such as forklifts, can happen at any time (Parikka, 2024). Times surrounding shift transitions may be prone to errors due to communication breakdowns or incomplete handovers. (Melo, 2023).

2.5 Association between socio-demographic factors with occupational accidents.

It is well documented that farming is dangerous in terms of fatalities and injuries (R. Jadhav, 2015). At the individual level, risk factors for injuries are gender, age, physical health, and types of employment, educational level (L. Day, 2009).

Several studies indicated that younger workers under the age of 25 have a higher risks of occupational accidents, due to inexperience, tendency to underestimate hazards, and they have a greater likelihood of taking risks (Mourelo, 2015). However some suggests that while younger workers have more accidents, the injuries are often less severe (Billim, 2025). According to, (Save, 2020), older workers may have fewer workers but when accidents do occur they tend to be more severe, leading to longer recovery periods, permanent disabilities and fatalities. This could be due to age-related decline in physical and cognitive functions.

According to, (Breslin, 2008), indicated that employees with lower levels in schooling are at greater danger of occupational accidents. This was attributed to a lack of awareness in safety procedures, failure of the employees in identifying potential workplace hazards. (Billim, 2025) supported that higher education can helps in reducing occupational accidents at work.

As experience increases the probability of accidents also decreases at work due to adaptation and increased awareness of risks (Somasundaram, 2022). However, some more experienced workers may be assigned some more difficult tasks and the complexity or nature of the tasks can results in work related injuries (Jérémie Tuganishuri, 2023).

In relation to marital status, according to (Mourelo, 2015), single workers are more likely to be involved in occupational accidents. This was linked to the fact many single workers are also young and less experienced. Another author argued that divorced or widowed workers may exhibit more cautious behaviour, leading to a lower probability of accidents. According to (de Medeiros, 2017), there is no significant association between marital status and the type of accidents that can occur at work.

2.6 Occupational Hazards Reported by Pig Production Farmers

Pig farmers are exposed to many hazardous situations in their daily practice. Those who work with pigs face unique hazards associated with these animals and their environment. The risk of acquiring a zoonotic infection can be high for pig farmers because of their close occupational contact with animals. Bacteria, dermatophytes, viruses, *Chlamydia*, *Rickettsia*, and parasites, carried by animals or in the surrounding environment, can infect the employee (Army et al, 1996). Workers are potentially exposed to a tremendous variety and quantity of synthetic chemicals used as pesticides and fumigants. These chemicals pose both acute and chronic health hazards. Exposure to organic materials and microorganisms from animal origin has also been shown to have detrimental effects on the respiratory system. Organic Dust Toxic Syndrome and Farmer's Lung Disease, an allergic alveolus is, are well-known agricultural occupational diseases.

2.7 Accidents Pig Feed Milling Process

Accident trend in a pig farm where there is a pig feed mill plant tends to be frequent and high because of the high rate of use of machinery, loading and unloading of full trucks of feed bags or raw materials. Agriculture is a dangerous industry with high rates of occupational injuries. The most frequent types of reported injuries, including those not requiring medical care, were bruises/contusions (40%), cuts/lacerations (21%), and sprains/strains (12%). These injuries were mainly caused by animals/livestock (33%), chemicals (23%), falls (12%), and tools (9%). In 2019, the incidence of fatal injuries was 23.1 injuries per 100,000 full-time equivalent (FTE)

workers in agriculture compared to 3.5 per 100,000 in all other industries combined. The rate of non-fatal injuries was 5.2 injuries per 100 FTE workers in agriculture and 2.8 per 100 in all other industries combined. (Athena K. Ramos ,. S., 2021). Workers may slip, trip, or fall while doing outdoor work in various risky weather conditions. Animal pens may be wet, muddy, snow-covered, or uneven, and workers could fall from horseback while cleaning through the pens. Workers may drive vehicles (i.e., feed trucks) and use mobile equipment (i.e., skid steers, loaders, ATVs/UTVs). Workers may be exposed to veterinary pharmaceuticals, pesticides, and other harmful chemical substances, which could have both acute and long-term health effects. Finally, employers may not have ongoing job-related safety training programs, often solely relying on a safety orientation completed at the time of hire

2.8 Ailments or Illnesses in the Pig Production Process

Despite the occupational accidents happening in the pig production there is an increase in ailments as well. Animal farming has been associated with negative respiratory effects such as work-related asthma and rhinitis. Animal farming is associated with exposure to organic dust containing allergens and microbial matter, including live microorganisms and viruses, endotoxins and other factors like irritant gases such as ammonia and disinfectants. These exposures have been identified as specific agents/risk factors of asthma, rhinitis, chronic bronchitis, COPD and reduced FEV. (T. Sigsgaard, 2020)

(Joana Campos, 2019), highlighted that Salmonellosis remains one of the most frequent foodborne zoonosis. The most frequent sources of human infections are food products of animal origin, being pork meat being one of the most relevant. Currently, particular pig food production well-adapted and persistent *Salmonella enterica* serotypes (e.g., *Salmonella* Typhimurium, *Salmonella* 1, 4, 12: i: -, *Salmonella* Derby and *Salmonella* Rissen) are frequently reported to be associated with human infections in diverse industrialized countries.

According to (Vanessa R. Coffman, 2020), applying pesticides and increasing years worked at any IHO were positively associated with reports of eye, nose, and/or throat irritation. Over time, transient exposures, including those associated with dustiness in barns, cleaning of barns, and pig contact, were associated with increased odds of symptoms, including sneezing, headache, and eye or nose irritation, particularly in the highest categories of exposure.

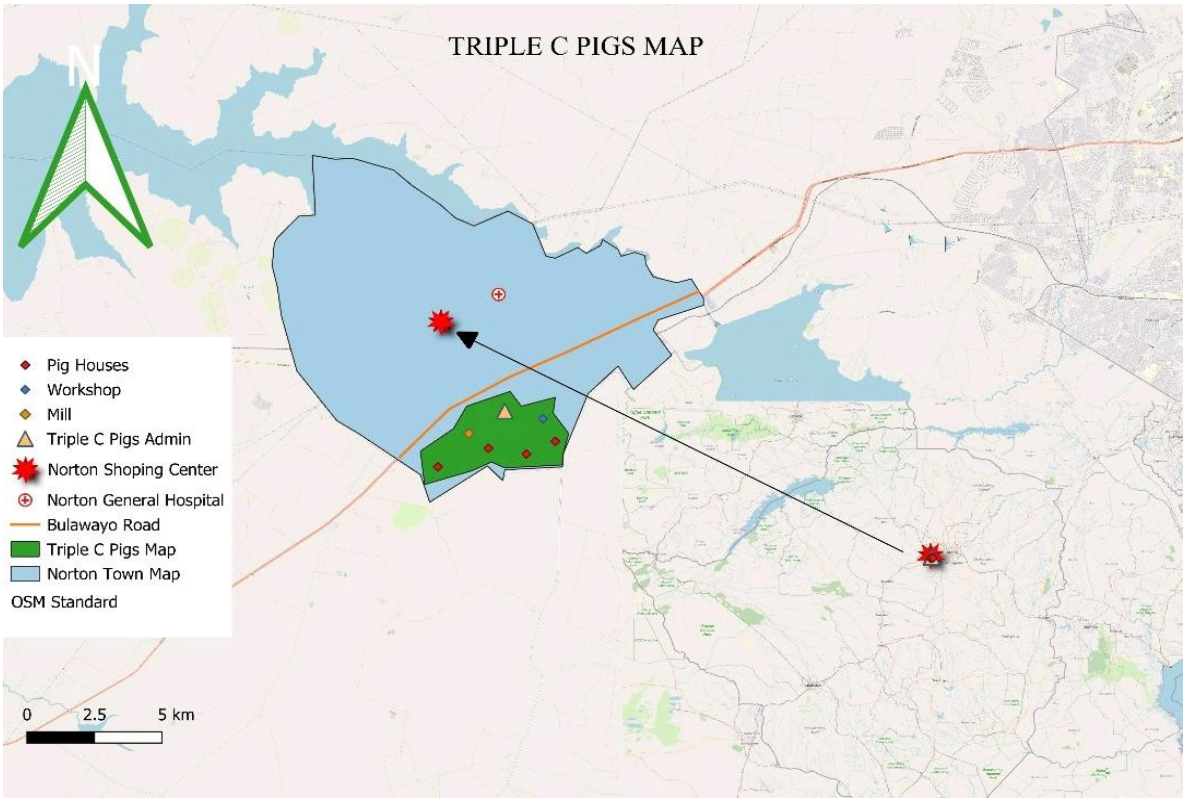
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter gives a brief outline of the study area. The chapter discusses the research design and sampling techniques used. This chapter will also discuss the research instruments used to gather data and the analytical framework used. This chapter also discusses the research's ethical considerations, including how informed consent was obtained from the participants, how confidentiality was maintained, and how data was used and stored. This research followed a rigorous and well-designed methodology that was carefully planned and executed to ensure accurate and reliable results.

3.2 STUDY AREA DESCRIPTION

The research was done at Grasmere Farm, a pig farming unit in Norton, which is located in Mashonaland West Province of Zimbabwe (17°55'30"South 30°54'50"East). The farm is about



48km from the city of Harare.

Figure 1: Map showing Triple C Pigs Farm

3.3.1 STUDY DESIGN

The production of this study was a community-engaged research partnership between the Triple C Pigs employees and the researcher. Before their informed consent was obtained, every participant was informed about the study's methods and their rights as research volunteers. An in-person verbal interview was conducted with the personnel. The interviews used a standardized questionnaire that included as many reliable and valid metrics as possible. The questions focused on demographics, stress, mental and physical health, and the setting of the job. All study guides and resources were available in English. The full data collection was collected in May 2025. Bindura University of Science Education gave its permission to the proposal. According to Triple C Pigs Statistics, in 2024, 350 people were working at the Triple C Pigs farm. To participate in this study, workers had to be a minimum of eighteen years old and currently employed at Triple C Pigs.

3.3.2 SAMPLING AND SAMPLE SIZE

Sampling is the procedure of picking a subset of participants from a population to determine the characteristics of the entire population. The two primary benefits related to sampling are faster data collection and reduced costs. Each observation assesses one or more qualities of visible subjects who are identifiable as separate persons. Sampling is commonly used in corporate research, medical research, and agricultural research to acquire information about a population. A sample size of 100 participants was used by the researcher during the study.

3.3.3 SAMPLING METHOD

The researcher first used a random sampling called stratified sampling to group Grasmere Pig sites into strata. Grasmere Farm has 5 sites, namely the Grower site, Weaner, Main site, Workshop and Maintenance, and lastly Mill site. The employees were grouped into subcategories or strata with relevant factors such as job roles, for example (animal handlers, maintenance workers, milling workers) and shifts, for instance (night shift, day shift). The sample was then proportionally selected from each subgroup to ensure that each category was

represented by its size in the total workforce. The advantages of simple random sampling are that it allows the results to apply to the whole demographic, and it offers an equal chance of selection for everybody within the population group. Using random sampling with each stratum ensured that there was a diverse and representative sample. This sampling method ensured that all relevant subgroups were included, allowing the study to identify specific factors related to the recurrence of accidents at CCC Pigs. A larger sample of 60 participants was used to provide more accurate and reliable data.

3.3.4 DATA SOURCES

During the research, the researcher used different sources of data, which included primary and secondary sources. Primary data was obtained from primary sources such as interviews, questionnaires, and surveys. Interviewed employees provided the primary data. Secondary data was obtained from books, journals, articles, and the internet.

3.4 ETHICAL CONSIDERATIONS

The study was cleared in writing by CCC Pigs H.R.O. and SHEQ Officer in writing as well as the Department of Environmental Science at Bindura University of Science Education. The purpose of the research was explained to the participants, and ethical approval was obtained. Relevant ethical issues when carrying out research involving human participants were considered (Resnik, 2018). These included confidentiality, obtaining informed consent, avoiding harm, maintaining anonymity, allowing voluntary participation, respecting the right to withdraw at any time, and respect for the dignity of the participants. All information was only used for research purposes.

3.5 QUESTIONNAIRE

To gather data regarding the recurrence of occupational accidents among Triple C Pigs workers, questionnaires were used. The questionnaire was developed from relevant literature. The questionnaire had 3 sections, which are: 1. Demographic covariates, 2. Perceived causes of occupational accidents, 3. Accidents trends. A questionnaire allows for flexibility in questioning while ensuring that key topics are covered and promotes two-way communication between the interviewer and the respondent (Magaldi, 2020). The questionnaire may include bias at some point during the interviews (Mashuri, 2020). 60 questionnaires were distributed.

3.6 STATISTICAL DATA ANALYSIS

Data were analysed using SPSS version 23.0. We calculated descriptive statistics like frequencies. A standard p-value of 0.05 was used to evaluate significance. Pearson's correlations were used to assess the strength of relationships between research variables and covariates known to be associated with occupational injury and job-related health problems

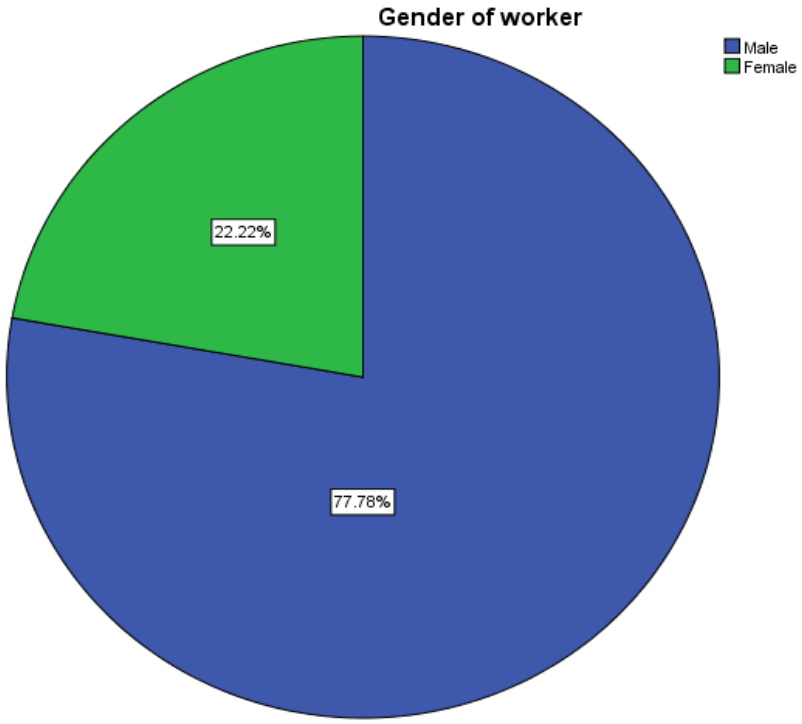
CHAPTER FOUR: RESULTS

4.1 NTRODUCTION

The key findings from this research study are summarized in the form of various visual aids including charts, tables and graphs. These visual representations allow for easy comprehension and comparison of data.

4.2 SOCIO-DEMOGRAPHIC CHARECTERISTICS OF TRIPLE C PIGS

The distribution of gender among a sample of 65 Triple C Pigs workers had a quite difference, as



demonstrated by the fact that 22.22% were females 77.78% were males.

Figure 4.1: Gender of study respondents

The ages of the respondents varied widely from 18 to over 50 years. The largest proportion of respondents fell within the age range of 18 to 25 years (29.63%) followed by 26 to 34 years (24.07%) followed by 41 to 49 years (20.07%) and 35 to 40 years (16.67%) while the smallest proportion 9.25% were between 50+ years of age. This shows that the workforce was skewed towards a slightly older demographic

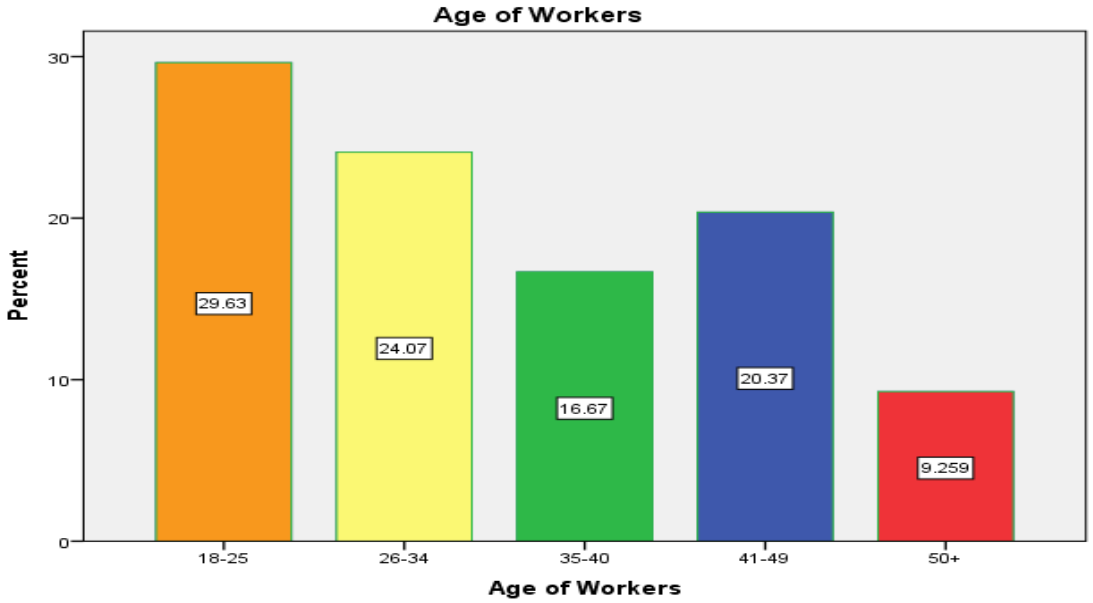
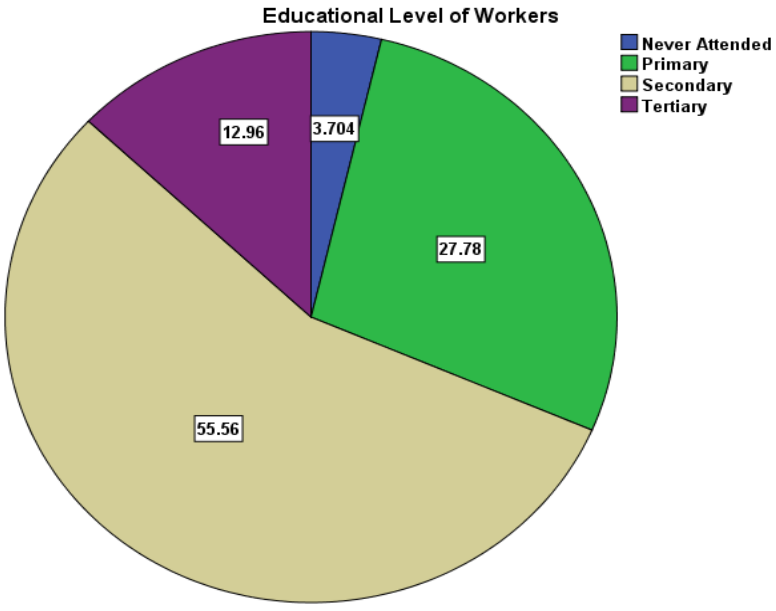


Figure 4.2: Distribution of respondents by age

The level of education attained by the respondents was diverse with those who attended tertiary level/college or above representing 12.96% those who attained secondary level comprised of 55.56% followed by respondents who attained primary level education which accounted for

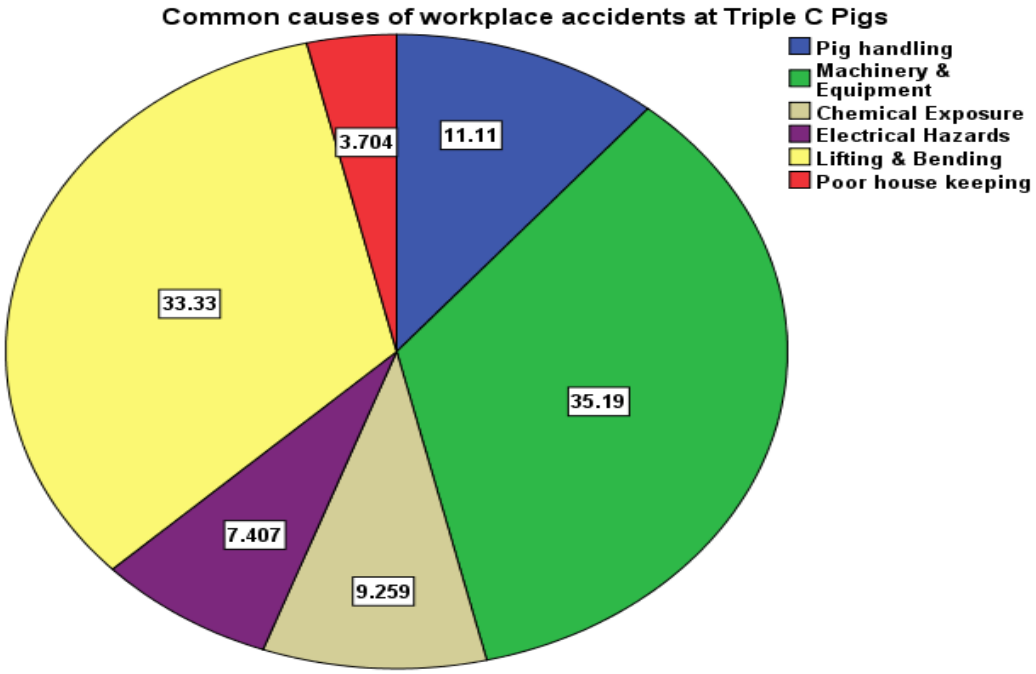


27.78% of the respondents. Respondents who never attended school represented 3.70%.

Figure 4.3: Educational levels of study participants

4.3 PERCEIVED ACCIDENTS CAUSES AT TRIPLE C PIGS

According to the data, pig handling accounts for 11.11% of the accidents. Machinery-related incidents are the leading cause, responsible for 35.19% of accidents. Chemical exposure contributing to 9.25% of accidents. Lifting and bending injuries are also prevalent accounting for 33.33% of incidents. Poor housekeeping and electric hazards also contribute to workplace



accidents, at 3.70% and 7.40%, respectively.

Figure 4.4: Common causes of accidents

4.4 ACCIDENTS TRENDS AT TRIPLE C PIGS

The bar graph illustrates the percentage of accidents occurring at various times of day, revealing significant trends. During the morning hours (6 AM to 12 PM), only 5.56% of accidents are reported. In the early afternoon (12 PM to 4 PM), the reported accidents accounts to 7.40%. During the late afternoon (4 PM to 8 PM) sees a substantial rise, with 31.48% of accidents

occurring during this time. The shift (8 PM to 6 AM) accounts for just 1.85% of accidents. Notably, over half of the accidents, at 53.70%, fall into the category of anytime or unpredictable.

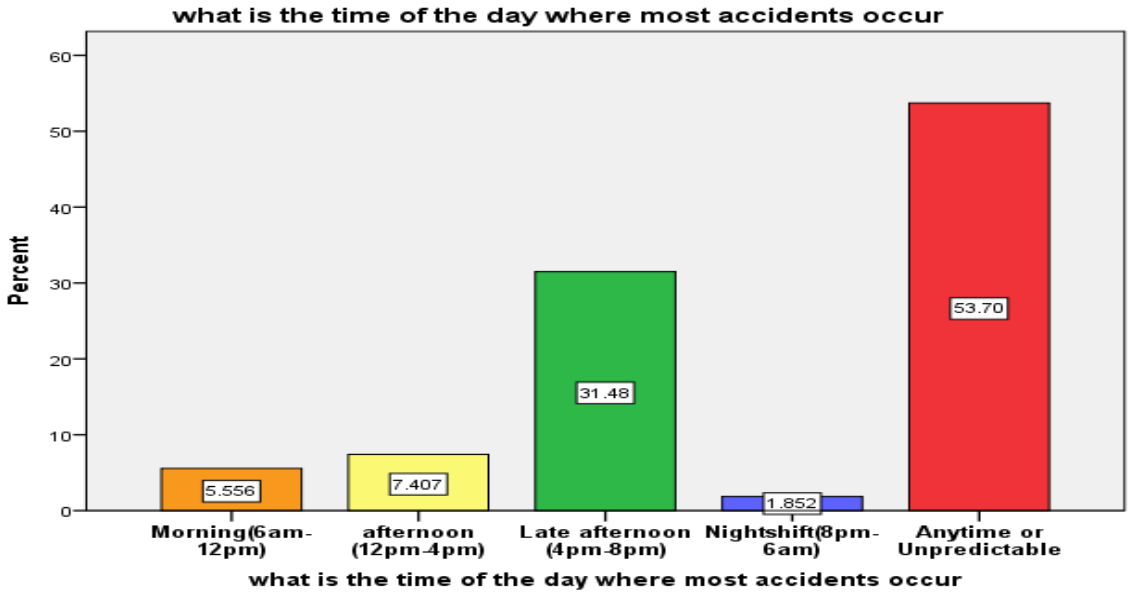


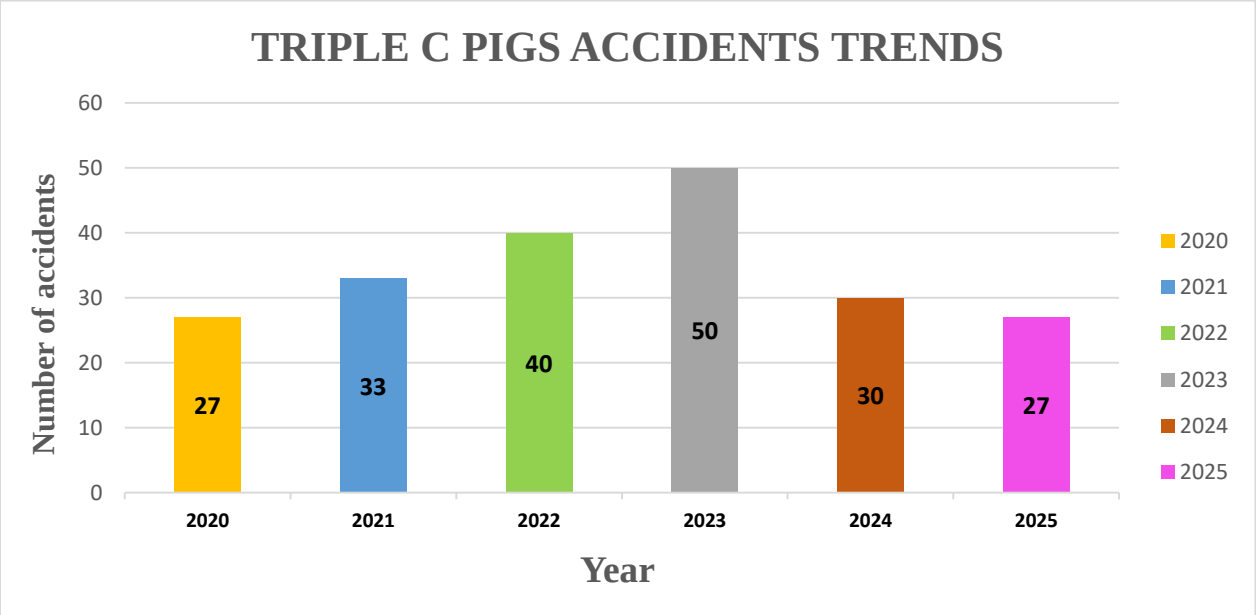
***Figure 4.5: Time of the day where most accidents* occur**

The frequency of accidents in the pig production shows that a significant portion of 44.44% experience accidents once, while 22.22% experience them 2-3 times. Additionally, 20.37% claim to never have accidents, 5.55% experience accidents 4-5 times, and 7.40% report accidents more



than five times.

Figure 4.6: Number of times employees have experienced workplace accident.



4.5 Triple C PIGS Accidents Trends for the past 5 years

Figure 4.7: Accident trends for Triple C Pigs Farm

There was a consistent increase in the number of accidents from 27 in 2020 to 50 in 2023. This upward trend suggests that after the start of the implementation of the SHEQ department in 2019, there may have been heightened reporting of accidents or initial challenges in safety management and training. The highest peak of the accidents might have been due to an increased awareness of reporting hazards and near misses at the farm. A notable decrease to 30 accidents in 2024 suggests that the SHEQ department may have started to implement effective safety measures and training programmes, resulting in improved safety conditions, and also the employees might have been able to identify and report potential occupational hazards, and this reduced the number of accidents recorded at the site. This reduction indicates a positive response to an earlier trend. The number of accidents remained stable at 27 in 2025, mirroring the initial count in 2020; however, the accidents were recorded at the halfway of the year, and the organisation could record more accidents as the year ends.

CHAPTER FIVE: DISCUSSION

5.1 INTRODUCTION

The following chapter is going to discuss results obtained from analysis done. The purpose of this discussion is to provide an explanation of the results as per the objectives.

5.2 PERCEIVED CAUSES OF OCCUPATIONAL ACCIDENTS AT TRIPLE C PIGS

The study's results revealed that the most common perceived cause of occupational accidents was the use of machinery and equipment (35.19%), this is due to the potentially hazardous nature of the operations involved in a pig farming. Workers were often required to operate heavy machinery such as feed mixers, transport vehicles, pressure washers and other heavy maintenance equipment. The likelihood of occupational accidents increases due to the potential for mechanical failure, improper use, or inadequate training on equipment operation at the farm. Additionally, the fast paced work at the farm also lead to hurried actions whilst operating the machinery and equipment leading to occupational accidents.

On the same note, the study also revealed that lifting and bending (33.33%) was the second common cause of occupational accidents. At triple C Pigs, these accidents are caused by loading and offloading of feedbags, pigs in slaughterhouses, awkward positions while injecting or attending piglets in farrowing houses. Another reason being that the workers may not use the proper lifting technique, especially when under time pressure, which resulted in strains and sprains injuries.

It also noted that pig handling (11.11%) was also a third major contributor to the occupational accidents that were recorded due to unpredictable nature of animals. Pigs can be large and strong making them difficult to manage especially in stressful situations. Workers may face risks from animal aggression, slips and falls while moving pigs especially boars or working in confined spaces within the pig houses.

Lastly, the study revealed that chemical exposure (9.25%) and electrical hazards (7.40%) and poor housekeeping (3.70%) had a lower percentage on the perceived causation of occupational accidents at the farm. Good housekeeping practices, such as maintaining clear walkways and proper storage of tools and materials, can significantly reduce trip hazards, while effective management in electrical safety may contribute to lower incidents rates to those areas.

5.3 OCCUPATIONAL ACCIDENTS TRENDS AT TRIPLE C PIGS

The study's results showed that many occupational accidents frequently occurred unpredictably/anytime of the day (53.70%). This highlights that many accidents at the farm arise without a clear pattern or consistent risk factors. This unpredictability could be attributed to a number of things, including the nature of farm work, which frequently entails a range of jobs that change swiftly. Workers may face unforeseen challenges or hazards that do not occur during typical tasks.

On the contrary, the study identified that 31.48% of the accidents occurred during late afternoon (4pm-8pm). As the workday progresses at the farm, fatigue can set in, leading to decreased attention, and increased risk taking behaviours among the workers. As employees become more fatigued, their ability to identify hazards and adhere to safety protocols diminishes, heightening the likelihood of mistakes since most workers finish work at 5pm at the farm most workers will be rushing to finish their daily tasks. Another thing is the issue of overtime which is more prevalent at the Mill site, this overtime shifts contribute to physical strain where the workers are lifting and loading heavy bags of pig feed. Some of the worker stay outside the work premise or kilometers away so they will be in a hurry to finish their tasks so that they board the bus on time. The combination of fatigue, reduced alertness can result in overlooking safety measures or mismanaging equipment, ultimately leading to accidents. Lastly the stress associated with working long hour's results in decreased morale and lost in focus which greatly influence the causation on occupational accidents.

In contrast, fewer accidents were recorded during the morning (6am-12pm) (5.55%) and night shifts (6pm-6am) (1.85%), this might be because during the morning workers are more alert and focused leading to more carefully adherence to safety protocols and during the morning in most sites, a daily SHEQ Morning Toolbox talk is conducted to remind each worker on the importance of occupational health and safety. During the night shift, the lower number of accidents could be

attributed to reduced activity levels and fewer workers present, leading to a quieter and more controlled environment.

5.4 RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND OCCUPATIONAL ACCIDENTS

5.4.1 Worker experience to the causation of occupational accidents at the farm.

According to the research, it showed that employee's working experience have a relationship to the causation of workplace accidents at Triple C Pigs. It showed that employees with more than 3 years working experiences were less prone to workplace accidents due to familiarity with the farm procedures, increased awareness of potential hazards and they have developed skills in managing some of the occupational risks at their work sites.

On the same note, new employees who have a work experience less than 1 year at the farm, were likely to be the more exposed to workplace accidents, due to lack of experience, uncertainty with workplace procedures and potential gaps in training. The other reason for these accidents in these new employees could be that the farm recruit new workforce frequently and this results in having as many new employees and this increases the chances of accident causation. Workers with work experience less than 1 year may have never worked at a farm before with similar workplace hazards and this means that everything will be new to the workforce.

5.4.2 Worker educational level to the causation of occupational accidents at the farm

The study revealed that workers who attended tertiary level were around 12.96% and it is clear that these employees were not exposed to high risks areas due to their levels of education were most of them were site supervisors, so their involvement with dangerous activities was very limited hence low occupational accidents causation.

Workers who attended secondary (55.56%) had a larger demographic population at the farm but on accident causation the group is composed of many work that does not require a lot of expertise and they had better understand of safety procedures and an increased awareness of potential farm risks. The third group had respondents which completed primary school and it is not surprising that the much of the injuries were sustained by this group. These workers worked mostly as casual workers at the mill site where there is strenuous activity like lifting, loading and offloading of feed bags and raw materials, pig house attendants, workshop assistance and yard

maintainers. So this group had limited awareness on potential workplace hazards and thus resulting in more occupational accidents. The last group for those who never attended school was very few at the farm but it is crystal clear that this were the affected or exposed to occupational accidents.

Lastly the interrelation and correlation between educational level and worker experience to the causation of workplace accidents is that employees with lower education and short tenure might be more prone to accidents due to limited knowledge and experience.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter presents the conclusions drawn from the research conducted at Triple C Pigs regarding occupational accidents. By analyzing the perceived causes, trends and the influence of socio-demographic factors it has helped the researcher to provide targeted recommendations to reduce occupational accidents and promote a safer working environment for all employees.

6.2 CONCLUSION

The study at Triple C Pigs identified several key factors contributing to the recurrence of occupational accidents, including the unpredictability of incidents, the influence of worker experience, and the impact of educational levels. Machinery and Equipment use was the perceived common cause leading to the recurrence of occupational accidents followed by Lifting and bending and pig handling. Many accidents occurred without a clear patterns (any time of the day/unpredictably), often late shifts (4pm-8pm), when worker fatigue increased. Employees with over three years working experience demonstrated lower accidents rates due to their familiarity with safety procedures, while new hires were more susceptible to occupational accidents. Workers with lower educational backgrounds were frequently involved in occupational accidents.

6.3 RECOMMENDATIONS

Therefore, it is recommended that;

- Proper training and refresher training for all machine and equipment operators must be frequently done and making sure that there are Standard Operating Procedures for a machine related work and the mill site must procure effective mechanical lifting aids
- The Mill site must consider adjusting work schedules to minimize fatigue, ensuring adequate breaks and rest periods during overtime.
- Regular safety audits should be conducted, particularly during late shifts, to identify and mitigate risks associated with fatigue

- ❖ Those employees who haven't received formal education must be informed on hazards associated with their work and awareness must be raised and experienced employees must be mixed with those new employees.

References

1. Acharya, S. S. (2006). Sustainable agriculture and rural livelihoods. *Agricultural Economics Research Review 19(2),* 205-218.
2. Amy L. Hafer, M., Ricky L. Langley, M. M., WE Morgan Morrow, P., & Jerry J. Tulis, P. (1996). Occupational hazards reported by swine veterinarians in the United States. *Swine Health and Production,* 138-141.
3. Athena K. Ramos, ,. S. (2021). Occupational Injuries among Latino/a Immigrant Cattle Feedyard Workers in the Central States Region of the. 1-13.
4. Athena K. Ramos, 1. A.-S. (2018). Self-Reported Occupational Injuries and Perceived Occupational Health Problems among Latino Immigrant Swine. *Journal of Environmental and Public Health,* 1-2.
5. Authority, Agriculture and Food Development. (2024). Farm safety: Farm construction and work at height.
6. Bayram, M. M. (2017). "The relationships between OHS prevention costs, safety performance, employee satisfaction and accident costs.". *International journal of occupational safety and ergonomics 23(2),* 285-296.
7. Berry, L. (2024). What Are Common Causes of Agricultural Machinery Injuries?
8. Billim, A. (2025). Demographic Analysis of Occupational Safety in the Construction Sector: Strategies and Insights for Risk Reduction. 15(4), 528.
9. Black, B. (2015). Workshop processes, practices and materials. Routledge.
10. Breslin, F. C. (2008). Educational Status and Work Injury Among Young People: Refining the Targeting of Prevention Resources. *Canadian journal of public health. Revue canadienne de santé publique* , 99(2):121-4.

11. Chas Cini, K. M. (2014). PORK SA GUIDEBOOK –WORKPLACE HEALTH and SAFETY. pp10-107.

12. Cross, J. &. (2012). Dust explosions. Springer Science & Business Media.

13. Davidzo H. Mapuvire, S. R. (2022). The Health and Safety Perspectives in the Zimbabwe Public Sector. *Transformational Human Resources Management in Zimbabwe*, 167-185.

14. de Medeiros, J. R. (2017). Occupational group, educational level, marital status and deleterious habits among individuals with maxillofacial fractures: retrospective study. *Medicina oral, patologia oral y cirugia bucal,*.

15. Dogan, K. H. (2012). "Livestock-handling related injuries and deaths.". *Livestock production 1*, 81-116.

16. Dutkiewicz, J. S. (2017). Streptococcus suis : a re-ermerging pathogen associated with occupational exposure to pigs or pork products. Part 1- Epidemeology . 24(4) , https:// doi. org/ 10.26444 aaem 79813. 683-685.

17. EFSA Panel on Animal Health and Welfare (AHAW), N. S. (2022). Welfare of pigs during transport. . *EFSA Journal*, 20(9), e07445.

18. Enn, A. &. (2019). Dynamics of work accidents incidence by severity, gender and lost workdays in Estonian agricultural sector and sub-sectors in 2008–2017.

19. Falcony. (2024). Underlining 8 Common Safety Incidents in Agriculture. Retrieved from https://blog.falcony.io

20. Feyer, A. M.-M. (2007). Causes of accidents and the time of day. Pages 158-164. doi:https://doi.org/10.1080/02678379508256550

21. Forde, A. (2015, November). Here’s where and when a farm accident is most likely to occur.

22. Frank, A. L. (2004). Issues of agricultural safety and health. Annu. Rev. Public Health.

23. Gateway, P. I. (2018). *Safe Animal Handling.* Retrieved from [https://porkgateway.org/resource/safe-animal-handling/]

24. Gerash Steiner Blanton, P. (2024, May 20). Types of Farming Equipment Injuries.

25. Glasscock, K. R. (2006). Psychosocial factors and safety behavior as predictors of accidental work injuries in farming. *Work and Stress, 20 (2),* pp. 173-189.

26. Hartman, K. F. (2004). Risk factors associated with sick leave due to work-related injuries in Dutch farmers: An exploratory case-control study. *Safety Science, 42 (9),* pp. 807-823.

27. HSE. (2022, January 6). Safe maintenance. Retrieved from https://www.hse.gov.uk/agriculture/topics/maintenance-1.htm

28. Hyeseon Chae1, K. M. (2014). Estimated rate of agricultural injury: the Korean Farmers' Occupational Disease and Injury Survey. *Volume 26*. doi: https://doi.org/10.1186/2052-4374-26-8

29. Iskandar, I. D. (2022). The Incidence of Work-Related Ill-Health as Reported to The Health and Occupation Research (THOR) Network by Physicians in the Republic of Ireland between 2005 and 2021. *Centre for Occupational and Environmental Health The University of Manchester*.

30. It Happens. (2024). *FARM ACCIDENT CLAIMS: A GUIDE TO COMPENSATION, COMMON MISTAKES, AND EXEMPTIONS.*

31. Jérémie Tuganishuri, S.-G. Y.-K. (2023). Analysis of the Severity and Cause and Effect of Occupational Accidents in South Korea. Retrieved from https://doi.org/10.3390/su152015058

32. Joana Campos, J. M. (2019). Non-typhoidal Salmonella in the Pig Production Chain: A Comprehensive Analysis of Its Impact on Human Health. 1-28.

33. John Shutske, M. S. (2012). Safe Animal Handling. *Pork Information Gateway*.

34. K. Svendsen, O. A. (2014). Nonfatal occupational injuries in Norwegian farmers. *Safety and Health at Work,*, 147-151.

35. Karttunen, R. R. (2013). Distribution and characteristics of occupational injuries and diseases among farmers: A retrospective analysis of workers' compensation claims:

Occupational Injuries and Diseases Among Farmers. *American Journal of Industrial Medicine*, pp. 856-869.

36. Kilger, S. (2023). Top 10 OSHA citations for animal feed and grain processing facilities. *FEED and GRAIN*.

37. Kraemer, J. G. (2017). What is known about zoonotic bacteria in cattle and pig farms, and what should be done to prevent occupational infections, . *https://doi. org / 10.1007/ 978-3-319- 61688-9*, 361-389.

38. L. Day, D. V.-S. (2009). Risk factors for work related injury among male farmers. *Occupational and Environmental Medicine, ,* pp. 312-318.

39. Latham, A. M. (2025). Electrical Hazards on Australian Farms: A Rapid Review of Electrical Perceptions in Agriculture. *ournal of Agromedicine, 30(1),*, 68-79.

40. Law, P. (2023, September 27). Farming Machinery and Equipment: Key Causes of Farm Accidents. Retrieved from https://www.pringlelaw.net

41. Magaldi, D. B. (2020). Semi structured interviews, Encyclopedia of personality and Individual diffrences.

42. Mashuri, S. S. (2020). Semi structured interview: A mthodological refflection on the development of a Qualitative research intstrument in educational studies. Journal of research and Method in education 12(1), 22-29.

43. Mason, K. (1979). Accident patterns by time-of-day and day-of-week of injury occurrence. *Journal of Occupational Accidents, Volume 2, Issue 2,* Pages 159-176.

44. Maxime Delsart 1, *. ,. (2020). Pig Farming in Alternative Systems: Strengths and Challenges in Terms of Animal Welfare, Biosecurity,Animal Health and Pork Safety. *Agriculture*, 1 of 34.

45. Melo, A. (2023). From mill to farm: The impact of feed manufacturing.

46. Mischa Tosswill, M. R. (2018, November). Livestock-related injuries in the Midland region of New Zealand.

47. Moin Iqbal1, N. B. (March 2018). OCCUPATIONAL HEALTH HAZARDS OF LIVESTOCK WORKERS IN PAKISTAN. *Pakistan Journal of Public Health| Vol. 8, No. 1|*, 1-55.

48. Mourelo, R. B. (2015). The Impact of Worker's Age on the Consequences of Occupational Accidents: Empirical Evidence Using Spanish Data. *Journal of Labor Research*, 36(2).

49. Mutimaamba, V. A. (2024). Swine Biosecurity: Essential Practices for Disease Prevention and Herd Health. Wikifarmer. Retrieved from.

50. Parikka, K. (2024). 12 Most Common Near Misses in Agriculture and Farming.

51. Pega, F. H. (2022). Global, regional and national burden of disease attributable to 19 selected occupational risk factors for 183 countries, 2000–2016: A systematic analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury. *Scandinavian journal of work, environment & health, 48(2)*, 158.

52. Pouliakas, K. &. (2013). The economics of health and safety at work: an interdiciplinary review of the theory and policy. *Journal of Economic Surveys, 27(1)*, 167-208.

53. QLD, W. (2022). Pig handling. Retrieved from https://www.worksafe.qld.gov.au/safety-and-prevention/hazards/workplace-hazards/agriculture/pig-handling]

54. Quora. (2019, December 9). Can domesticated pigs be dangerous to humans?

55. R. Jadhav, C. A. (2015). Risk factors for agricultural injury: A systematic review and meta-analysis. *Journal of Agromedicine,*, pp. 434-449.

56. Resnik, D. (2018). The ethics of research with human subjects: Protecting people, advancing science, promoting trust. *Vol 74*. Springer.

57. Rushton, L. (2007). Occupational causes of chronic obstructive pulmonary disease. *Reviews on environmental health, 22(3),*, 195-212.

58. Save, M. Ö. (2020). elf-reported occupational accidents and affecting factors among the adult population. Retrieved from https://doi.org/10.4322/2526-8910.ctoAO2065

59. SHIKE, J. (2025). Top 3 Dangers on Your Hog Farm: How to Protect Yourself From Injury.

60. Solicitors, J. (2024, August 20). What Are the Most Common Farm Accidents? Retrieved from https://www.jmw.co.uk

61. Somasundaram, D. (2022). A study on socio demographic factors and work related health problems among women construction workers in Western Tamilnadu. *Journal of Positive School Psychology*, 7741 – 7746.

62. Sunisa Chaiklieng, C. C. (2023, May). Situations of work-related diseases and iagriculturists in the upper northeast regions of Thailand. 3-29. doi:https://doi.org/10.12688/f1000research.73221.3

63. T. Sigsgaard, I. B.-O.-S. (2020). Respiratory diseases and allergy in farmers working with livestock: a EAACI position paper. 1-30.

64. Teagasc. (2024). Farm safety: Farm construction and work at height. pp 1-2.

65. Vanessa R. Coffman, D. J.-W. (2020). Self-reported work activities, mucus membrane symptoms, and respiratory health outcomes among an industrial hog operation worker cohort, North Carolina, USA. 1-42.

66. Winingham, W. K. (2019, March). Farming Accidents: Types of Farming Equipment Injuries. Retrieved from https://www.wkw.com

RESEARCH QUESTIONNAIRE FOR TRIPLE C PIGS

Dear Respondent

My name is Brighton Murandu, a Bindura University of Science Education fourth year student undertaking a Bachelor of Science Honours Degree in Safety, Health and Environmental Management (SHEM). I am doing **AN INVESTIGATION ON THE RECURRENCE OF OCCUPATIONAL ACCIDENTS AND AILMENTS AT TRIPLE C PIGS** as part of my research project. Your responses will be used to inform the research and contribute to a better understanding of issues to do with occupational accidents. The information collected will be treated with the strictest confidentiality and will only be used for research Please answer all questions honestly. Thank you for your time and participation.

INSTRUCTIONS TO RESPONDENTS

- *Tick all the appropriate boxes*
- *Do not write your name on any part of the paper*

SECTION A: SOCIO-DEMOGRAPHIC FACTORS

What is your age (years)? 18-25☐ 26-34☐ 35-40☐ 41-49☐ 50+ ☐

What is your gender? Male ☐ Female ☐

What is your level of education? Never attended☐ Primary☐ Secondary☐ Tertiary☐

Which site do you work for? Mill☐ Grower☐ Weaner☐ M/Site ☐ W/Shop☐
H.C&General☐ AI ☐ Biosecurity☐

What is your length of employment? Less than 1 year ☐ one to three years☐ more than three years☐

What is your relationship status? Never married☐ Married☐ Divorced☐

SECTION B: PERCEIVED ACCIDENTS CAUSES	
Question	**Answers**
What do you believe are the most common causes of workplace accidents at Triple C Pigs?	Pig handling☐ machinery & equipment☐ chemical exposure☐ electrical hazards☐ lifting & bending ☐Poor house-keeping☐ Other……
Have you ever experienced a work-related injury while working	YES ☐ NO ☐
If yes what was the nature of the accident?	Slips ☐ Falls☐ Pig-related injuries☐ Machinery accidents ☐ Other……..
Do you believe that inadequate supervision contributes to workplace accidents?	Yes ☐ No ☐ DON'T KNOW ☐
Do you believe that improper use of equipment contributes to accidents in pig production?	Yes ☐ No ☐ DON'T KNOW ☐
Is poor communication among employees a contributing factor to workplace accidents?	Yes ☐ No ☐ DON'T KNOW ☐
SECTION C: ACCIDENTS TRENDS	
How often have you experienced work related accidents or ailments in the past year?	Never☐ Once☐ 2-3 Times☐ 4-5Times☐ More than 5 times ☐
What type of accidents have you experienced most frequently in the pig production sector?	Animal bites☐Slips, trips, falls☐Cuts/lacerations ☐ Chemical☐ machinery☐Other (specify)……..
What body parts are most commonly injured in workplace accidents?	Hands☐Feet☐Back☐Arms☐Head☐ Other(specify)……

What time of the day do most accidents occur in your workplace?	Morning(6am-12pm)☐Afternoon(12-4pm)☐Late afternoon(4pm-8pm)☐Nightshift(8pm-6am)☐ Anytime/unpredictable☐ Don't know☐
In the past year, have you or a colleague experienced an accident while working with pigs	Yes ☐ No ☐ DON'T KNOW ☐