BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCES

DEPARTMENT OF NATURAL RESOURCES

AN ETHNOGRAPHIC STUDY ON THE SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACTS OF TRADITIONAL TABLE SALT PRODUCTION IN CHIBUWE AREA, ZIMBABWE.

BY

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B202314B

A DISSERTATION SUBMITTED TO BINDURA UNIVERSITY OF SCIENCE EDUCATION IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE BACHELOR OF SCIENCE HONOURS DEGREE IN NATURAL RESOURCES MANAGEMENT.

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JUNE 2024

APPROVAL FORM

This dissertation titled "An ethnographic study on the socio-economic and environmental impacts of traditional table salt production in Chibuwe area, Zimbabwe" by Nyengeterai Murenje, with registration number B202314B, has been approved for submission in partial fulfilment of the requirements for the award of the Bachelor of Science Honours Degree in Natural Resources Management at the Bindura University of Science Education.

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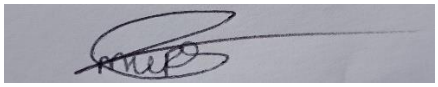
Student's Signature: 

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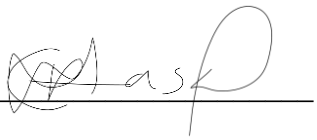
Supervisor's Signature: 

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DECLARATION

I, Nyengeterai Murenje, with registration number B202314B, do hereby declare that this dissertation is my own original work, and has not been previously submitted for examination at this or any other institution. All sources of information used have been duly acknowledged.

DEDICATION

This dissertation is dedicated to my beloved parents, Mr. and Mrs. Murenje, who have always supported and encouraged me throughout my academic journey. Their unwavering love and guidance have been instrumental in shaping me into the person I am today.

ACKNOWLEDGEMENTS

First and foremost, I would like to express my sincere gratitude to my supervisor, Ms. C Masona, for her invaluable guidance, support, and constructive feedback throughout the research process. Her expertise and dedication have been instrumental in the successful completion of this dissertation. I would also like to thank the Bindura University of Science Education for providing me with the opportunity to pursue my Bachelor of Science Honours Degree in Natural Resources Management. I am grateful for the resources and facilities made available to me during my studies. Finally, I extend my heartfelt appreciation to my family (Nyasha, Kupakwashe, mom & dad), friends (Shalin & Jairos), and colleagues who have been a constant source of encouragement and motivation throughout this journey.

ABSTRACT

This ethnographic study examines the socio-economic and environmental impacts of traditional salt production in Chibuwe, Zimbabwe. The research employed a mixed-methods approach, including surveys, interviews, and field observations. The data were collected using the Kobocollect toolbox and analyzed using IBM SPSS v27 and Microsoft Excel. The results indicate that women are the primary salt producers in Chibuwe (100% of participants). The majority of participants are married (45.0%) with ages ranging from 20-29 (32.5%) and 40-49 (22.5%). Borehole water is the predominant water source used (57.5%). The most common tools and materials used include buckets (42.5%), hoes (27.5%), and shovels (25.0%). The majority of participants (80.0%) sell their salt directly to the local community, with the remaining 15.0% selling through local shops. The average monthly earnings for salt producers is approximately R532.50. The research also identified significant environmental impacts associated with traditional salt production, including soil degradation (77.5%), deforestation (57.5%), and water pollution (17.5%). However, respondents reported that 52.5% are taking no action to address these issues, while 35% are engaged in filling of pits and 10% are undertaking reforestation efforts. The study recommends promoting sustainable production methods, diversifying livelihood options, implementing land rehabilitation measures, improving market access and development, providing training and education programs, and empowering women salt producers.

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LIST OF ACRONYMS AND ABBREVIATIONS

EMA	Environmental Management Agency
IBM	International Business Machines Corporation
R	Rands
SPSS	Statistical Package for the Social Sciences
ZIMSTAT	Zimbabwe National Statistics Agency

CHAPTER 1

INTRODUCTION

1.1 Introduction

Table salt, also known as sodium chloride (NaCl), has been an essential ingredient in human civilization for thousands of years (Nzaga et al., 2023). Salt, often referred to as the "supreme flavour enhancer," is a widely used ingredient in both everyday diets and the food industry. For centuries, sodium chloride has been employed as a food additive and preservative, significantly enhancing the quality of food by enhancing its texture, safety, and taste (Yang & Wang, 2022).

In today's world, salt continues to be a fundamental ingredient in food preservation practices. Its osmotic effect and ability to reduce water activity play a critical role in inhibiting microbial growth and extending the shelf life of various food products (Amadu, 2019). Table salt is widely used in curing and pickling processes, where it imparts flavour, removes moisture, and prevents spoilage (Schnebele & Braunstein, 2021). Additionally, it is a key component in the fermentation of foods, aiding in the preservation and development of unique flavours. With its natural preservative properties and ability to enhance taste, salt remains indispensable in ensuring food safety and maintaining the quality of preserved food items (Plaiphum & Tansuchat, 2023).

1.2 Background

Table salt production has been an important economic activity for many communities around the world for centuries (Nirwansyah et al., 2022). Traditional methods of salt production, such as solar evaporation of saltwater in ponds or basins and boiling of brine have provided livelihoods and sustenance for generations (Nzaga et al., 2023). The socio-economic importance of traditional salt production cannot be overstated, as it has been shown to be a crucial source of income, food security, and cultural identity for many marginalized communities (Kobayashi et al., 2013). However, the long-term sustainability of these traditional practices have been called into question, as they can have significant environmental impacts on ecosystems (Adounkpe et al., 2021). The environmental consequences of salt

production, such as habitat destruction, soil salinization, and pollution, threaten the long-term viability of these communities and the natural resources they depend on (Elizarov et al., 2023).

The rural community of Chibuwe, located in south-eastern Zimbabwe (Sithole et al., 2023), has a long-standing tradition of salt production from the region's clay-rich soils. The origins of salt production in Chibuwe remain obscure, lost in the passage of time. However, the significance of this practice within the community's culture is undeniable. The knowledge and skills associated with extracting salt from clay pits, leaching the brine, and boiling it down to crystals, have been passed down through the generations, forming a crucial part of the community's cultural and social fabric (Marufu, 2022). Rituals and beliefs are interwoven with the production process, reflecting a deep-seated connection between the people of Chibuwe and the land they inhabit and its natural resources (Chiruvo, 2021).

While traditional salt production offers substantial benefits to communities, concerns about its potential environmental impact are emerging (Henn et al., 2022). Repeated extraction of clay can lead to soil salinization, reducing its fertility for agriculture (Shi, et al., 2021). The use of firewood for boiling brine raises concerns about deforestation and its impact on the local ecosystem (Balde, 2020). Additionally, brine runoff can potentially contaminate water sources, impacting the community's access to clean water (Maziri et al., 2017).

Demographic factors significantly impact traditional salt production, with studies carried by (Iwuchukwu et al., 2021) highlighting the importance of age, gender, ethnicity and education. Younger salt producers tend to adopt innovative technologies and sustainable practices, while older producers tend to adhere to traditional methods (Marques et al., 2009). According to Bhattacharya *et al.*, (2018) gender dynamics also play a crucial role as women’s involvement in traditional salt production influence household decision making and income allocation.

Understanding the complex dynamics between tradition, livelihoods, and the environment in Chibuwe requires a multifaceted approach. This ethnographic study, through in-depth interviews, observations, and active participation in the community, aims to unveil the lived experiences of the Chibuwe people. By immersing oneself in their cultural context, one can gain deeper insights into the economic realities and environmental concerns associated with traditional salt production.

1.3 Problem Statement

Traditional salt production in Chibuwe, Zimbabwe, has been practiced for generations, providing a vital source of income and cultural identity for the community. However, concerns are emerging about the potential socioeconomic and environmental impacts of these practices. This study aims to investigate these concerns through an ethnographic approach, examining the traditional salt production methods, their economic contributions to the community, and their potential environmental consequences. By understanding these complex dynamics, the study seeks to identify sustainable solutions that can ensure the continued viability of traditional salt production while minimizing negative impacts on the community and environment.

1.4 Aim of the Study

To investigate the socio-economic and environmental impacts of traditional salt production in Chibuwe, Zimbabwe.

1.5 Research Objectives

To examine the stages of traditional salt production methods in Chibuwe.

To assess the socio-economic and environmental impacts of traditional salt production

To investigate potential sustainable salt production practices.

To investigate the relationship between demographic characteristics and salt production activities of traditional salt producers in Chibuwe.

1.6 Research questions

1. What are the various stages involved in traditional salt production in Chibuwe?
2. What is the economic contribution of traditional salt production to household income in Chibuwe?
3. What are the potential impacts of salt production on the environment?
4. What are the most environmentally sustainable and economically feasible methods for producing salt?

1.7 Significance of the Study

There is lack of comprehensive research on traditional salt production in Chibuwe, particularly regarding its socio-economic and environmental dimensions. Existing studies often focus on

larger-scale salt production or modern industrial methods (Schnebele & Braunstein, 2021), leaving a significant gap in knowledge about the traditional practices specific to this region. Therefore, this study is necessary to fill this gap and contribute to a better understanding of the local salt production industry.

More so, assessing the environmental impacts of traditional salt production methods is crucial for promoting sustainable practices. The study can provide insights into potential negative effects on the ecosystem, such as land degradation, water pollution, and impacts on biodiversity. By identifying these challenges, the research can propose sustainable practices to mitigate these impacts and ensure the long-term viability of salt production in Chibuwe. This will contribute to the broader goal of sustainable development and environmental conservation.

Additionally, salt production often holds cultural and social importance within communities. Conducting an ethnographic study can help document and preserve the cultural practices, traditions, and knowledge associated with salt production in Chibuwe. By exploring the social and cultural aspects of salt production, the research can shed light on its role in local customs, rituals, and social interactions. This documentation contributes to cultural preservation efforts and fosters a sense of pride and identity among community members. Moreover, it can help raise awareness about the significance of traditional salt production and its cultural heritage among the wider population.

1.8 Scope of the Study

The study will examine the economic significance of salt production in Chibuwe, focusing on income generation, employment opportunities, and market dynamics. It will explore the role of salt production in the local economy and its contribution to the livelihoods of the community. More so, the study will assess the environmental impacts of traditional salt production methods, including land degradation, water pollution, and effects on biodiversity. It will identify potential challenges and propose sustainable practices to mitigate negative environmental consequences. An ethnographic investigation will be conducted into the cultural and social aspects of salt production in Chibuwe. It will document the cultural practices, traditions, and social interactions associated with salt production, aiming to preserve and promote the cultural heritage of the local community.

1.9 Limitations of the Study

Due to resource constraints, the study may have a limited sample size, focusing on a specific group of salt producers. The findings may not be representative of the entire salt production industry in Chibuwe or applicable to other regions with different contexts. In addition, conducting an ethnographic study requires significant time and resources. The study may face limitations in terms of the duration of data collection and analysis, which could impact the depth and breadth of the findings.

Furthermore, ethnographic research involves close interaction and interpretation by the researcher. There is a potential for subjectivity and bias in data collection, interpretation, and analysis, which may affect the objectivity of the study's findings. There is also a chance that the study may be influenced by external factors such as changes in government policies, market dynamics, or environmental conditions. These factors could impact the accuracy and relevance of the study's findings.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter delves into the existing scholarship on traditional salt production, specifically focusing on its socioeconomic and environmental implications. By examining previous studies and identifying existing knowledge gaps, this review aims to pave the way for a comprehensive understanding of this practice and its multifaceted effects. Existing literature provides valuable insights into the cultural significance and economic benefits associated with this practice.

2.2 Traditional Salt Production Techniques and Methods

Salt can be extracted from various sources such as salt rocks, brine springs, salt pans and seawater (Metwally et al., 2022). Traditional salt production methods used includes the evaporation and concentration method. The evaporation method is when saline water is allowed to be heated by the sun, evaporating the water and leaving salt behind (Yankowski, 2007). On the other hand, the concentration method involves accumulation of salt water in a pond (salt beds) for a number of day, for example 7 days (Yankowski, 2007). As the water evaporates, the salt crystals are left behind on the surface of the soil. These crystals are then collected using rakes or other simple tools (Duncan, 2023). These methods are done during the warm and dry season, to allow maximum evaporation by the sun.

Another technique that is used by traditional salt producers is through cooking salt (Adounkpe et al., 2021). This method involves the use of fire to evaporate the salt water, by direct fire evaporation of brine in pottery vessels, leaving salt crystals behind. In other countries salt can be extracted by the burning of salt containing plants and using their ashes as salt (Barker et al., 2017).

In regions where rivers only flow during the rainy seasons, rather than being perennial, the local people have developed a unique technique to extract salt (Khayrulina et al., 2022). During the dry periods when the riverbeds are exposed, the residents collect the salt-containing soil from the riverbed. They then mix this soil with water to create a brine solution (Nzaga et al., 2023). This brine is then filtered to remove any impurities or sediment, leaving behind a

concentrated salt solution. Finally, the filtered brine is subjected to evaporation, that is through solar method or the cooking or boiling method, where the water gradually evaporates away, leaving behind the crystallized salt (Lwanyaga, 2013).

2.2 Environmental Impacts of Traditional Salt Production

2.2.1 Impacts on Vegetation

One of the most evident impacts of traditional salt production is deforestation. Vast majority of cooking salt harvesters uses wood for salt water evaporation (Adounkpe et al., 2021). In most coastal areas where traditional salt cooking is practised, there is notable decrease of mangrove as they are used as a source of firewood (Adounkpe et al., 2021). Mangroves serve as a vital habitat for a diverse range of terrestrial and aquatic animals, many of which hold economic significance. These include shrimps belonging to the *Penaeus* genus, crabs of the *Scylla* and *Uca* species, Crassostrea oysters, and numerous species of marine fish (Ocholla et al., 2013).

According to Ocholla (2013), vegetation serves as crucial resources for the local communities, providing them with food, herbal medicine, and serving as grazing land for their livestock. These functions were essential for supporting the livelihoods of the local people. The destruction of vegetation is strongly associated with climate change factors such as increase in temperature, reduction in rainfall and the rise in sea levels that generally affects livelihood (Butsch & Heinkel, 2020). According to Iwuchukwu et al., (2021) the limited availability of funds or inadequate access to alternative energy sources may be a contributing factor leading communities to rely on this method of salt production. The utilization of solar dryers helps decrease the use of firewood, leading to environmental conservation (Nzaga et al., 2023).

However, traditional salt production methods often utilize renewable and natural resources, such as soil, sand, bamboo, and coconut trees (Rochwulaningsih et al., 2019). These methods are generally less harmful to the environment compared to industrial-scale salt production. By relying on local resources and sustainable practices, traditional salt production can contribute to the conservation of coastal ecosystems (Rochwulaningsih et al., 2019).

2.2.2 Impacts on Wildlife.

Traditional salt production methods often involve the creation of saltpans or ponds, which result in the modification or destruction of natural habitats. This can disrupt the ecosystems that support wildlife, including their feeding, breeding, and nesting grounds (Kasedde, 2013). Wildlife species are displaced and disturbed by the presence of salt production infrastructure, human activities, and associated noise and disturbance(Yani et al., 2019). This can disrupt their natural behaviour patterns and leads to population declines or local extinctions (Butsch & Heinkel, 2020). Traditional salt production in Kenya has a significant impact on endangered birds. According to BirdLife International, one species in the area is globally endangered, five are globally threatened, and 33 are listed as endangered in the Regional Red Data list (Ocholla et al., 2013).

2.2.3 Impacts on Water Resources and Aquatic Species

The traditional salt production processes have an impact on aquatic species by altering the natural dynamics of water bodies (Götzfried & Gaude, 2021). In lakes, for example, saltwater, being denser than freshwater tends to sink to the bottom. As a consequence, the deeper layers of the water become depleted of oxygen, leading to the gradual disappearance of organisms that depend on oxygen (Götzfried & Gaude, 2021). Species that can tolerate high salinity and low oxygen conditions become dominant in these environments (Helmi & Sasaoka, 2018). Thus, the salt production processes disrupt the ecological balance and favour the survival of species adapted to salinity and anoxia, while negatively impacting other aquatic organisms (Götzfried & Gaude, 2021). In addition, salt brine leakages into water bodies poses risk of cellular dehydration for organisms (Schnebele & Braunstein, 2021). This can result in the death of the most sensitive organisms and microorganisms, as they struggle to maintain the balance of water and salts within their cells (Götzfried & Gaude, 2021).

The destruction of mangroves caused by traditional salt production has a detrimental impact on various fish species (Adounkpe et al., 2021).While some fish species prefer deeper waters as adults, many rely on mangrove habitats for crucial purposes such as feeding and providing a nursery environment for their young. These species often spend their early developmental stages within the mangrove ecosystem, benefiting from the shelter, safety, and abundant food resources that this habitat offers (Ocholla et al., 2013).

Contaminants such as heavy metals or pollutants from salt extraction processes can leach into groundwater or surface water sources, posing health risks to both humans and wildlife that come into contact with these contaminated waters (Elizarov et al., 2023). Small-scale salt production activities impact the hydrology of an area by altering the flow of water within the ecosystem (HeruSusanto et al., 2015). Extraction processes that involve diverting or using large quantities of water can reduce the availability of water for other purposes, including agricultural irrigation or domestic use (Yani et al., 2019).

2.2.4 Impacts on Land Resources

Small scale, traditional salt production leads to the accumulation of salts in the soil, which result in soil salinization (Elizarov et al., 2023). Excessive salt accumulation in the soil makes it unsuitable for most crops, leading to reduced agricultural productivity and loss of fertile land (Metwally et al., 2022).Traditional small-scale salt production activities compete with other land uses such as agriculture, tourism, or conservation efforts. This can lead to conflicts over land tenure, resource allocation, and environmental management (Ekrami et al., 2021). In coastal regions, traditional salt production involves the construction of shallow evaporation ponds or salt pans. Over time, the continuous extraction of salt can lead to land subsidence, where the land sinks or settles due to the removal of underground brine or water (Tijani & Loehnert, 2004). Land subsidence can result in the loss of land productivity, increased vulnerability to flooding, and damage to infrastructure (Yankowski, 2007).

2.3 Socio-economic Impacts of Traditional Salt Production

One of the significant benefits of traditional small-scale salt production is the creation of employment opportunities for local people (Kobayashi et al., 2013). This type of activity often requires manual labour, providing jobs for individuals in the community who may not have access to other forms of employment (Kobayashi et al., 2013). Engaging in salt production can also serve as a source of income for local communities. Selling salt products can generate revenue that supports households and contributes to the local economy (Iwuchukwu et al., 2021). In addition to this, traditional salt production can contribute to community development by fostering cooperation among community members (Tran et al., 2022).

Traditional salt production contributes to preservation of cultural heritage. In regions where traditional salt production methods have been practiced for generations, engaging in this activity helps preserve cultural heritage and traditional knowledge (Kobayashi et al., 2013) . It maintains a connection to the past and promotes cultural identity. The active participation of elderly individuals in salt production has played a crucial role in transferring traditional processing techniques to the younger generation (Nzaga et al., 2023). Older salt producers take on the responsibility of providing on-the-job training to younger individuals, effectively passing down their knowledge and expertise. This intergenerational exchange ensures the preservation and continuity of traditional salt production methods (Nzaga et al., 2023).

The historical utilization of salt for various medicinal purposes, such as alleviating stomach-aches, fever blisters, pain, swelling, mosquito bites, and promoting relaxation through foot soaks, highlights its significant role in traditional healthcare, in addition to its well-known function of preventing dehydration (Barker et al., 2017). The diverse range of its applications underscores the necessity of a dependable salt source, which traditional production techniques offered.

2.4 Challenges and Constraints Faced by Traditional Salt Producers

According to the artisanal salt producers, one major challenge confronting artisanal salt production is, weather (Tutu et al., 2024).Traditional salt production heavily relies on weather conditions, particularly sunlight and temperature. Climate change and unpredictable weather patterns can disrupt the production process and reduce salt yields (Bhattacharya et al., 2018). Traditional salt producers often lack government support in terms of developing post-harvest technology, ensuring salt quality, and increasing capital (VeraFiles, 2023). This lack of support hampers their ability to improve their production methods and compete in the market.

Traditional salt producers often struggle to access wider markets due to limited distribution networks and marketing capabilities (Syafii et al., 2018). This can restrict their ability to sell their products and generate higher profits. More so, they face challenges in accessing research and development support to improve their production techniques, enhance salt quality, and explore new market opportunities(Iwuchukwu et al., 2021). Unavailability of iodine is another challenge which salt farmers face, hence selling non-iodized salt (Tutu et al., 2024).

2.5 Policies and regulations related to salt production by EMA

Based on the Environmental Management Act of Zimbabwe, the Environmental Management Agency (EMA) has responsibilities and powers related to water pollution, land degradation, and deforestation:

The Act establishes water pollution standards and requires a license to discharge effluents (Sections 57-62). EMA can regulate and enforce these standards to prevent water pollution. For land degradation, the Act empowers EMA to set standards for waste management and prohibit the discharge and disposal of wastes (Sections 69-70). EMA can also take action against the degradation of wetlands, which are protected under the Act (Section 113). Regarding deforestation, the Act allows the President to set aside state land or acquire other land for environmental purposes, including the protection of forested areas (Sections 109-110). Additionally, the Act has provisions to control the spread of invasive alien species, which can contribute to deforestation (Sections 118-127).

2.6 Solutions for sustainable salt production

Solar evaporation systems can the sun's energy to evaporate water and produce salt. These systems can be designed with salt-rejection capabilities and enhanced water production efficiency, resulting in higher evaporation rates and reduced energy consumption (Valle, 2023). Implementing eco-friendly practices help reduce environmental impact and this includes using renewable energy sources like solar power for evaporation processes and minimizing water usage through efficient techniques(Tutu et al., 2024).

Iodine deficiency disorders can be effectively addressed by iodizing salt (Amadu, 2019). Nutrition International proposes iodizing small-scale salt producers as a solution to universal salt iodization. This approach ensures that iodized salt is accessible, permanent, and effective in iodine-deficient areas (WHO, 2020). More so, measures to protect local biodiversity and wildlife habitats around salt production sites is vital for sustainability. Creating buffer zones, preserving natural vegetation, and monitoring wildlife populations can help mitigate the impact on ecosystems. (Yani et al., 2019). Engaging with stakeholders including government agencies, environmental organizations, and industry partners can foster knowledge sharing, innovation, and collective efforts towards sustainable small-scale salt production (Nirwansyah et al., 2022).

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter provides a detailed description of the methodology used in conducting the ethnographic study on the socio-economic and environmental impacts of traditional salt production in the Chibuwe area of Zimbabwe. The chapter outlines the study area, research design, data collection methods, sampling techniques, data analysis procedures, and ethical considerations.

3.2 Description of the Study Area

Chibuwe area in Ward 20 of Chipinge District, Manicaland Province, experiences subtropical climatic conditions. The area lies between latitude 20°27'23.9"S and longitude 32°18'46.3"E and is found in the south-eastern low-veld of Zimbabwe, specifically in the Save Valley (Sithole et al., 2023). The mean annual rainfall is about 550 mm with an annual temperature range of 18 to 35°C (Mashapa et al., 2019). The area is representative of the semi-arid deciduous African savannah and is characterized by prevalent vegetation types, including *Colophospermum mopane* and *Acacia* woodland (Mashapa et al., 2019). The region typically has hot summers and mild winters. Rainfall is abundant during the summer months, with the wet season usually lasting from November to March, and bringing lush greenery to the region. On the other hand, August is the driest month, with only 3.11mm of rainfall, creating a drier and arid landscape. The general soil composition in the area consists of alluvial soils characterized by deep grayish brown sandy loams and clay loams layered over brown sandy clay loams or sandy clays (Sithole et al., 2023). These soils contains salt (Calcium Carbonate) which are a result of weathering of salt containing rocks and leaching of saline water deep into these soils. According to the census report of 2022, Chibuwe (Ward 20) has a total population of 21,267 and 4,837 households (ZIMSTAT, 2022). The major economic activities found in

the area includes subsistence farming which is practised under the Chibuwe Irrigation Scheme (Sithole et al., 2023), livestock production and salt production.

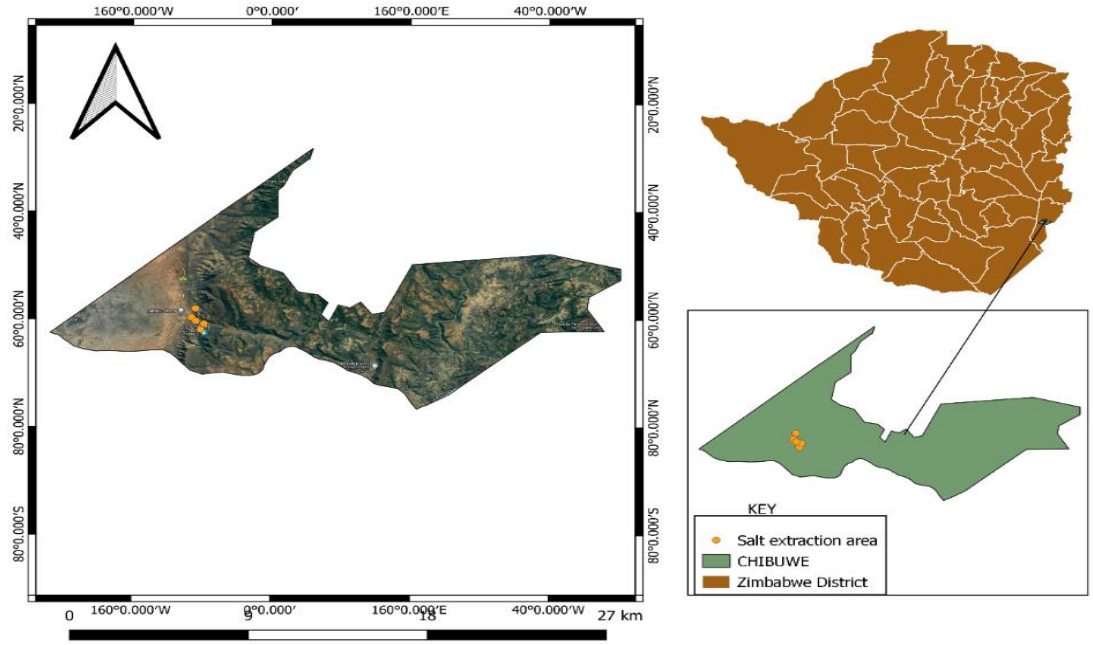

Figure 3.1 showing the study area of Chibuwe, Ward 20

3.3 Research Design

The research design chosen for this study was ethnographic research. This design allowed for an in-depth exploration of the social and environmental impacts of traditional salt production in Chibuwe Area, Ward 20. Ethnography involves immersing oneself in the community being studied, observing and interacting with participants, and collecting data through various methods. By adopting this approach, the researcher aimed to gain a holistic understanding of the subject matter within its cultural and social context.

3.4 Sampling

The study employed snowball sampling as the sampling technique for participant selection. This non-probability sampling method was chosen due to the specific nature of the research, which required identifying individuals with knowledge and experience in traditional salt production.

The sample size consisted of 40 participants out of 120, all of whom were salt producers. This deliberate focus on interviewing salt producers was essential to gain in-depth insights into their perspectives, practices, and experiences related to traditional salt production. By exclusively interviewing salt producers, the aim was to capture a comprehensive understanding of the social and environmental impacts associated with this specific group's activities.

The sample size of 40 salt producers was considered appropriate for the aims of the study and allowed for a detailed exploration of the socio-economic and environmental dimensions of salt production in Chibuwe Area.

3.5 Data Collection

The Kobocollect toolbox was selected as the data collection tool due to its efficiency and standardization features. This digital data collection tool streamlined the process of gathering information from participants in a structured manner. The use of digital questionnaires ensured consistency in data collection and facilitated data entry and management.

During the data collection phase, face-to-face interviews were conducted with the participants, and each interview lasted a minimum of 20 minutes. These interviews provided an opportunity for the researcher to engage directly with the participants, ask follow-up questions, and gain deeper insights into their perspectives on traditional salt production in Chibuwe Area. Semi-structured questionnaires (Appendix 1) were specifically developed for this study to capture a wide range of information related to traditional salt production in Chibuwe Area. The questionnaires (Appendix 1) consisted of a combination of open-ended and closed-ended questions, enabling the collection of both qualitative and quantitative data. The open-ended questions allowed participants to provide detailed and nuanced responses, while the closed-ended questions provided structured data for statistical analysis.

The questionnaires (Appendix 1) were designed to explore various aspects of traditional salt production, including social practices, environmental impacts, community perceptions, and economic aspects. To ensure confidentiality, the questionnaires (Appendix 1) used in the study were anonymously coded from number 1 to 40. This coding system allowed for the identification and organization of responses while maintaining the privacy of the participants.

Anonymity was crucial in creating a safe and open environment for participants to express their views and experiences without fear of judgment or repercussions.

The Kobocollect toolbox offered several advantages, such as enhanced efficiency, accuracy, and standardization. It allowed the researcher to design and administer the questionnaires in a structured manner, ensuring consistency across all interviews. The digital format also facilitated easier data entry and management, reducing the chances of errors during transcription. The utilization of the Kobocollect toolbox not only enhanced the efficiency of data collection but also contributed to the overall quality of the study. By adopting a digital approach, the researcher minimized the risk of data loss or misplacement, ensuring the integrity and reliability of the collected information.

3.6 Data Analyses

The collected data were subjected to analysis using International Business Machines Corporation (IBM), Statistical Package for the Social Sciences (SPSS) v27, a statistical analysis software. This software facilitated the organization, cleaning, and statistical analysis of the data collected from the semi-structured questionnaires. By employing statistical analysis techniques, the researcher aimed to derive meaningful insights and identify patterns and trends in the data.

Quantitative data obtained from closed-ended questions were analysed using descriptive statistics, such as frequencies, percentages, and measures of central tendency. Additionally, the chi-square test was used to assess the statistical significance of the relationships between categorical variables. The chi-square test was employed to determine if there were any significant associations between the socio-economic or environmental factors and the traditional salt production practices.

Qualitative data obtained from open-ended questions were analysed using thematic analysis. To analyse the open-ended questions, the researcher employed thematic analysis, which involved a systematic process of identifying recurring themes and patterns in the participants' responses. The analysis steps included reviewing the raw responses, preliminary data coding using deductive and inductive codes, grouping codes into categories, identifying emerging attributes, and drawing conclusions to form a narrative. This analysis process helped the

researcher gain a deeper understanding of the socio-economic and environmental impacts of traditional salt production, as expressed by the participants.

Furthermore, Microsoft Excel was utilized to organize and visualize the data. Spreadsheets were used to input and clean the data, calculate descriptive statistics, and create various charts and graphs to aid in the interpretation and presentation of the research findings. The combination of SPSS for statistical analysis, the chi-square test for assessing the significance of relationships, thematic analysis for qualitative data, and the use of Excel for data organization and visualization provided a comprehensive approach to analysing the data and deriving meaningful insights from the research.

3.7 Ethical Considerations

All participants provided voluntary and informed consent. Comprehensive information regarding the purpose, nature, and potential risks and benefits of the study was provided to the respondents. Participants were fully informed of their rights to participate, withdraw, or refuse without facing any negative consequences. Moreover, measures were taken to protect the privacy and anonymity of individuals and communities. Pseudonyms were assigned to participants, and personal or sensitive information shared during the study was securely stored. Furthermore, the study was approached with cultural humility and sensitivity, demonstrating respect for the cultural norms, traditions, and practices of the Chibuwe community. Guidance was sought from local stakeholders and community members to ensure that research methods and interactions were appropriate and aligned with the values of the community.

CHAPTER 4

RESULTS

4.1 Demographic information

The salt farmers in Chibuwe are female and the age range is diverse, with the largest groups falling in the 20-29 and 40-49 age ranges. The majority of participants are married, followed by single and widowed individuals. The level of education varies, with the most common being O' Level and ZJC qualifications as shown in Table 4.1.

Table 4.1 Demographic information of participants

Variable	Category	Frequency	Percentage
Gender	Female	40	100.0%
Age	20-29	13	32.5%
	40-49	9	22.5%
	60+	8	20.0%
	30-39	6	15.0%
	50-59	4	10.0%
Marital Status	Married	18	45.0%
	Single	12	30.0%
	Widow	9	22.5%
	Divorced	1	2.5%
Level of Education	O' Level	15	37.5%
	ZJC	13	32.5%
	Primary	9	22.5%
	Tertiary	2	5.0%
	A' Level	1	2.5%

4.2 The methods, materials, tools and stages involved in the salt production process.

4.2.1 Stages involved in the salt production process

Figure 4.1 outlines the key stages of traditional salt production, with the identification of salt-rich soil, extraction of soil and evaporation of brine being the most critical steps, which over 80% of the salt farmer do. The later stages, such as drying, packaging, and grinding, have lower percentages compared to the initial extraction and evaporation stages, but they are still important components of the overall salt production process

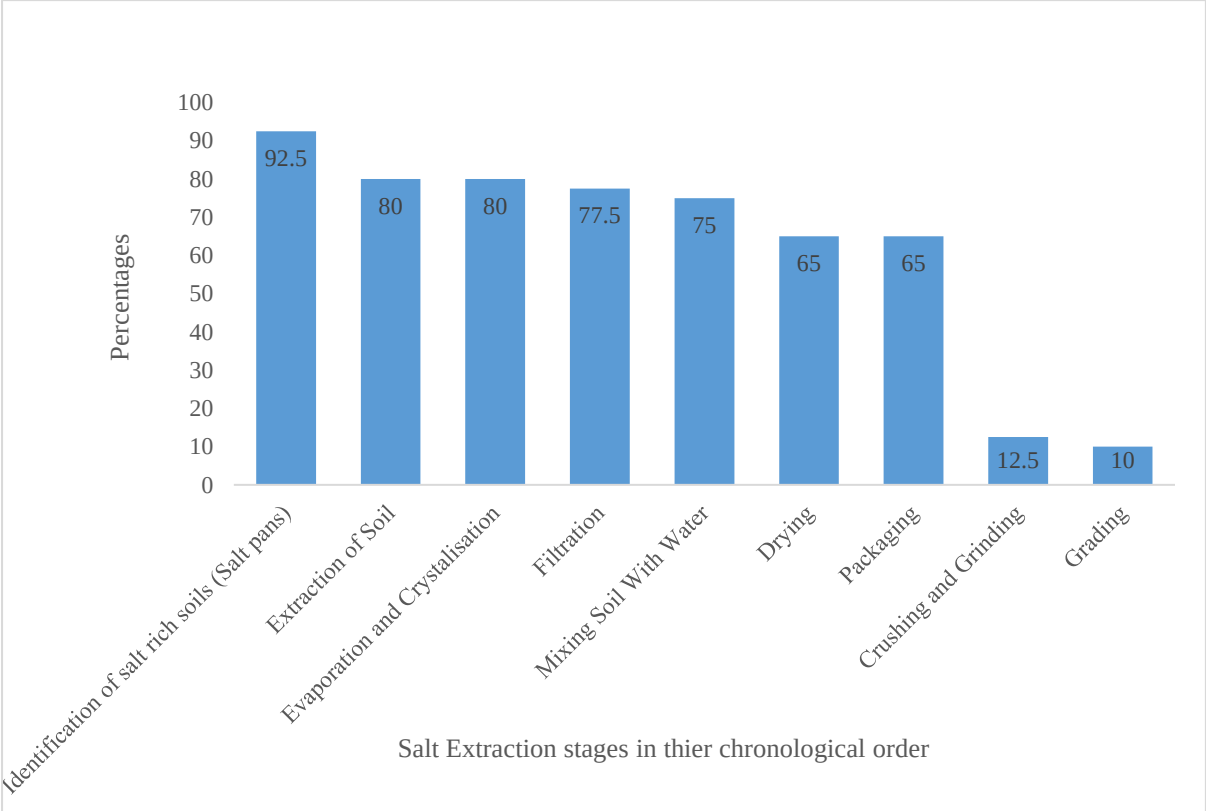

Figure 4.1 showing the stages involved in the salt production process in Chibuwe.

4.2.2 Type of water used during salt processing.

The results (table 4.2) reveals that borehole water is the predominant water source utilized by the traditional salt producers in the Chibuwe area, accounting for 57.5% of the total water sources employed. In contrast, rainwater and well water are the least commonly used,

comprising only 2% of the total type of water used. These findings indicate that borehole water is the primary and most accessible water resource leveraged by the traditional salt producers in the Chibuwe community for their salt extraction and processing activities

Table 4.1 showing the type of water used in the salt production process

Type of water used	Percentage
Borehole water	57.5
Stream Water/River water	15
Any water	15
Well Water	2
Rain Water	2

4.1.3 Material and tools used in the salt production process

Salt farmers in Chibuwe utilised different types of tools and materials during the production process. These tools and materials as shown in table 4.3 were either traditionally made or obtained from the local environment. The high frequency of buckets, dishes, hoes, and shovels suggests that these are the core components and tools used in the traditional salt production process. The presence of combustible materials like firewood and cooking sticks indicates the importance of heat and evaporation in the salt extraction and processing activities.

Table 4.2 showing the materials used the salt production process.

Tools and materials	Percentage
Buckets	42.5%
Hoes	27.5%
Shovels	25.0%
Evaporating dishes	20.0%
Dishes	17.5%
Cooking sticks	12.5%
Firewood	12.5%
Sacks	12.5%
Plastics	10.0%
Clay pots	7.5%
Drums	7.5%
Picks	7.5%
Fire	2.5%
Knives	2.5%
Pans	2.5%
Salt soil	2.5%
Sand	2.5%

Sieves	2.5%
Tractor disks	2.5%
Trays	2.5%
Water	2.5%
Wheelbarrows	2.5%

4.1.4 Time taken to evaporate brine

Figure 4.2 shows that the majority (47%) complete the evaporation of brine within 1-2 hours, with a significant portion (33%) taking 2-3 hours. A smaller percentage require more than 3 hours or less than 1 hour for the evaporation process.

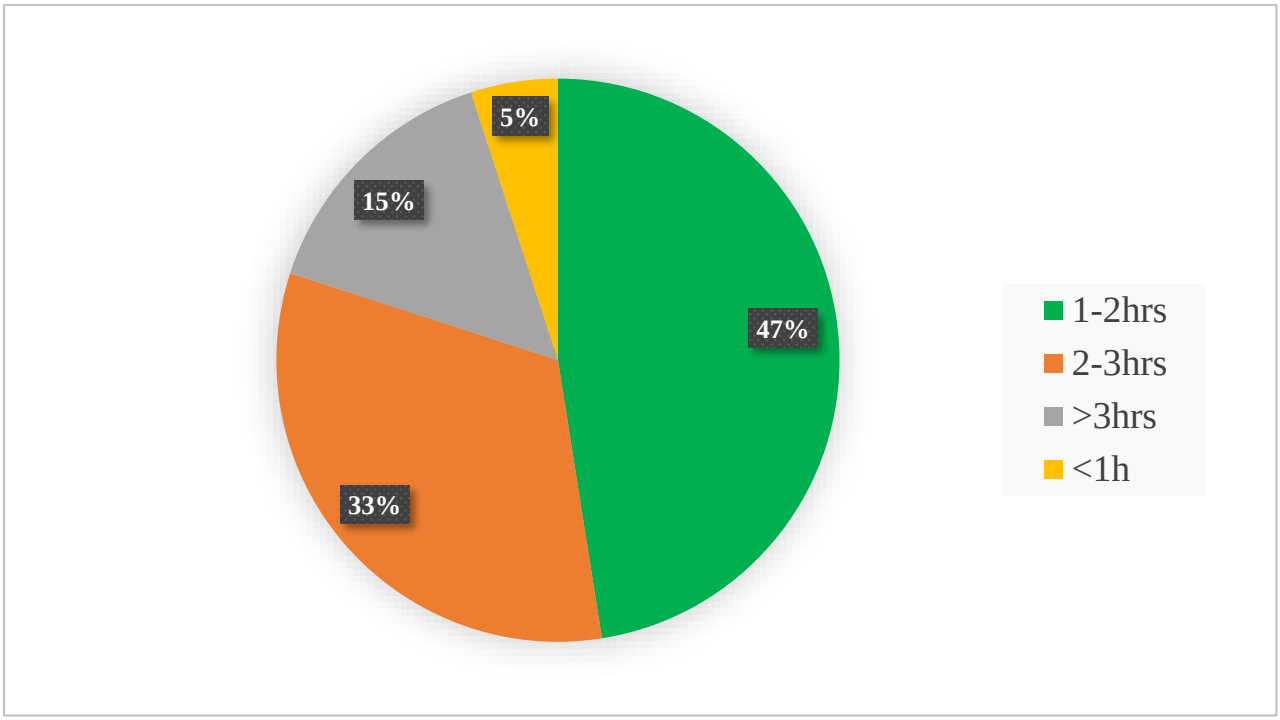

Figure 4.2 showing the frequency (in percentages) of the time taken by salt producers to evaporate brine

4.1.5 Time taken to dry produced salt

The data in figure 4.3 indicates that the majority of salt producers (82.5%) dry the salt for either two or three days as part of their traditional methods. A smaller proportion require four days or just a single day for the drying process.

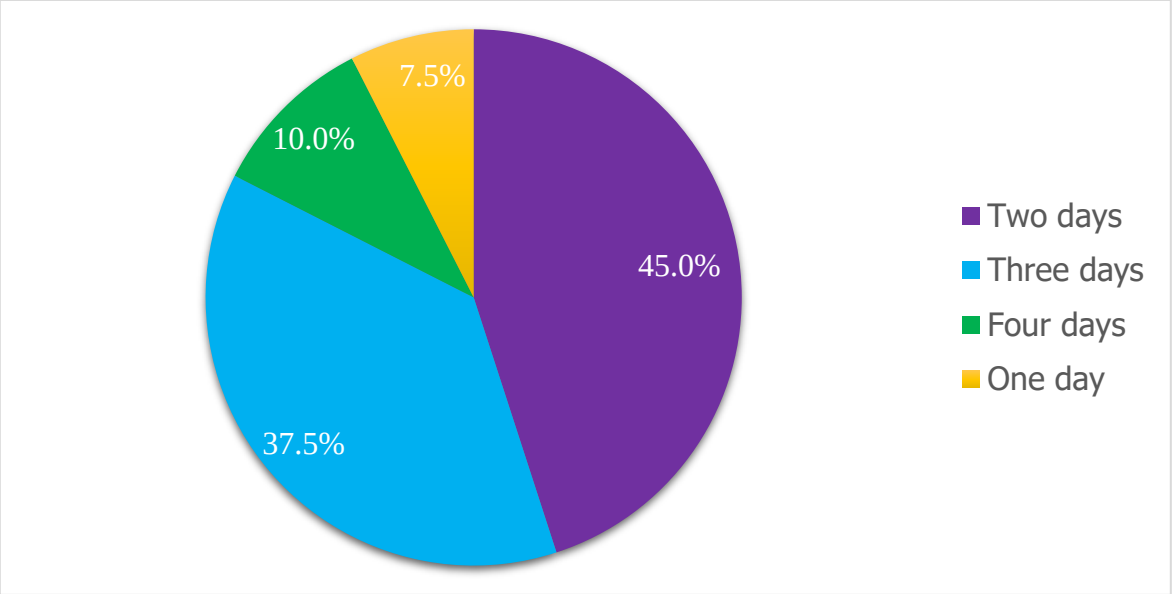

Figure 4.3 showing the time (in days) taken to dry the produced salt before selling it.

4.1.6 Salt produced by salt farmers per day.

As shown in table 4.4, the majority (80.0%) fall within the 2-4 buckets per day range, indicating a typical production level, a significant portion (15.0%) exceeds 5 buckets per day.

Table 4.3 showing the quantity of salt produced per day

Salt produced per day	Percentage
2 buckets	37.5%
3 buckets	22.5%
4 buckets	20.0%
Above 5	15.0%
5 buckets	5.0%

4.2 The Social and economic aspects of traditional salt production in Chibuwe

4.2.2 Sources of labour for salt extraction

The data in figure 4.5 shows that the primary source of labour is children, represented by the largest bar, indicating their significant involvement in the salt extraction process. The next

major source is self-labour, where individuals participate directly in the salt production activities. The smallest portion of the labour force is comprised of employed workers, who are hired to assist in the salt production operations.

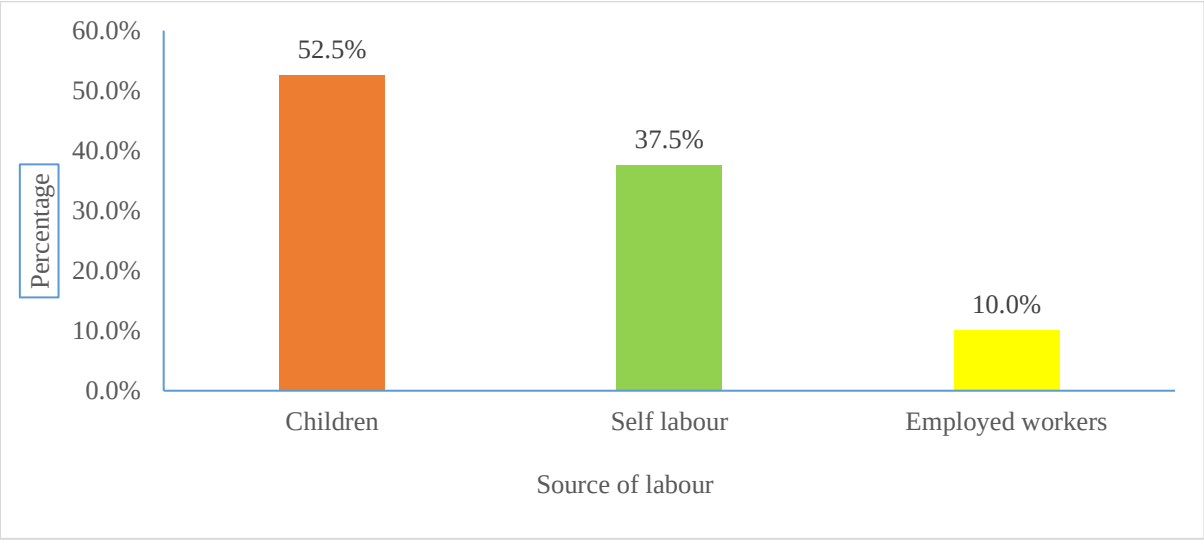

Figure 4.4 showing the Sources of Labour in Traditional Salt Production

4.2.3 Marketing of produced salt

Table 4.5 shows that the majority of salt produced (80.0%) is sold directly to the local community, while a smaller portion (15.0%) is sold through local shops. Additionally, a small percentage (5.0%) is retained for domestic consumption.

Table 4.4 showing the markets for the produced salt.

Market	Percentage
Local Community	80.0%
Local Shops	15.0%
Domestic Consumption	5.0%

4.2.4 Cost of processed salt

The price range for the salt sold by the producers spans from a minimum of R5 per kg to a maximum of R40 per kg, with the most common price point being R10 per kg, which is reported by 35.0% of the participants as shown in figure 4.6.

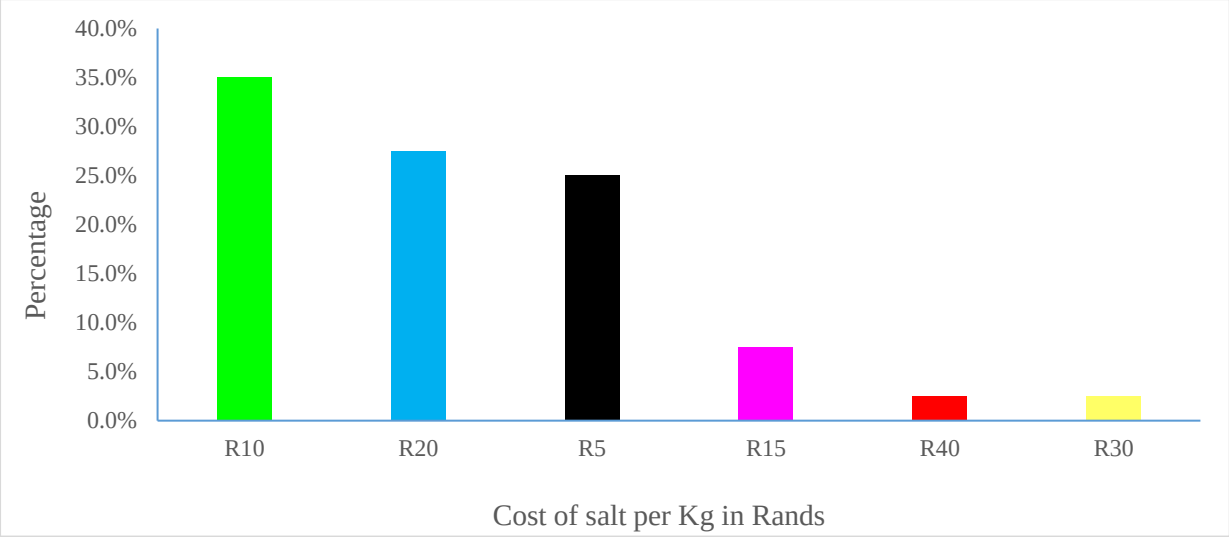

Figure 4.6 showing the Pricing of Salt by Producers

4.2.5 Income Distribution of Salt Producers

The data in Figure 4.7 shows that the majority of salt producers (22.5%) earn around R300 per month, while the smallest groups, each at 7.5%, earn higher amounts of up to R1200 per month. The average monthly earnings across the community is approximately R532.50, suggesting a need to explore ways to improve the overall economic outcomes for salt producers.

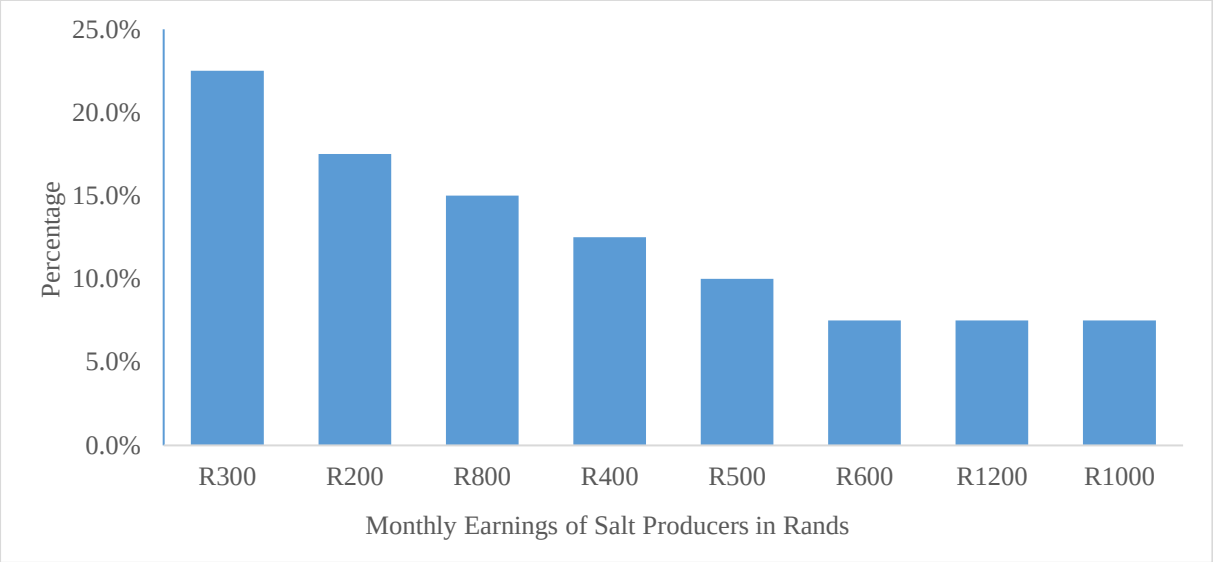

Figure 4.7 showing earnings breakdown of salt industry participants

4.2.6 Challenges faced by salt producers.

The main challenge faced by salt producers is competition from industrial producers, affecting 77.5% of them as shown in Table 4.6.

Table 4.5 showing challenges faced by salt producers

Challenge	Percentage
Competition from industrial salt producers	77.5%
Limited access to markets	57.5%
Lack of storage facilities	22.5%
Price fluctuations	17.5%

4.3 The environmental impacts of traditional salt production

4.3.1 Energy sources used for salt cooking

The salt farming industry appears to have a strong reliance on firewood as its primary energy source, with a 100% utilization of this renewable biomass. Complementing the *Mopane* and *Acacia* are smaller amounts of Musasa (*Brachystegia spiciformis*) wood, which make up 9.3%

of the firewood used. This suggests the availability or convenience of this particular wood species in the area.

Table 4.6 showing type of fuel used for cooking salt

Source of Energy	**Percentage**
Firewood	100
Type Of Fire wood	**Percentage**
Acacia	37.0%
Mopane	38.5%
Musasa	9.3%
Others	15.2%

4.3.2 Environmental impacts of salt production in Chibuwe

The respondents acknowledged that salt production leads to significant environmental issues in the community. Soil degradation and deforestation were the most prevalent issues, affecting the community. Water pollution and disturbance of local ecosystems were also identified as significant concerns as shown in figure 4.8.

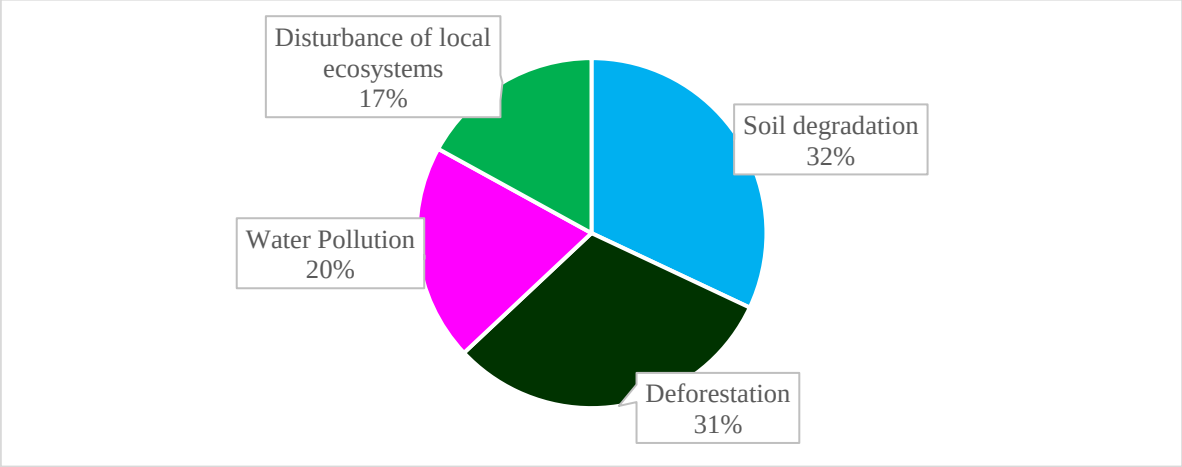

Figure 4.8 showing the impacts of salt production on the environment

4.3.3 Land rehabilitation measures

The respondents reported that 52.5% are taking no action, while 35% are engaged in filling of pits and 10% are undertaking reforestation efforts to rehabilitate land damaged by salt production as shown in figure 4.9.

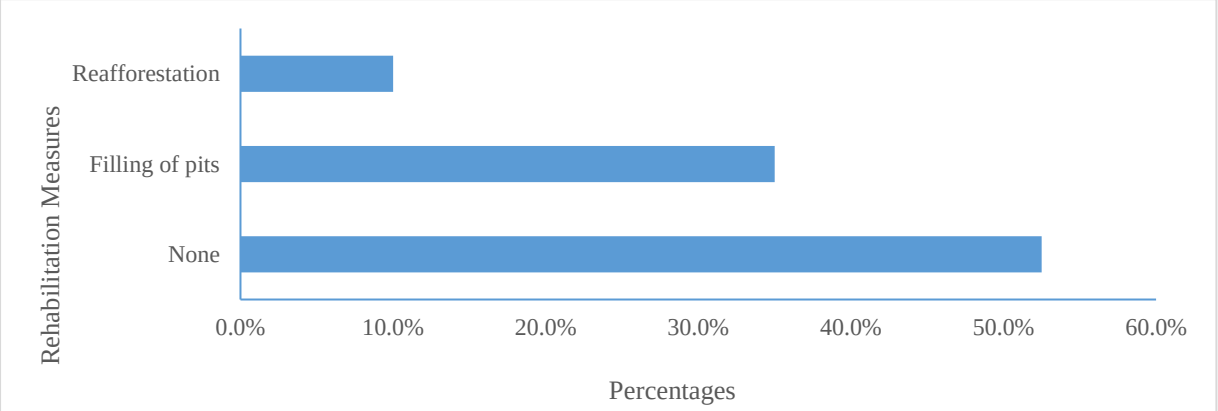

Figure 4.9 showing efforts made by salt farmers to rehabilitate damaged land.

4.4 Suggestions to enhance the socio-economic and environmental aspects of salt production

Table 4.7 showing participant's suggestions towards sustainable salt production

Improvement	Percentage
Market Access and Development	
- Establish new markets for salt	22.5%
- Provide training on salt production and marketing	10.0%
- Facilitate access to new technologies for salt extraction	5.0%
Training and Education	
- Implement training programs on safe salt extraction	10.0%
- Educate communities on sustainable salt production practices	7.5%
- Empower women through salt production training and opportunities	7.5%
Environmental Conservation	
- Promote afforestation and reforestation efforts	5.0%
- Educate communities on environmentally friendly salt production methods	5.0%
- Encourage the use of clean energy sources for salt production	5.0%
Clean Water and Sanitation	
- Improve access to clean drinking water and sanitation facilities	5.0%
- Implement programs to improve sanitation and hygiene practices	5.0%
Provision of Clean Energy Sources	5.0%

- Provide access to clean energy sources for salt production	5.0%
Use of Modern Machinery and Technology	
- Introduce modern machinery for efficient salt production	5.0%
- Provide training on the use and maintenance of modern technologies	2.5%

4.5 Relationship between Age Group and Years of Experience.

A Chi-Square test was conducted to examine the relationship between participants' age group and their years of experience in traditional salt production. The null hypothesis stated that age group and years of experience were independent. The results (Table 4.11) showed a statistically significant relationship, with a Pearson Chi-Square value of 37.678 (df = 16, p = 0.002) and a Likelihood Ratio Chi-Square value of 44.255 (df = 16, p < 0.001). Therefore, the null hypothesis was rejected, indicating that age group and years of experience in salt production are not independent. This suggests that an individual's age is meaningfully associated with their level of experience in the traditional salt production practices within the Chibuwe community.

Table 4.8 showing Chi-Square test results between Age Group and Years of Experience

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	37.678[a]	16	.002
Likelihood Ratio	44.255	16	.000
N of Valid Cases	40		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is .30.

4.6 Relationship between Marital Status and Source of Labour

The Chi-Square tests in table 4.12 reveal that there is a statistically significant association between an individual's marital status and their source of labour, with a Pearson Chi-Square value of 15.460 and a corresponding p-value of 0.017. Therefore, the null hypothesis that there is no relationship between these variables was rejected. This indicates that individual's marital status is an important factor in understanding their source of labour, such as being employed,

self-employed, or seeking employment. The low p-value indicates the observed association is unlikely to have occurred by chance, further supporting the strength of the relationship between these characteristics. These findings suggest marital status plays a meaningful role in shaping an individual's labour force participation and source of income.

Table 4.9 showing the chi-square test results between marital status and source of labour

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.460[a]	6	.017
Likelihood Ratio	12.613	6	.050
N of Valid Cases	40		

a 0 cells (0.0%) have expected count less than 5. The minimum expected count is 0.13

CHAPTER 5

DISCUSSION OF RESULTS

5.1 The Methods, Materials, Tools and Stages Involved in the Salt Production Process

The study revealed that traditional salt production in Chibuwe involves several distinct stages, with the identification of salt-rich soil and extraction being the most critical steps. This aligns with previous studies conducted in other regions, such as the work of Nzaga et al. (2023) in Tanzania and Kobayashi et al. (2013) in Guinea, which also identified these stages as crucial elements of the traditional salt production process.

The findings also highlighted the diverse range of tools and materials utilized by salt farmers in Chibuwe. These tools, primarily consisting of buckets, dishes, hoes, and shovels, are consistent with those reported in studies by Adounkpe et al. (2021) in Benin and Rochwulaningsih et al. (2019) in Indonesia. This consistency suggests a commonality in the tools and materials used for traditional salt production across different geographical locations. It becomes evident that the utilization of buckets, dishes, hoes, shovels and other traditional tools in salt production across various geographical locations, including Chibuwe can be understood in light of their ready availability and relative affordability, which enables salt farmers in Chibuwe and other traditional salt-producing communities to acquire them without significant financial burdens. Moreover, the simplicity and ease of maintenance associated with these tools make them particularly suitable for resource-constrained environments, where access to advanced machinery or spare parts may be limited. The selection of these specific tools can be discerned from their demonstrated efficacy in the salt production process. For instance, the indispensable role played by buckets and dishes as vessels for collecting and transporting brine, coupled with the instrumental nature of hoes and shovels in extracting salt from salt pans, signifies their practical importance.

Furthermore, the study identified the use of firewood as the primary energy source for salt cooking, a finding that aligns with previous research conducted in Kenya by Ocholla et al. (2013). The commonly used tree species were the *mopane* and *acacia* species because these are the trees that predominate the region. This reliance on firewood raises concerns about deforestation and its associated environmental consequences, as discussed in Section 5.3. By drawing attention to this aspect, it becomes evident that the socio-economic and environmental impacts of salt production in the Chibuwe area are closely intertwined, highlighting the urgency for sustainable energy alternatives in the salt production process.

5.2 The Social and Economic Aspects of Traditional Salt Production

The study found that women constitute the majority of salt producers in Chibuwe, a finding that aligns with previous studies conducted in other regions, such as the work of Barker et al. (2017) in California and Helmi and Sasaoka (2018) in Indonesia. Men in Chibuwe seek formal employment in nearby sugarcane plantations, particularly during harvest seasons. This is due to the higher wages and more stable employment opportunities offered by these sectors compared to traditional salt production. According to the Zimbabwe National Statistics Agency (2023), the unemployment rate for men in Zimbabwe is significantly lower than that for women, suggesting greater access to formal employment. Additionally, a report by the Zimbabwe Environmental Law Association (2022) highlights the agricultural sector's significant employment of the male workforce in rural areas. GreenFuel's sugarcane plantation near Chibuwe further attracts male labourers with its higher wages and stable employment, as reported by the company in 2023. These factors contribute to the observed phenomenon of women constituting the majority of salt producers in Chibuwe. This suggests that traditional salt production often plays a significant role in women's livelihoods and economic empowerment.

The study also revealed that the majority of salt produced in Chibuwe is sold directly to the local community, with a smaller portion sold through local shops. Traditional salt producers have limited access to transportation and storage facilities, making it challenging to distribute their salt to distant markets. This restricts their reach primarily to the local community and

nearby areas. More so, the lower price and perceived higher quality of traditional salt often make it the preferred choice for local consumers. Additionally, some local shops choose to sell traditional salt to support local producers and the community's economic development. These findings are consistent with the work of Nzaga et al. (2023) in Tanzania, which reported similar marketing patterns for traditional salt production. This suggests that traditional salt production primarily caters to local market demands, contributing to the economic development of the local community.

However, the study also identified challenges faced by salt producers, including competition from industrial producers and limited access to markets. This forces salt farmers to sell their salt at a relatively cheaper price than the commercially made salt resulting in them getting an average monthly salary of R532.50. Poor infrastructure such as road and communication networks, limits transportation options, and communication, as a result, their reach is restricted, limiting their sales and income potential. These challenges are echoed in the work of Adounkpe et al. (2021) in Benin and Syafii et al. (2018) in Indonesia, highlighting the need for interventions to support traditional salt producers and enhance their competitiveness.

5.3 The Environmental Impacts of Traditional Salt Production

The study identified several environmental impacts associated with traditional salt production in Chibuwe, including soil degradation, deforestation, and water pollution. These findings are consistent with previous studies conducted in other regions, such as the work of Adounkpe et al. (2021) in Benin and Ekrami et al. (2021) in Iran. These studies highlight the potential negative environmental consequences of traditional salt production practices, emphasizing the need for sustainable solutions.

5.3.1 Soil Degradation

Traditional salt production in Chibuwe involves extracting salt-rich soil from clay pits. This repeated extraction leads to soil salinization, reducing its fertility for agriculture (Elizarov et al., 2023). The use of firewood for boiling brine contributes to deforestation and soil erosion. Deforestation removes vegetation cover, exposing the soil to wind and water erosion, leading

to soil degradation (Gotore et al., 2017). The used source of firewood, *acacia and mopane* are very common in semi-arid areas like Chibuwe, therefore this exacerbates the process of soil erosion since there is already sparse vegetation in the area. Soil degradation reduce the land's ability to support agriculture, leading to reduced crop yields and food insecurity (Yani et al., 2019).

5.3.2 Deforestation

As mentioned on section 5.3.1, firewood is the primary energy source for salt production with the *mopane and acacia* species being the commonly used source of firewood. The constant demand for firewood leads to deforestation (Nzaga et al., 2023), as trees are cut to fuel the boiling process. Land clearing for salt production facilities also contributes to deforestation, as trees are removed to make space for the processing site. Deforestation can harm and destroy habitats for various plant and animal species, leading to a loss of biodiversity (Kobayashi et al., 2013).

5.3.3 Water Pollution

Brine runoff from salt production sites can contaminate nearby water sources. This contamination can harm aquatic life and render water unsuitable for human use. Improper disposal of salt production waste can also pollute water sources. This waste can contain harmful chemicals and residues that can contaminate water bodies (Marques et al., 2009). The dumping of used soils on unprotected sites also contributes to well water contamination especially during the rainy season, through high runoffs that takes place which deposits the waste in the unprotected wells.

The study also revealed that salt producers in Chibuwe are taking some measures to mitigate the environmental impacts of their activities, such as filling of pits and reforestation efforts. However, it is clear that the majority (52.5%) of the salt farmers are unaware of the harm that they are doing to the environment, hence taking no measures against environmental degradation caused by salt production in the area. The farmers pointed out that most of them were unaware of the environmental degradation of salt production. This might be linked to the

level of education of the salt farmers since the majority (70%) only reached ZJC and O'Level. Therefore, the efforts are encouraging, but further interventions are needed to promote sustainable practices and minimize environmental degradation.

5.4 Suggestions to Enhance the Socio-Economic and Environmental Aspects of Salt Production

The study identified several suggestions for enhancing the socio-economic and environmental aspects of traditional salt production in Chibuwe. These suggestions include improving market access and development, providing training and education, promoting environmental conservation, and ensuring clean water and sanitation. These suggestions align with the recommendations of previous studies, such as the work of Helmi and Sasaoka (2018) in Indonesia and Rochwulaningsih et al. (2019) in Indonesia, which emphasized the importance of market development, education, and environmental sustainability for traditional salt production.

The implementation of these suggestions could contribute to improving the livelihoods of salt producers, enhancing the sustainability of salt production practices, and mitigating the environmental impacts associated with traditional salt production.

5.5 Relationship between Age Group and Years of Experience

The study found a statistically significant relationship between participants' age group and their years of experience in traditional salt production. This suggests that individuals with more years of experience are likely to be older, indicating a generational transfer of knowledge and skills within the salt production community. This finding is consistent with the work of Kobayashi et al. (2013) in Guinea, which also reported a similar relationship between age and experience in traditional salt production.

5.6 Relationship between Marital Status and Source of Labour

The study identified a statistically significant association between an individual's marital status and their source of labour. This suggests that marital status plays a role in shaping an individual's labour force participation and source of income. This finding aligns with the work of Iwuchukwu et al. (2021) in Nigeria, which also reported a similar relationship between marital status and labour participation in traditional salt production.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study provides a comprehensive understanding of the socio-economic and environmental impacts of traditional salt production in Chibuwe, Zimbabwe. The study revealed that traditional salt production plays a crucial role in the livelihoods and food security of the community, providing an important source of income. However, the research also identified significant environmental impacts, such as vegetation loss, wildlife disturbances, water pollution, and land degradation. These environmental consequences pose challenges to the long-term sustainability of the salt production activities.

The study found that women are the primary salt producers in Chibuwe, highlighting the importance of this activity in women's economic empowerment. However, salt producers face challenges such as competition from industrial producers and limited access to markets. More so, the study also revealed a strong correlation between age and experience in salt production, indicating a generational transfer of knowledge and skills. Additionally, the study found a significant association between marital status and source of labour, suggesting that marital status influences an individual's labour force participation.

6.2 Recommendations

i. Promote sustainable production methods through eco-friendly practices like solar evaporation and renewable energy.
ii. Diversify livelihood options for salt producers to reduce reliance on salt production and promote economic resilience.
iii. Implement land rehabilitation measures, such as filling pits and reforestation, to restore degraded land and protect biodiversity.

iv. Improve market access and development by establishing marketing cooperatives, providing marketing training, and supporting value-added salt products.
v. Provide training and education programs on safe extraction, sustainable production, and business skills to empower salt producers.
vi. Empower women salt producers through targeted training and support programs to promote leadership and address gender inequalities.
vii. Advocate for policy changes that support sustainable development of the salt industry, including environmental protection, fair trade, and resource access.

6.3 Further Research

While this study has provided a comprehensive understanding of the traditional salt production in Chibuwe, there is a need for further research to expand the knowledge base. Some areas for future studies include:

1. Exploring the feasibility and potential benefits of introducing more environmentally-friendly salt production technologies and techniques in the Chibuwe area such as solar evaporation, bio-based salt production and vacuum salt production.
2. Analysing the market dynamics and value chain of the traditional salt industry to identify opportunities for improving the livelihoods of salt producers.

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Appendix 1: Questionnaire

Ethnographic Study Questionnaire on Traditional Salt Production in Chibuwe Area

Gender Of Partcipant

- ◯ Male
- ◯ Female

Age Of Participant

- ◯ 10-19
- ◯ 20-29
- ◯ 30-39
- ◯ 40-49
- ◯ 50-59
- ◯ 60+

What is your marital status?

- ☐ Married
- ☐ Single
- ☐ Divorsed
- ☐ Widow

What is your level of Education?

- ◯ Primary
- ◯ ZJC
- ◯ O' Level
- ◯ A' level
- ◯ Tetiary

Besides salt processing, what other economic activities are you involved in?

- ◯ Subsistence Farming
- ◯ Animal Rearing
- ◯ Businessman/women
- ◯ None
- ◯ Other

Specify

_____

Have you attended any food/salt processing training?

- ◯ Yes
- ◯ No

Years of experience in salt production

- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 6 +

Where do you get labour for the salt extacation process?

- ◯ Children
- ◯ Spouse
- ◯ We employ workers
- ◯ Self labour

What are the key steps involved in traditional salt production?

- ☐ Identification of salt rich soils (Salt pans)
- ☐ Extarction of Soil
- ☐ Mixing Soil With Water
- ☐ Filtration
- ☐ Evaporation and Crystalisation
- ☐ Drying
- ☐ Packaging
- ☐ Crushing and Grinding
- ☐ Grading

What soil and water ratios do you use?

- ◯ 1:1
- ◯ 1:2
- ◯ 2:1
- ◯ We don't measure the ratio

What type of water is used in salt processing?

- ◯ Any water
- ◯ Borehole water
- ◯ Hot water
- ◯ Stream Water/River water
- ◯ Well Water
- ◯ Rain Water
- ◯ Waste Water

What other raw materials do you use besides water?

_____

How many times is filtration done per each soil batch?

_____

What material and tools do you use during the salt production process?

_____

How long do you evaporate brine (salt solution) for salt recovery?

- ◯ <1h
- ◯ 1-2hrs
- ◯ 2-3hrs
- ◯ >3hrs

How long do you dry salt before selling?

- ◯ One day
- ◯ Two days
- ◯ Three days
- ◯ Four days

How many brine (salt solution) batches do you process per day?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5

How much salt do you produce per day?

- ◯ 2 buckets
- ◯ 3 buckets
- ◯ 4 buckets
- ◯ 5 buckets
- ◯ Above 5

How many times do you cook salt per week?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 7

Do you produce salt throughout the year?

_____

Where do you sell your salt?

- ◯ Local community
- ◯ Commercial Shops
- ◯ Local Shops
- ◯ We use it for domestic Consumption

What is the price of salt per kilogram?

- ◯ R5
- ◯ R10
- ◯ R15
- ◯ R20
- ◯ R25
- ◯ R30
- ◯ R40

How much do you earn form selling salt per month?

_____

What are the income-generating opportunities associated with salt production in Chibuwe Area?

_____

What are the benefits of traditional processed salt over Industrial produced Salt?

Are there any challenges or limitations faced by salt producers in terms of market access or pricing?

- [ ] Limited access to markets
- [ ] Price fluctuations
- [ ] Competition from industrial salt producers
- [ ] Lack of storage facilities
- [ ] Other

Specify Other Challenges

Are there any specific rituals or cultural practices associated with salt production?

- ◯ Yes
- ◯ NO

If Yes Specify

- [ ] Traditional songs or dances (Muchongoyo)
- [ ] Offerings to ancestral spirits (Kupira)
- [ ] Community gatherings or feasts (Bira)
- [ ] Exocising evil Spirits
- [ ] Other

Specify

Are they any taboos related to salt production processes?

How is the knowledge of salt production passed down through generations in the community?

How do community members perceive traditional salt production in terms of its cultural significance? Please rate on a scale of 1 to 5, with 1 being "Not significant" and 5 being "Highly significant."

What type of energy do you use for cooking Salt?

- ◯ Firewood
- ◯ Gas
- ◯ Elctricity
- ◯ Coal
- ◯ Other

How many bundles of firewood are needed per day?

_____

Where do you get your firewood?

_____

What type of firewood or tree species do you commoly used?

_____

Do have any knowledge of the environmental impacts associated with salt production?

- [ ] Soil degradation
- [ ] Water Pollution
- [ ] Deforestation
- [ ] Disturbance of local ecosystems
- [ ] Other

Specify

_____

How do you dispose used soils?

_____

What measures do you take to rehabilate land after the salt extraction processes?

- ◯ None
- ◯ Filling of pits
- ◯ Afforestation
- ◯ Reafforestation

Have there been any observed positive environmental impacts associated with salt production activities?

- ◯ Yes
- ◯ No

If Yes Specify

_____

What improvements or changes would you suggest to enhance the socio-economic and environmental aspects of salt production in Chibuwe Area?

_____

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