

**BINDURA UNIVERSITY OF SCIENCE EDUCATION
DEPARTMENT OF NATURAL RESOURCES MANAGEMENT
Faculty of Agriculture And Environmental Sciences**



NAME : WADZANAI E. CHIKOHORA

REGISTRATION NUMBER: B1953739

RESEARCH TOPIC:

Perceptions on the effectiveness of wild fire management strategies in ward 1 of
Hwedza District, Zimbabwe

**A PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS OF THE BACHELOR OF SCIENCE HONOURS DEGREE IN
NATURAL RESOURCES MANAGEMENT**

TABLE OF CONTENTS

Item	Page Number
Cover Page	i
TABLE OF CONTENTS	ii
DECLARATION	v
DEDICATION	vi
ABSTRACT	vii
LIST OF FIGURES	viii
LIST OF TABLES	vii
CHAPTER ONE	1
1.1 BACKGROUND TO THE STUDY	1
1.2 STATEMENT OF THE PROBLEM	1
1.3 OBJECTIVES OF THE STUDY	2
1.4 RESEARCH SUB-OBJECTIVES	2
1.5 MAJOR RESEARCH QUESTION	2
1.6 RESEARCH SUB-QUESTIONS	2
1.7 SIGNIFICANCE OF THE STUDY	3
1.9 ASSUMPTIONS OF THE STUDY	3
1.10 LIMITATIONS OF THE STUDY	4
1.12 DEFINITION OF KEY TERMS	4
1.12.1 Wildfire	4
1.13 ORGANISATION OF THE STUDY	5
CHAPTER TWO	7
LITERATURE REVIEW	7
2.1 THEORETIC FRAMEWORK	7
2.1.1 Theory Of Reasoned Action	7
2.1.2 Theory of Planned Behaviour	7
2.1.3 Theory of Catastrophe	8
2.2 CONCEPTUAL FRAMEWORK	9
2.2.1 Fire Prevention Concept	9
2.2.2 Fire Detection Concept	10
2.2.3 Fire Suppression Concept	10
2.3 EMPIRICAL LITERATURE	11
2.4 RESEARCH GAP	16
RESEARCH METHODOLOGY	17
3.1. Research Design	17
3.2. Target Population	17
3.3 Sampling methods and sampling techniques	18
3.3.1 Stratified sampling	18
3.3.2 Non-Probability Sampling Methods	18
3.3.3 Judgmental Sampling	18
3.3.4 Sampling frame	19

3.3.5 Sample size	19
3.4 Data sources	20
3.4.1 Primary Source	20
3.5 Data Collection Method	20
3.5.1 The Questionnaire	21
3.5.2 Personal Interview	22
3.6. Data collection Procedure and administration	23
3.7. Validity of instruments	23
3.8 Reliability of instruments	23
3.9 Data analysis and presentation tools	23
CHAPTER FOUR	25
DATA PRESENTATION AND ANALYSIS	25
4.1 RESPONSE RATE	25
4.2 DATA PRESENTATION AND ANALYSIS	26
4.2.1. DEMOGRAPHIC DATA	26
4.2.1.1 Distribution by gender	26
4.2.1.1 Distribution by Age	28
4.2.1.1 Distribution by Education Level	28
4.2.1.1 Distribution by Occupation	29
4.2 PRESENTATION OF FINDINGS	30
4.3 VILLAGERS RESPONSES	30
CHAPTER FIVE	44
DISCUSSION	44
5.1 CAUSES OF WILD FIRES IN HWEDZA	44
5.1.1 Natural Causes	44
5.1.2 Human Causes	44
5.2 WILD FIRE MANAGEMENT STRATEGIES IN HWEDZA, WARD1	45
5.2.1 Prevention Methods	45
5.2.2 Detection Methods	46
5.2.3 Suppression Methods	46
5.3 HOW AVAILABLE WILDFIRE MANAGEMENT STRATEGIES ARE PERCIEVED	46
5.3.1 Prevention Methods	
5.4 RECOMMENDATIONS TO IMPROVE WILDFIRE MANAGEMENT	47
CHAPTER SIX	49
SUMMARY, CONCLUSION AND RECOMMENDATIONS	49
6.0 INTRODUCTION	
6.1 SUMMARY	49
6.2 CONCLUSIONS	50
6.3 LIMITATIONS OF THE STUDY	51
6.4 RECOMMENDATIONS FOR FURTHER RESEARCH	51
References:	51
Appendix : 1	53

LIST OF FIGURES

Item	Page Number
Figure 1.1	9
Figure 4.1	26
Figure 4.2	27
Figure 4.3	28
Figure 4.4	29
Figure 4.5	30

LIST OF TABLES

Item	Page Number
Table 4.1: Response Rate	25
Table 4.2	26
Table 4.3	26
Table 4.4	28
Table 4.5	28
Table 4.6	29
Table 4.7	31
Table 4.8	31
Table 4.9	31
Table 4.10	32
Table 4.11	33
Table 4.13	33
Table 4.14	34
Table 4.15	34
Table 4.16	34
Table 4.17	35
Table 4.18	35
Table 4.20	36
Table 4.21	36
Table 4.26	39
Table 4.28	40
Table 4.29	40
Table 4.30	40

Table 4.31		40
Table 4.32	41	
Table 4.33		41
Table 4.34		41
Table 4.35		42
Table 4.36		42
Table 4.38		43
Table 4.39		43
Table 4.40		43

DECLARATION

I declare that the research project on PERCEPTIONS ON THE EFFECTIVENESS OF WILD FIRE MANAGEMENT STRATEGIES IN WARD 1 OF HWEDZA DISTRICT, ZIMBABWE. I hereby handed in for the qualification of Bachelor of Science (Honours) Degree in Natural Resource, is my own independent work and that I have not previously submitted the same work for a qualification at or in another university.

.....
Wadzanai E. Chikohora

Date December 2022

DEDICATION

To family , friends , relatives and church-mates. I have to confess that all your efforts have not been put to waste. For their vision, your prayers and wishes gave me the best. All those who helped in financing my academic programs and this research in particular, will be richly blessed by the Almighty God.

ACKNOWLEDGEMENTS

I would like to take this opportunity to thank Almighty God for His omnipresent guidance, care and love which saw me completing this research project.

My heartfelt thanks also go to the respondents for the cooperation in giving me the data and positive responses that came in handy in doing this research. I am also glad to note that Bindura University Of Science Education has shown very remarkable support in my academic life

I am also indebted to my supervisor Dr Gotosa for the role they played in guiding me during the entire research period. He was a source of encouragement and his guidance and thoughts contributed greatly to my success.

ABSTRACT

The purpose of the study was to look at perceptions on the effectiveness of wild fire management strategies in ward 1 of Hwedza District, Zimbabwe in Zimbabwe

The literature review looked a collection of detailed relevant knowledge compiled by the writer from academic work contributed by various authors on almost similar research undertaken in the same area of study. This research generally helped to produce many ideas relevant to the study and enabled the researcher to try and relate the ideas . The researcher wanted to apply both qualitative and quantitative approaches. There are some instances where the research would have to use descriptive and content filled explanations and other where mathematical calculations were required..

In the research, the sample size is one important feature of any empirical study in which the final goal is to make inferences about the population from a sample. In the actual research study practice, the sample size used in a study is determined based on the expense of data collection, and eventually the need for the research process to have much sufficient statistical power. In most complicated studies, there may usually be several different sample sizes involved in the study.

In the research process this researcher used questionnaires which he made in a self-administered and ensured respondents are given a week to complete them. This was a way of giving them a chance to complete the questionnaires at their own pace. Furthermore, the researcher took it upon himself to make a follow-up and contact those respondents where possible during the week ,to remind them about the urgency of the questionnaires.

It was deduced that there are some fire management strategies which are very effective in Hwedza, ward1. These include but are not limited to fire guards, fire beater and tree branches whilst other methods like water and bucket as well as bucket and sand were not very effective.

Recommendations from the villagers were mainly centred on the need for the Environmental management Agency to train villagers so that they do not unnecessarily start unattended and uncontrollable fires. Also some recommendations are that police officers need to enforce the penalties and arrest offenders so as to prevent would be offenders from breaching the rules on wild fire management.

CHAPTER ONE

1.0 INTRODUCTION

The main purpose of the study was to identify perceptions on the effectiveness of wild fire management strategies in ward 1 of Hwedza District, Zimbabwe. This first chapter is aimed to provide the actual area of the problem and forms the ground and pillar of all the succeeding chapters. The chapter identifies the background to the study. The statement of the problem and the questions which gave some guidance to the study are also presented here. The importance of the research which was being undertaken, the aims and objectives, as well as the significance of the study are herein detailed. Chapter one also includes the limitations, delimitations, theoretical framework, methodology and definition of key terms which are also furnished. This chapter ends by a summary of the six succeeding chapters of the study.

1.1 BACKGROUND TO THE STUDY

Environmental Management Agency, a parastatal established by the Government of Zimbabwe to manage the country's natural resources especially on how humans exploit such resources, has reported that wildfires also known as veld fires have continues to cause havoc in the countryside. According to the website, the Environmental Management Agency (EMA) is a statutory body responsible for ensuring the sustainable management of natural resources and protection of the environment, the prevention of pollution and environmental degradation, the preparation of Environmental Plans for the management and protection of the environment. EMA was established under the Environmental Management Act [Chapter 20:27] and enacted in 2002.

1.2 STATEMENT OF THE PROBLEM

Some concerns are being raised by various stakeholders on why this challenge of wild fires continue to rise and cause havoc in various rural villages of Zimbabwe. Each year grazing areas, thickets of vegetation, wildlife and human lives are lost to these raging fires. In year 2021 huge tracks of vegetation were lost and many people died and EMA reported more than 84% increase in Wildfires. In October year 2022, herald newspaper of Zimbabwe reported that 10 people (farm workers) were killed and many track of vegetation about 163 820.05

hectares were again lost to wildfires in Matebeleland region of Zimbabwe. This recurs annually despite the fact that the government has set up institutions to monitor and manage the occurrence of Wildfires country wide and budget allocations continue to be channeled towards curbing wildfires. Also as alluded to in the preceding sections, vegetation, wildlife and human lives continue to be lost. These various interested stakeholders have devised strategies to manage these wildfires which but those strategies seem not to be effective enough. Nkhesani (2011) pointed out that wildfires in many countries in Southern Africa are very destructive to the ecosystem and occur with high frequency and intensity. As a result, the sustainability of the forest, grasslands and farmlands are all at high risk. The fundamental causes of increasing fire incidents in Zimbabwe are not very clear as put by Nyamadzawo et al (2013).

The wildfire problems pose severe environmental consequences and straining of natural resources like grasslands, groundwater recharge and natural forests. Additionally, the fires cause huge negative impacts on the livelihoods of people.

1.4 OBJECTIVES OF THE STUDY

To assess effectiveness of wild fire management strategies in ward 1 of Hwedza District, Zimbabwe.

1.8 RESEARCH SUB-OBJECTIVES

- 1.8.1** To identify wildfire management strategies used in Hwedza, ward 1.
- 1.8.2** To see how the villagers in Hwedza perceive these strategies
- 1.8.3** To get recommendations for enhancing Wildfire management strategies.

1.9 MAJOR RESEARCH QUESTION

How effective are wild fire management strategies in ward 1 of Hwedza District, Zimbabwe?

1.10 RESEARCH SUB-QUESTIONS

- 1.10.1** What wildfire management strategies are used in Hwedza, ward 1?
- 1.10.2** How do the villagers in Hwedza perceive these strategies?
- 1.10.3** What recommendations are there to enhance Wildfire management strategies?

1.11 SIGNIFICANCE OF THE STUDY

1.11.1 To the Government of Zimbabwe

The government of Zimbabwe through the line ministry of Environment and Tourism is very much keen to see that vegetation is maintained to reduce desertification and air pollution is eradicated.

1.11.2 To environmentalists

Activists in environmental conservation as well as in animal rights are interested in the findings of this study because they want to see how best the responsible authorities are taking care of the environment. These people therefore want to see strategies that have been put in place and if they are effectively working in curtailing spread of wildfires.

1.11.3 Fellow Researchers

This group of people is interested in knowing this outcome so that they may see how best they may follow through and work on recommendations for further study. They intend to use these findings in order to identify some research gap for further research.

1.9 ASSUMPTIONS OF THE STUDY

The underlying assumptions were that:

- a) the respondents would fully co-operate with, and assist the researcher through responding accurately and timely without bias or delay
- b) the respondents would possess sufficient information about the society in question and that they also fully understand the concepts defined.
- c) much of data collected by the research would be significant representative sample of the college under study
- d) respondents would avail sincere responses sufficient to make logical inferences
- e) information and requisite data would be readily obtainable and accessible with less information being very much or highly classified

1.10 LIMITATIONS OF THE STUDY

Generally , patriarchal and traditional systems or villages in any tend to withhold key information pertaining to their wards. So it is one area that this researcher faced such a challenge of failing to get much positive response. However, during interviews the researcher tried as much as he could to gain the participant's confidence and belief by actually assuring them that their views and responses for the session would be held in the strict confidence it deserves.

This was a way which was meant to allay any probable fear. Also, most institutions have a tendency of centralising authority to disclose such information to outsiders. Only some village head or the manager like at EMA is usually the only authorised speaker. So the major challenge was on booking appointments with such elders who was not be very forth coming or was not always be available.

Some target interviewees did not want to give enough attention to the researcher. They suspected some investigation was underway at their organization or village. So the response rate therefore would be affected since suspicion was at play.

1.12 DEFINITION OF KEY TERMS

1.12.1 Wildfire

Covington and Moore (1994) defined it as a catastrophic fire as a fire that kills a majority of the trees in the canopy in in any dry forest that was, in presettlement times, subject to frequent surface fires. An inferno which gets out of control with its attending destruction spreading across wide area of both the forests and grassland; thereby resulting in loss of biodiversity as well as human life, according to Oyelele (2021).

1.12.2 EMA: The Environmental Management Agency (EMA) is a statutory body responsible for ensuring the sustainable management of natural resources and protection of the environment, the prevention of pollution and environmental degradation, the preparation of Environmental Plans for the management and protection of the environment. EMA was established under the Environmental Management Act [Chapter 20:27] and enacted in 2002.

1.13 ORGANISATION OF THE STUDY

Chapter One:

Introduction.

This chapter introduces the research by providing a clear background to the study. The problem is defined and placed into context. The objectives and justification of the study are spelt out. The significance of the study is explained.

Chapter Two:

In this chapter the researcher provides an overview of theoretical thought on the financial inclusion. Here, the financial inclusion is clearly defined. Its history, as well as some of its aspects is spelt out. Indicators for making financial inclusion assessment are outlined and justified.

Chapter Three:

Research methodology. The research methodology is outlined in this chapter. The primary and secondary research methods used are discussed in detail. This helps the readers link the process and the objectives to the results.

Chapter Four:

This chapter focuses on the research findings in relation to the research objectives and data collected. It presents data in the light of the insights gained from literature and provides pointers for Chapter Five.

Chapter Five:

This area is about discussion and analysis of presentations done in chapter four. It precedes the final chapter which covers recommendations

Chapter Six

This chapter covers recommendations for future research. It focuses on interpreting research findings and how they relate to the problem statement

1.14 CHAPTER SUMMARY

Chapter 1 therefore basically formed the clear and guiding framework for the study. It unveiled and showed the actual background to the problem. A perceptions on the effectiveness of wild fire management strategies in ward 1 of Hwedza District, Zimbabwe

and provision of recommendations depending on the findings. In the very chapter, the objectives and research questions were also crafted or formulated as highlighted. These give a basic project guideline to the underlying main and key objective of the study. In the same chapter, the scope of study, significance of this project and limitations were also have been clearly stated.

The succeeding chapter (chapter 2) provided an insight into some literature underlying this research. This is popularly known as literature review. The following chapter covered what other authors in the same area under research have come up with concerning Perceptions on the effectiveness of wild fire management strategies in ward 1 of Hwedza District, Zimbabwe and also in some areas regionally, continentally and globally. Much literature and journals or publications on the same area would be studied. In the researcher's quest to effectively achieve the objectives of the study, findings by other researchers were also considered, forming the literature review section of chapter two.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

Literature review is a collection of detailed relevant knowledge compiled by the writer from academic work contributed by various authors on almost similar research undertaken in the same area of study. It provided a rich analysis and study into the similarities and differences of ideas and suggestions by diverse and various authors who also worked on perceptions on the effectiveness of wild fire management strategies in ward 1 of Hwedza District, Zimbabwe.

This exercise generally helped to produce many ideas relevant to the study and enabled the researcher to try and relate these ideas perceptions on the effectiveness of wild fire management strategies in ward 1 of Hwedza District, Zimbabwe.

2.1 THEORETIC FRAMEWORK

2.1.1 Theory Of Reasoned Action

According to Hale and Householder (2002) the Theory of Reasoned Action (TRA) assumes that the behavior under investigation is under volitional control, that is, that people believe that they can execute the behavior whenever they are willing to do so. Taylor (2011) puts that gradually, the TRA was used more often for the study of behaviors for which control was a variable factor. Peslak and Ceccucci (2010) add that TRA was complemented by a component that was named perceived behavioral control. They say that concept represents the extent to which people believe they are able to perform the behavior because they have adequate capabilities and/or opportunities or are lacking in these. It is therefore very easy to see that this factor can materially improve the generality of application of the model because there are many behaviors that need specific skills or exogenous facilities.

2.1.2 Theory of Planned Behaviour

According to Conner and Armitage (1998), in the 'Theory of planned behavior', the core assumption is that intention is the best predictor of planned behavior. They add that intention, as defined in the theory, can therefore be seen as a person's readiness or preparedness to perform a specific behavior. As a result, this intention is determined by three additional

factors such as the attitude towards performing the behavior in question, which can be seen as an assessment of expected outcomes. The other subjective norms involve, a belief about how other important people will think about a given behavior. To conclude, the more favorable the attitude and the subjective norms, and the greater the perceived control the stronger should be the person's intention to perform the behavior in question as suggested by Ajzen (1985).

2.1.3 Theory of Catastrophe

Bowman et al (2013) says that the theory provide an illustrative example of a catastrophe using simulated fire data. Preliminary results suggest that catastrophe theory may be an effective tool to model wildfire controllability as measured by the modeled change in fire line intensity, wind speed, initial fuel moisture and fuel loading. Because the use of fuel loading as a control parameter describes the marginal physical effects on wildfire behavior, this framework may prove suitable as the production relationship for future economic analysis.

Catastrophe theory is a topological branch of mathematics developed to explain natural cause and effect relationships that result in discontinuous behavior Thom (1975). It combines theorems and properties from calculus, algebra, and geometry to classify discontinuities into seven basic shapes which Thom called elementary catastrophes. The basic shapes progress from the elementary fold to successively higher order and more complex catastrophes such as the cusp, butterfly, swallowtail, and so on. Although the word catastrophe is frequently used to describe cataclysmic and destructive events, it is not used here in this manner.

According to Loehle(1985),it conveys the idea that changes in the equilibrium of a system are discontinuous and occur suddenly as a result of gradually changing forces. If a system is identified as one of the seven shapes, through mathematical transformations it can be represented using canonical equations and studied in a familiar form. Because of the topological nature of catastrophe theory, the framework has been used to study a variety of seemingly different situations in the natural sciences such as range.

2.2 CONCEPTUAL FRAMEWORK

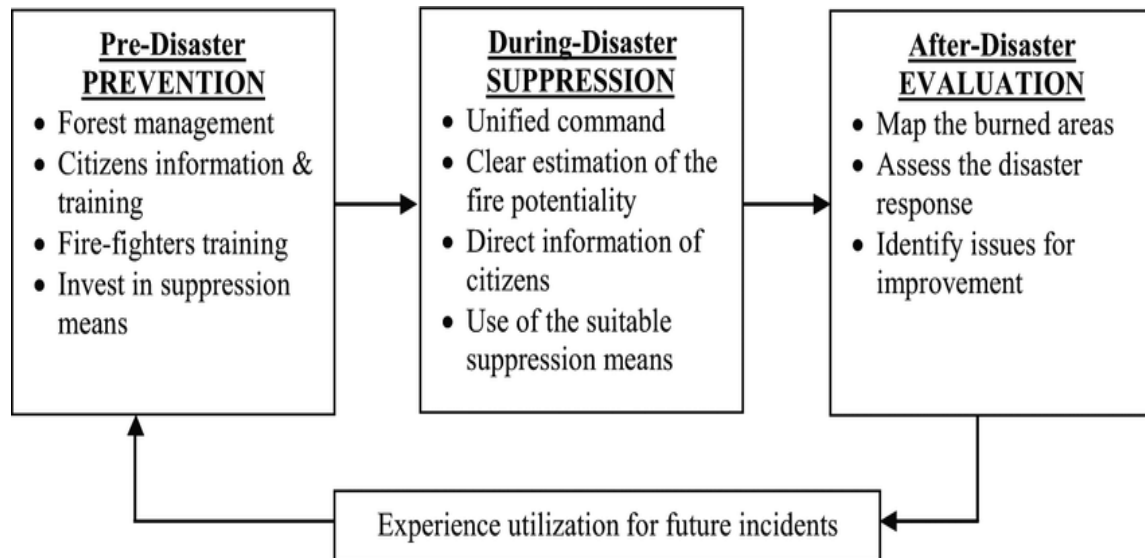


Figure 1.1

2.2.1 Fire Prevention Concept

Runefors, Johansson and P van Hees (2017) state that fire management training should provide a balanced mix of theory and field practice, which incorporates local conditions and knowledge and experience of the participants. They say fire prevention activities include, environmental education, institutional issues, the role, functions, and responsibilities of fire crews. Thomaz and Perreira (2021) says that fire prevention includes fire preparedness rising, the use and maintenance of simple equipment, and also fire fighting strategies, tactics and techniques. They say assumptions and gross over estimations are often made of peoples capabilities to fight fires by using tree branches and palm leaves In most cases in rural areas as said by Hesseln (2018) barefooted people, without any protection against radiant heat, smoke inhalation and flames, are next to useless in combating fires, unless equipped with tools, clothing and water to contain the fire.

It therefor follows that well made rake-hoes, fire swatters and backpack sprayers are required for community fire fighting as was put by Jurvélius (1980). He adds that The temperature in a burning fire, with several metres of flame height, is ranging from 300 to 500 degrees Centigrade, depending on the fuel load and fire intensity. No human being will be able to go even near a 300-500 degree fire, without appropriated tools, boots and uniforms with helmet and face shield.

2.2.2 Fire Detection Concept

At earlier times, forest fires were detected using watchtowers, which were not efficient because they were based on human observations. In recent history and even the present day, several forest fire detection methods have been implemented, such as watchtowers, satellite image processing methods, optical sensors, and digital camera-based methods², although there are many drawbacks, such as inefficiency, power consumption, latency, accuracy and implementation costs

Sahin (2007) says that wireless sensor networks (WSNs) are very useful since they are self-configured and infrastructure-free wireless networks that help monitor physical or environmental conditions and pass these data through the network to a designated location or sink where the data can be observed and analyzed. He adds that efficiency and low power consumption are the major advantages of a WSN. In the proposed detection system, wireless sensor nodes are deployed according to cellular architecture to cover the entire area with sensors to monitor temperature, relative humidity, light intensity level, and carbon monoxide (CO) level using a microcontroller, transceiver module, and power components. The power supply to the sensor node is provided using batteries as the primary power supply, and solar panels are used as the secondary power supply. These sensor nodes are specially designed with a spherical shape to withstand damage caused by environment as put by Krstinic et al (2009).

2.2.3 Fire Suppression Concept

According to Orr et al (2022), if wildfires occur yet pose no threat to life, critical infrastructure, private assets or cultural and environmental areas of significance it is possible to simply allow the fire to self-extinguish once it runs out of available fuel or rainfall occurs. However, according to Margel et al (2022), unfortunately this is rarely possible in populated areas common throughout developed nations and significant intervention is required by fire and emergency services to suppress wildfires and minimise their impacts. It calls for wildfire suppression strategies options to assist fire incident controllers to make critical incident decisions during chaotic and large wildfire incidents.

Penman and Cirullis (2019) say that direct firefighting attack involves firefighters (including personnel, firefighting appliances, machines and aircraft) directly attacking the

wildfire using the tactics of either head attack or flank attack. They add that a direct head attack involves firefighting efforts directly against the head fire before moving down either flank once the head fire is suppressed, a direct tail attack involves attacking the bushfire from the rear and working along the flanks towards the head fire, and a direct flank attack involves attacking the side of the fire and working around the head and tail. Wang, Qiao, Kang, and Deng (2022) say that the direct tail attack is preferred method of suppression as it reduces the potential for crews to be caught in a burn over due to a wind change that turns the flank into the greater head fire.

Penha and Nakamura (2010) say that direct head attacks expose firefighters to the most severe wildfire behaviour, which reduces towards the tail. All tactics require firefighters to be able to access the fire edge in order to extinguish the fire. In dense forest fuels or in difficult terrain, this may be problematic and result in firefighters attempting to extinguish bushfire wherever they can in a patchwork manner. Where this occurs suppression efforts are likely to be less than optimal and result in unrestrained wildfire propagation as well as placing firefighters in unnecessary danger.

2.3 EMPIRICAL LITERATURE

2.3.1 Cici Sundari , Eko Priyo Purnomo, Dyah Mutiarin , Maisarah Mitra Adrian, Cindy Fabrizia Suling, Irfandi Pratama(2022):Sustainable Forest Governance: A New Policy Strategy in Handling Forest Fires in Jambi Province-Indonesia (2022)

. Jambi Province is one of the areas most prone to forest destruction in Indonesia. The case of forest fires is an annual disaster that regularly occurs in Indonesia, including one in Jambi province. The problem of forest fires often occurs in Indonesia, whether human activities cause it or are caused by a long dry season. This study analyzes Sustainable Forest Governance from the point of view of the New Policy Strategy in Handling Forest Fires in Jambi Province. This research focuses on Jambi Province, one of Indonesia's regions with the largest forest. This research method is qualitative exploratory with secondary data carried out to describe and describe the research. Data were collected from field interviews, online media, and related literature related to the research topic.

The analysis technique uses the NVivo 12 plus data processing application, a qualitative document analysis tool with the help of a computer. Equipment. They are easy to use and can word-process and explore word frequency, attributes, and cases from big data. They

also generate factor or sub-factor categories in journalistic and research applications related to the research topic. The study results show that the government's program in making new policy strategies for handling forest fires in the province has several indicators, then the cooperation of actors in forest fire prevention in the region.

Research results on new strategies in handling forest fires in Jambi Province, which are included in the government program in preventing and overcoming forest fires in Jambi Province. To take forest and land fires, several indicators prepare the government, then the Penta helix actor collaboration scheme in handling forest fires in Jambi Jambi Province based on the Decree of the Governor of Jambi Number 420/KEP/GUB/BPBD/2022 concerning the establishment of an emergency alert status for forest and land fires in Jambi Province.

The collaboration of the forest fire emergency unit in Jambi Province and seeing community participation is no longer a matter of whether they want to participate but rather the extent to which they will benefit through this participation in their socio-economic life. The success of forest and land fire prevention and control (extinguishing) activities is very dependent on the success of humans and local communities in the emotions, feelings, and enthusiasm to maintain forest sustainability, which requires a forest and land management approach that understands the multiple aspects. The informal reaction of the community can be seen through the government's policy of making the Fire Care Group program based on community aspirations for forest and land fire incidents. The government created the Fire Care Group to suppress forest and land fires.

2.3.2 Fire Management Techniques In And Around Kanji Lake National Park (Borgu Sector) Nigeria (2021)

Traditionally, fire has been used as a management tool to control vegetation structure and composition. Habitat management does not only include planting of a few trees and other crops, manipulating all necessary life forms round the year; but introducing control burning is a key to habitat management. Increase in the incidence of uncontrolled wildfires with the damaging effect on national parks, indigenous forests, forest plantation, rangelands communal grazing areas and agricultural lands have raised concerns to look into techniques in the management wildfire.

Annual bush burning exercise at the Kainji Lake National park is usually characterized with prolonged smoke and displacement of wildlife species. Structured questionnaire were administered to both staff of Kainji Lake National park (KLNP) as well as 8-villages randomly selected around Borgu sector of the park to elicit information from people who have indicated their involvement with the use of fire one time or the other from the reconnaissance survey carried out. The results shows that male (55%) was more involve in the use fire than the female, youth ages 21-40 are the active respondents involve in the use accounting 80%.

The results also show that the major culprit of wildfire associated incidences were those who uses fire for farming, honey harvesting and livestock keeper (28%, 24% and 23% respectively). Also the effect of the fire were more pronounced on farmland and disturbance to people especially respiratory associated ones (45% and 43% respectively). Base on this it is recommended that the community be sensitized often on the consequences of uncontrolled fire as well encourage them to participate in conserving the park.

2.3.3 Assessing the Efficacy of California's Wildfire and Forest Resilience Action Plan By Chloe Nelson- America (2022)

California's wildfire threat eclipses current forestry management and wildfire mitigation strategies in place to protect people, infrastructure, and the natural environment. Climate change escalates wildfire risks with declining water supply coupled with hotter, drier conditions. California's Wildfire and Forest Resilience Action Plan attempts to integrate and build upon previously successful wildfire resilience plans to amplify the scale and pace of the state's land management and community protections. This research assesses the plan's efficacy to respond to the growing wildfire threat. This study investigates if there is equitable planning for the needs of high wildfire risk groups living in the WUI and on tribal lands. It also compares the plan structure and initial implementation against a wildfire & forestry management planning framework to determine its potential for success.

This study reviews the forestry, community, economy, and technology-focused actions against the Arup City Resilience Framework to identify strengths and opportunities for a resilient wildfire management approach. Land treatment and resident outreach and education efforts planned for WUI areas target the key protective needs for those

communities. Most work to improve training, grant funding, and partnership opportunities for Native American Indigenous communities is structured through federal and state approval systems. To make wildfire management practices more equitable, more authoritative power should be given to Tribal leadership and traditional ecological knowledge (TEK) should be meaningfully integrated into prescribed fire training and goals.

The structure of the Action Plan satisfies all planning criteria, but the development of the proposed Forest and Wildland Stewardship Interagency Tracking System will enhance consistency, transparency, and accountability of progress reporting and accessibility. The key actions fulfill Arup's twelve resilience dimensions, but a gap analysis identifies opportunity for future planning to build upon safeguards to human health. State facilitation of county-level emergency plan sharing will strengthen multi-jurisdictional coordination and instill a shared sense of ownership in building California's wildfire resilience.

2.3.4 Maureen Essen, Sarah McCaffrey, Jesse Abrams & Travis Pavaglio (2022): Improving wildfire management outcomes: shifting the paradigm of wildfire from simple to complex risk

Numerous wildfire management agencies and institutions rely primarily on simple risk approaches to wildfire that focus on technical risk assessments that do not reflect the complexity of contemporary wildfire risk. This review paper argues that such insufficiently complex conceptualizations of risk, which do not account for the social and ecological diversity of fire-prone areas, are key contributors to the continued wildfire dilemma. We discuss distinctions between approaching wildfire as a simple and a complex risk and illuminate the need for expanded and complimentary ways to further fire adaptation. We then share five principles to guide approaching wildfire as a complex risk to increase adaptation to and coexistence with wildfire. Such efforts are more likely to yield socially relevant and legitimate strategies for building wildfire adapted communities by recognizing and accounting for the complexities of wildfire governance amongst a variety of stakeholders who may operate at various scales using different knowledge systems.

key step for addressing wildfire risk management as a complex risk is to embrace knowledge plurality and seek expertise beyond the technical. Including other types of

expertise (and thus complexity) can increase the local relevance and legitimacy of the output which can be critical to local implementation. Questions about what and who defines risk for a locale also are often overlooked by assessments where local stakeholders' definition of risk and key values of concern are absent.

In some rural areas, for instance, instead of being concerned with structures, residents may be more concerned about the loss of fencing, grass, or forests that are critical to their culture or livelihood, yet many risk management approaches focus solely on structure loss (Kent et al. 2003; Paveglio et al. 2015). To avoid giving primacy to any one form of knowledge and foster a shared understanding of wildfire risk, complex risk approaches take into account the range of different knowledges of public, tribal, and private affiliated actors, practitioners, researchers (social and ecological), and residents who may be differently affected by wildfire risk.

Such conversations can bring valuable alternative insights to the conversation and help shape the technical and other methodological choices that lead to risk-related outputs. Processes where technical inputs are just one of many inputs in a larger, inductive process and incorporate place-based understandings through facilitated dialogue more readily align with complex risk and likely help develop risk management efforts tailored to a variety of local conditions (Paveglio et al. 2018; Charnley, Kelly, and Fischer 2020; McCaffrey et al. 2020). One action that could be taken guided by this principle would be to revisit the NSA portion of the CS, potentially as regionally- or state-specific components, in a way that meaningfully incorporates a range of different values and knowledges absent in prior analysis.

2.3.5 Causes of wildland fires and factors that influence knowledge of fire management at 8 Crofton village, Makoni District, Zimbabwe (2017)

The study showed that wildland fires are a threat to the conservation of biodiversity and human life. The findings also showed that in Zimbabwe, the newly re-settled smallholder farmers are perceived as the major drivers of wildland fires. This survey was conducted in Crofton Village Ward 38 of Makoni District in Zimbabwe to explore farmers' knowledge on the causes of wildland fires and factors that influence their knowledge on the management of wildland fires.

A random yet purposive multistage sampling was used to select 60% of the total population in the study area. Data processing and analysis was done using the Statistical Package for the Social Sciences (SPSS) version 21.0 of 2012 to analyse the relationship between the dependent variable (farmers' knowledge of wildland fire management) and independent variables (sex, age, level of education and period of stay in the village). Farmers revealed that land clearing, poor disposal of ashes, brick moulding and arson were the chief causes of wildland fires. There was a significant relationship between period of stay in the village with farmer's knowledge of management of wildland fires.

Farmers' knowledge on wildland fire management was influenced by period of stay and exposure to wildland fires in the village. Farmers with a longer period of stay in the study area were more knowledgeable than those with a shorter period. Gender and age had an effect on farmer's knowledge about causes of wildland fires and men apparently had more knowledge and experience with wildland fire management. Human activities were responsible for most of the wildland fires. Resettled farmers, farmers with primary level and those with no formal education had limited knowledge on wildland fire management. It was recommended that effective wildland fire awareness programmes be put in place to improve farmer knowledge and wildland fire management skills.

2.4 RESEARCH GAP

This study notes that though the research on wildfire management strategy has been done in various places globally , regionally and locally, the researcher decided to carry-out this study in Hwedza District Of Zimbabwe. Particularly in ward 1, in the quest to see if the strategies which have been presented by literature as is shown through empirical studies above will apply to Hwedza, Ward 1 District. This research therefore sought to get an assessment by villagers and Environmental management staff in this area of Zimbabwe of why wildfires continue to occur in the Hwedza area of Zimbabwe despite having these strategies in place.

2.5 CHAPTER SUMMARY

This section of research was about literature review. This writer understands that much of the information and material being studied has been published else-where in previous years. So it is very imperative to look at what other authors have said pertaining to issue under study. So chapter two was all about looking at and exploring theories which guide

the issue of credit risk management strategies on non-performing loans. Also some academic and business concepts have been looked at. Basically, empirical literature has been scrutinised by this researcher so as to see how the issues are perceived and areas being studied herein. The next chapter is called chapter three. It involves what is termed research methodology. It spells out how the research and actual field work in data collection is going to be conducted

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter titled research methodology is also referred to as a systematic way to solve a study problem. It covers area of science of studying how the research was going to be carried out. It essentially states the procedures by which this researcher went about her work showing some description, explanations and the then predicted phenomena. It also covers the study of methods by which the intended research knowledge was gained. Its aim has always been to give the work plan of the entire research. It also elaborates the various steps and phases that were generally adopted by a researcher in studying his research problem and also showing some logic behind them.

3.1. Research Design

The researcher has discovered that such a type of results expected from this type of study would be obtained through assessment. It is this researcher is desire to look at means that tries to discover the perception of the target population towards the effectiveness of strategies available to reduce veld fires in Hwedza. So there would be some form assessment of those strategies as researcher interacted with the people of ward 1 Hwedza in Zimbabwe.

3.2. Target Population

The research was conducted in ward 1 of Hwedza District. Hwedza District is situated in Mashonaland East Province, Zimbabwe. It is located about 127kms south of Harare. Hwedza district has a total area of 2650 km². Ward 1 of the district consists of 46 villages. According to ZIMSTATS National Census of 2022, the population of the studied ward is 4000 people.

operations. This research however did not target the whole population but sample some group.

The target personnel for research were those in this specific ward. These are the people whom the researcher felt were the ones with hands on experience in the process of fighting veld fires in said environment. Though some did not understand these strategies, definitions and clarifications were made by the researcher to bring clarity to what was being discussed and sought.

3.3 Sampling methods and sampling techniques

3.3.1 Stratified sampling

This is such a probability method that aims to link knowledge of the population to the principle of random selection so as to increase the accuracy and representation of the sample. This researcher, in his study, then divided the population into strata and came up with the following strata: -

- Ordinary Villagers
- Environmental Management Agency Employees

Through this process of dividing the population into a series of relevant strata, it implies therefore that the sample was more likely to be a very much true representative of the population. The researcher was thus highly ensured that each of the said strata was represented proportionally within the sample.

3.2.2 Non-Probability Sampling Methods

According to Peterson (1982), the elements that form part of population being studied do not normally have some equal chances of being selected for testing. This researcher thus decided to use what is termed convenience and judgmental sampling in the research process.

According to Saunders (2007), sampling is one of the most critical components of research studies which involve and is centered very much on the collection of primary data from population. He further states that the choice of a sampling technique should therefore seek to identify a principle by which the certain members of population are selected to be included in the sampling group. Moreover, he clearly states that any statistical method should require

some specific size of sample to be collected to satisfy requisite levels of confidence as suggested previously by Sharp (2002)

3.3.3 Judgmental Sampling

During his research exercise, this researcher also used this type sampling method to select the participants from various villagers of this ward. The process of judgmental sampling mainly involves selecting some particular sample units on purpose depending on the subject of inquiry.

Again , during the research, the participants were selected on the basis of availability, broad knowledge and understanding of the various strategies. The researcher also used judgmental technique to allow substantial control on the selection of the sample units. This would also assure her of a representative sample of the population and eventually assuring her of collection of accurate data. This technique generally saved the researcher's limited time and financial from which could have been wasted while probing some participants who were not very much knowledgeable of the area of study.

3.3.4 Sampling frame

Proctor (2003) in brief gives a simple definition of a sampling frame which he says is the set of source materials from which the sample is selected. This type of definition also encompasses some purpose of sampling frames, which provides the means for choosing the particular members of the target population that are to be selected for the interview in the survey. In most cases, most schools suggest that more than one set of materials may be necessary.

3.3.5 Sample size

In the research , the sample size is one important feature of any empirical study in which the final goal is to make inferences about the population from a sample. In the actual research study practice, the sample size used in a study is determined based on the expense of data collection, and eventually the need for the research process to have much sufficient statistical power. In most complicated studies, there may usually be several different sample sizes involved in the study.

These include the fact that in a stratified survey, there would be different sample sizes for each stated stratum. Usually, in a census, data are collected on the entire population, therefore the sample size is equal to the total given population size. It therefore also follows that in experimental design, where a study may be divided into diverse treatment groups, there may be also some various unique sample sizes in each group.

The sample sizes are usually chosen in various or several different ways which include:

- Experience – say for example, this includes those items readily available or convenient to collect given historical experience. Usually a choice of small sample sizes, though sometimes they are necessary, can eventually lead to or result in wide confidence intervals or risks of errors in statistical hypothesis testing.
- Some researchers like to use a target variance for an estimate to be derived from the sample ultimately obtained.
- Some resort to using a target for the power of a statistical test to be used once the sample is collected.

3.4 Data sources

According to Cooper and Schindler (2003:87) data is defined as the facts presented to the researcher from the study environment. It is from the very data that the researcher draws conclusions for the research study. Data is thus supposed to be set into two forms namely primary and secondary data. This researcher mainly used the primary data source though some of the interviewees would refer to readily available data.

3.4.1 Primary Source

The primary source of data involves the actual extraction of data from original supply such as the field itself. This takes the usual form of interview, questionnaires and observation and recording. This researcher therefore applied all the questionnaire to villagers in order to extract required data to solve the problem question. In this case, the primary data is such data that was collected for the first time and for purpose that is under consideration. This

researcher therefore found out that it possible to use primary data since it would give latest and accurate information.

3.5 Data Collection Method

In the research process this researcher used questionnaires which she made in a self-administered and ensured respondents were given a week to complete them. This was a way of giving them a chance to complete the questionnaires at their own pace. Furthermore, the researcher had to take it upon herself to make a follow-up and contact those respondents where possible during the week ,to remind them about the urgency of the questionnaires.

Interviews were based on an interview plan, that is, the plan was given to the interviewees in advance so that they could fully prepare for the interview. Face to face interviews with those within the village were conducted on the company's premises and each interview lasted at most for about 15 minutes.

3.5.1 The Questionnaire

Just like all other techniques, a questionnaire in data collection involves means when each person is asked to respond to same set of questions in a pre-determined order as suggested by DeVaus(2007). The same idea is supported by Saunders (2007) who also considered questionnaires to be the most widely survey data collection techniques. This is due to their ability to collect the required research data beyond the physical reach of the researcher. He therefore defines a questionnaire as a formalized instrument of asking research questions directly as well as in soliciting feedback from respondents or targeted group.

This researcher favoured the use of questionnaires because they encouraged the respondents to respond to sensitive information. The researcher also used some self-administered questionnaires which he first delivered to the target population and latter collected them from the respective participants. By this, the researcher would have some privilege to analyze different views from different level of individuals.

In the research process, before using the questionnaires to collect data, the researcher pilot tested the questionnaire on some four randomly selected individuals within the organisation so that she would refine it and be ensured that the respondents would not have much

difficulty in answering the questions. Furthermore, this helped the researcher to acquire some assessment of the questions' validity and see some reliability of the data collected.

This technique was used to assess the effectiveness of veld fire fighting strategies in Hwedza. These questionnaires had questions which were presented as open-ended and closed questions. The open-ended questions were used for the purpose of promoting critical thinking as well as to increase the respondent's participation while closed categorized questions ensured that the respondents remain onto the matter being addressed and facilitated much quicker and much easier responses which could be compared as they had been predetermined.

The questionnaire approach helped this researcher to save much of her time because questionnaires were self-administered to various people at the same time. This method seemed to be very efficient in collecting data since researcher managed to collect the responses after two working days. The respondents had enough time to answer the questions. The self-administering of the questionnaires help in high response rate not the respondents did not incur any financial costs. This also helped in increasing the reliability of the data as different participants would, in a simple way, air their views in respect of the asked questions.

However, it in other words implied that the questionnaire approach restricted the researcher from noticing the respondents' attitudes, gestures and verbal or non verbal expression towards certain questions. Also the researcher also would wait for some days before she got responses, thereby slowing down the research and study progress. However, on another angle, these limitations of the questionnaire were countered by the use of interviews and observations.

3.5.2 Personal Interview

The process of personal interviews involves direct verbal communication between the interviewer (the researcher in this case) and the interviewee who happens to be the respondent in this case also. Personal interview takes various forms such as telephone interview or face to face oral interview.

There are several reasons why the interviewer would choose personal interview ahead of other forms on research instruments. Such reasons may involve the limitedness of time to

apply other forms of methods or illiteracy of the respondents and the need for interpretation and explanation of certain statements

In his study, the researcher used interviews to those participants who, for various reasons, could not respond to question through answering of questionnaires. In this research, some employees were interviewed verbally as they would require more information about this phenomenon of veld fire fighting or management strategies.

The interviews approach helped the researcher to get immediate feed-back since the responses were immediate unlike in the case with questionnaires whereby the researcher would have to wait for some days to get feedback. The researcher managed to get some reasonably good quality data, which is very much relevant to the study's or research's objectives and since he would ask for explanations where necessary.

3.6. Data collection Procedure and administration

In the process of Data Collection procedure the researcher used some questionnaires. Such questionnaires were self-administered by the researcher and finally the final respondents were given one week, on average, to complete them. It was therefore the researcher's wish to ensure that the respondents would complete the questionnaires at their own pace. It however, remained the researcher's own responsibility to contact respondents during the week to remind them about the need to complete the research questionnaires.

On the other hand, the interviews were very much based on an interview plan, which was given to the interviewees way ahead of the interview dates so that they could fully prepare for the interview session. Also in some cases, face to face interviews with those within the organization were conducted at the actual company's premises, branches, departments or units and each interview lasted at most for close to an average of about 15 minutes.

3.7. Validity of instruments

Amedu (2008:47) suggests that the validity of the instruments used in this research work should be highly controlled by the researcher. This will give a clear information as how to

complete the questionnaire by the respondents and the researcher personally administered and collected them to ensure high rate of turn.

3.8 Reliability of instruments

Amedu (2008:47) again stresses that the truthfulness of the instrument used in collecting data cannot be defined. He says so because analysis relied on future researchers and therefore reliability of instrument can be based on the statistical roll employed as used for data analysis. The questionnaires were tested and that assisted the researcher in achieving the aims and objective of the research questions and hypothesis which are also to be tested.

3.9 Data analysis and presentation tools

Presentation of data was to be done using table , pie charts and graphs as shall be deduced from the software that was used. However, further descriptions and explanations would be given too. The analysis of data obtained from the questionnaire in this research was done by descriptive and inferential statistics through software SPSS.

3.10 Chapter summary

Chapter Three's main area of discussion is the research methodology. It is an area that gives a clear and full description of all the activities, stages as well as procedures which this writer undertook during the research. Such phases and stages included a full and distinct analysis of the research design, subjects, data collection instruments and their administering. The initial assumption that had been underlying was that the tools for the collection of data were effective and relevant to the research study. The succeeding chapter (chapter 4), will focus on data presentation, analysis, and followed by the area of interpretation of the research findings.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0 INTRODUCTION

The main purpose of this chapter is to present, interpret and analyse the data collected on the perceptions on the effectiveness of wild fire management strategies in ward 1 of Hwedza District of Zimbabwe. The data were presented by way of tables and conceptual analysis was done data with particular reference to theories, models and researches cited in chapter two.

4.1 RESPONSE RATE

This researcher therefore chose the questionnaires techniques. Questionnaires were meant for those respondents who were literate enough to read and understand. 50 questionnaires were used targeting selected villagers and 7 were targeting Environmental Management Agency(EMA) employees. Of the 50 questionnaires used, 48 were returned and all the 7 questionnaires targeting EMA employees we returned . The researcher also noted that all of those returned questionnaires were in a usable state. The information given and collected information was quite legible and clear. This shows that the response rate was therefore 83.33%. The table below summarises the outcome.

Table 4.1: Response Rate

Questionnaire Distributed	Questionnaire Returned	Questionnaire Unreturned	Response Rate

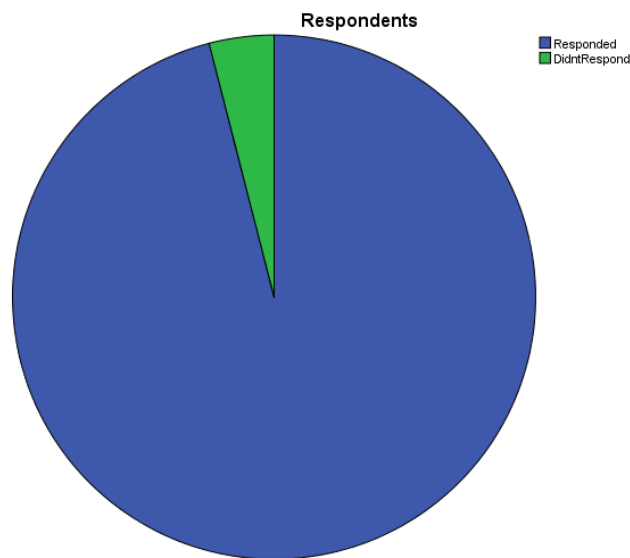
57	55	2	96.49%
----	----	---	--------

Respondents

Table 4.2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Responded	48	96.0	96.0	96.0
	DidntRespond	2	4.0	4.0	100.0
Total		50	100.0	100.0	

Figure 4.1



4.2 DATA PRESENTATION AND ANALYSIS

4.2.1. DEMOGRAPHIC DATA

4.2.1.1 Distribution by gender

Table 4.3

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MALE	25	52.1	52.1	52.1

FEMALE	23	47.9	47.9	100.0
Total	48	100.0	100.0	

Figure 4.2

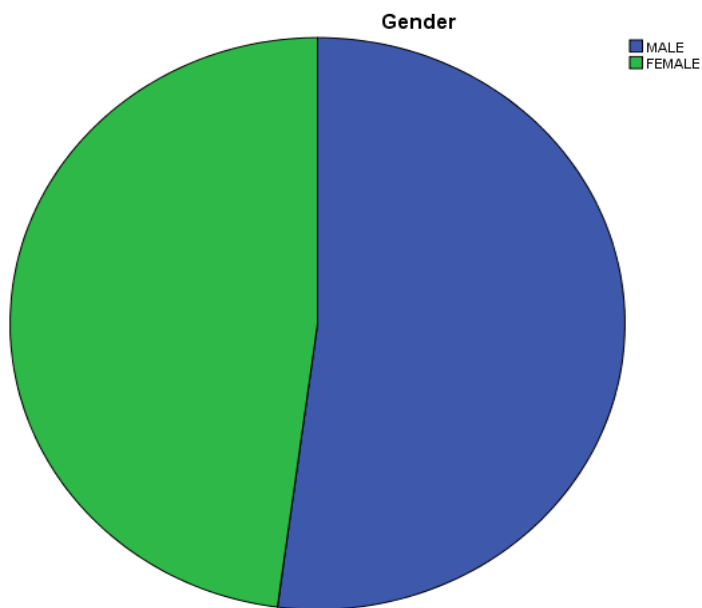


Table 4.4

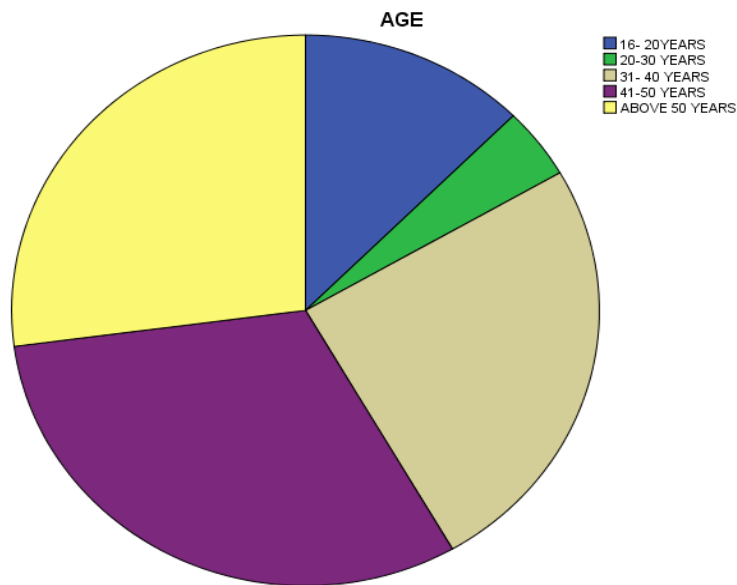
4.2.1.1 Distribution by Age

Table 4.4 Below shows the distribution of age groups of respondents who completed and returned the questionnaires during the research. Those between 16 to 20 years were 6, while those between 20 to 30 years were just two. In the range between 31 to 40 years were 12 while the highest frequency was on those between 41 to 50 years who were 15. The last group was that of those above years who were 13.

		AGE			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16- 20YEARS	6	12.5	12.5	12.5
	20-30 YEARS	2	4.2	4.2	16.7
	31- 40 YEARS	12	25.0	25.0	41.7
	41-50 YEARS	15	31.3	31.3	72.9
	ABOVE 50 YEARS	13	27.1	27.1	100.0

Total	48	100.0	100.0
-------	----	-------	-------

Figure 4.3



4.2.1.1 Distribution by Education Level

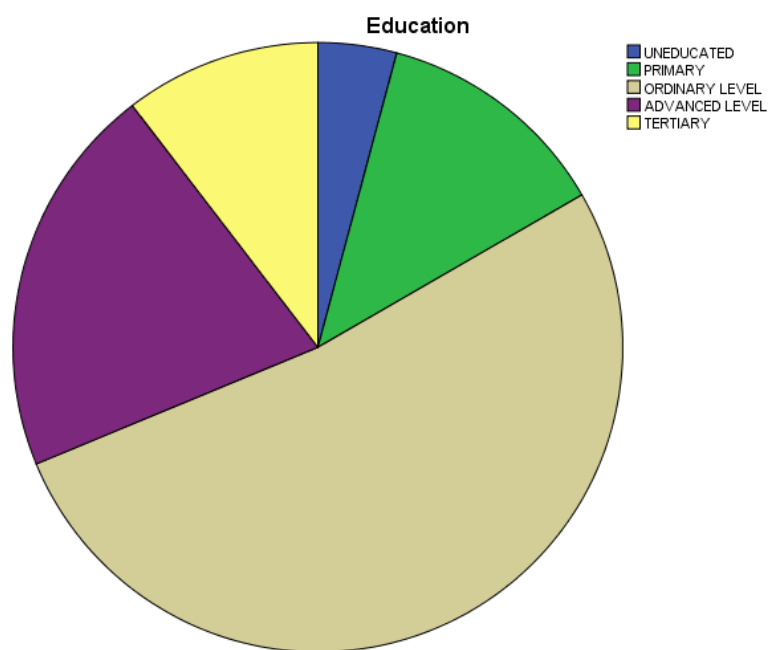
In the table below 4.5, majority of the respondents, 25 out of the total of 48, which is 52.1% attained ordinary level followed by 20.8% who attained advanced level education. Only 4.2% were uneducated while 12.5% had just reached primary level of education.

Table 4.5

		Education			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	UNEDUCATED	2	4.2	4.2	4.2
	PRIMARY	6	12.5	12.5	16.7

ORDINARY LEVEL	25	52.1	52.1	68.8
ADVANCED LEVEL	10	20.8	20.8	89.6
TERTIARY	5	10.4	10.4	100.0
Total	48	100.0	100.0	

Figure 4.4



4.2.1.1 Distribution by Occupation

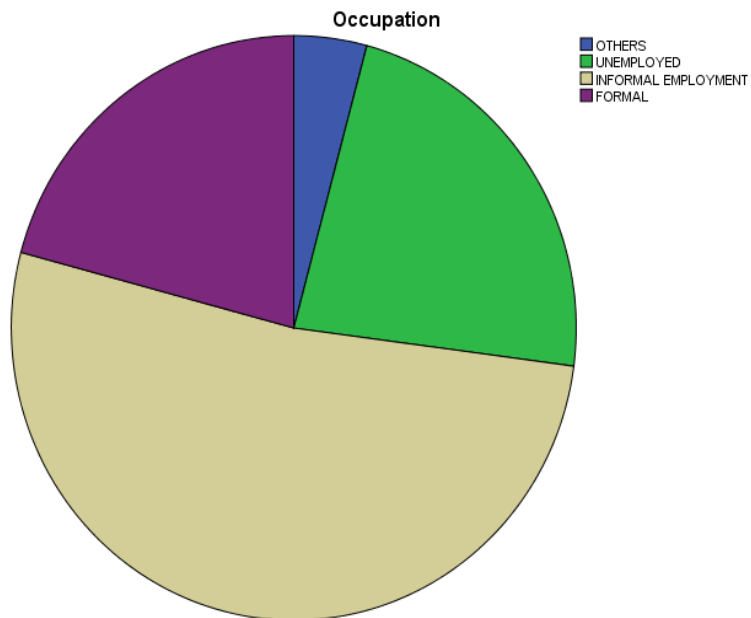
Table 4.6 shows the distribution of respondents by type of employment. More than 50%, in fact 52.1% of the respondents were informally employed, followed by 22.9% who were unemployed. The next group was that of

Table 4.6

		Occupation			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	OTHERS	2	4.2	4.2	4.2
	UNEMPLOYED	11	22.9	22.9	27.1

INFORMAL EMPLOYMENT	25	52.1	52.1	79.2
FORMAL	10	20.8	20.8	100.0
Total	48	100.0	100.0	

Figure 4.5



4.2 PRESENTATION OF FINDINGS

4.3 VILLAGERS RESPONSES

4.3.1 When asked if Hunting contributes to veld fires significantly, the

responses were as follows, 58.3% strongly agreed while 37.5 simply agreed.

Then the remaining 4.2% were neutral implying that they were not very sure of the significance, if any. The summary of response to this question is shown in table 4.7 below together with the counts and weights of each response.

Table 4.7

		Hunting			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NEUTRAL	2	4.2	4.2	4.2
	AGREE	18	37.5	37.5	41.7
	STRONGLY AGREE	28	58.3	58.3	100.0
	Total	48	100.0	100.0	

4.3.2 When asked about their perception on whether or not lightning causes wildfires regularly, the responses were as presented on a table below. Only 4.2% agreed to the statement, while 31.3% were neutral and 47.9% disagreed. The remaining 16.7% strongly disagreed.

Table 4.8

		Lightning			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	STRONGLY DISAGREE	8	16.7	16.7	16.7
	DISAGREE	23	47.9	47.9	64.6
	NEUTRAL	15	31.3	31.3	95.8
	AGREE	2	4.2	4.2	100.0
	Total	48	100.0	100.0	

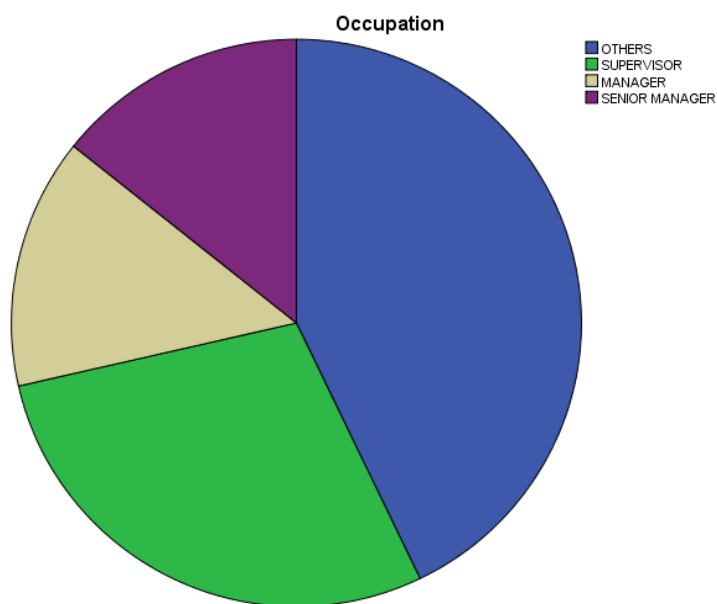
4.3.3 Respondents were asked if untrimmed vegetation, that which forms a dense thicket, would fuel wildfires. The highest response was that of 68.8% which strongly agreed while 25.0% agreed then the remainder of 6.3% was neutral, disagreed and strongly disagreed equally

Table 4.9

		Vegetation			
		Frequency	Percent	Valid Percent	Cumulative Percent

Occupation

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid OTHERS	3	42.9	42.9	42.9
SUPERVISOR	2	28.6	28.6	71.4
MANAGER	1	14.3	14.3	85.7
SENIOR MANAGER	1	14.3	14.3	100.0
Total	7	100.0	100.0	



The question wanted to enquire about the respondents' perceptions on whether not fire which is started by villagers when hunting turned into wild fires. Respondents showed that 42.9% agreed strongly while 28.6% agreed and 28.6% were neutral as shown by table 4.22 below.

Table 4.22

Hunting

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid NEUTRAL	2	28.6	28.6	28.6
AGREE	3	42.9	42.9	71.4
STRONGLY AGREE	2	28.6	28.6	100.0
Total	7	100.0	100.0	

Respondents' general sentiments were against the view that lightning frequently cause wildfire as shown in below table. Only 14.3% agreed, 42.9% were neutral and 14.3 disagreed. See table 4.23 below

Table 4.23

Lightning

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid DISAGREE	3	42.9	42.9	42.9
NEUTRAL	3	42.9	42.9	85.7
AGREE	1	14.3	14.3	100.0
Total	7	100.0	100.0	

All respondents strongly agreed that untrimmed vegetation fuels wildfires.

Table 4.24

Vegetation

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid STRONGLY AGREE	7	100.0	100.0	100.0

When asked about the contribution of fire started while smoking bees would contribute to wild fires, the respondents significantly agreed as shown by a 71.4% weight. This was followed by 14.3% which were neutral and 14.3% which disagreed.

Table 4.25

SmokingBees

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid DISAGREE	1	14.3	14.3	14.3
NEUTRAL	1	14.3	14.3	28.6
AGREE	5	71.4	71.4	100.0
Total	7	100.0	100.0	

These respondents are mainly of the idea that cigarette stubs cause wildfires. 71.4 agreed while 14.3 strongly agreed and 14.3 were neutral.

Table 4.26

Cigarette Stubs

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid NEUTRAL	1	14.3	14.3	14.3
AGREE	5	71.4	71.4	85.7
STRONGLY AGREE	1	14.3	14.3	100.0
Total	7	100.0	100.0	

Asked if they have trained villagers on fire management strategies, all respondents unanimously agree.

Table 4.27

Educ.OnFire

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	7	100.0	100.0	100.0

When asked if they at one time sent messages to villagers on wild fire campaigns, they all unanimously said yes.

Table 4.28

Send Messages

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 7	7	100.0	100.0	100.0

The table below shows a presentation on whether the respondents are in any fire campaign group in their ward. It shows that the respondents are all serious about fighting wild fires.

Table 4.29

Groups In Wards

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	7	100.0	100.0	100.0

When asked about their perception on the effectiveness of fire beaters in putting out wildfires, 85.7 agreed and 14.3 strongly agreed

Table 4.30

Fire Beaters

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid AGREE	6	85.7	85.7	85.7
STRONGLY AGREE	1	14.3	14.3	100.0
Total	7	100.0	100.0	

On ,the use of bucket and sand to put out Wild fire 42.9% disagreed, 28.6 % were neutral and the other 28.6% agreed.

Table 4.31

Buckets and Sand

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid DISAGREE	3	42.9	42.9	42.9
NEUTRAL	2	28.6	28.6	71.4
AGREE	2	28.6	28.6	100.0
Total	7	100.0	100.0	

The use of tree branches to put out fire got 71.4% commendation from those who strongly agreed and 28.4% from those who simply agreed.

Table 4.32

Tree Branches

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid AGREE	2	28.6	28.6	28.6
STRONGLY AGREE	5	71.4	71.4	100.0

Total	7	100.0	100.0
-------	---	-------	-------

Some 28.6 % of respondents agreed that bucket and water method is effective in putting out wildfire while 14.3% strongly agreed and 42.9% were neutral. The last group scored 14.3% who disagreed.

Table 4.33

Bucket Water

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid DISAGREE	1	14.3	14.3	14.3
NEUTRAL	3	42.9	42.9	57.1
AGREE	2	28.6	28.6	85.7
STRONGLY AGREE	1	14.3	14.3	100.0
Total	7	100.0	100.0	

As shown on table 4.34 below, fire guards have been identified as effective in curbing wildfire from spreading. The table below shows that 57.1% strongly agreed while 42.9 agreed simply.

Table 4.34

Fire Guards

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid AGREE	3	42.9	42.9	42.9
STRONGLY AGREE	4	57.1	57.1	100.0
Total	7	100.0	100.0	

When responding to whether or not policy penalties are heavy enough to deter breaches of wildfire rules, 42.9% agreed, while 28.6 strongly agreed. 14.3 % were neutral while 14.3% again disagreed.

Table 4.35

Police Penalties

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid DISAGREE	1	14.3	14.3	14.3
NEUTRAL	1	14.3	14.3	28.6
AGREE	3	42.9	42.9	71.4

STRONGLY AGREE	2	28.6	28.6	100.0
Total	7	100.0	100.0	

Of the 7 respondents, only one has participated in fire suppression incidents.

Table 4.36

Suppression

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid NO	1	14.3	14.3	14.3
YES	6	85.7	85.7	100.0
Total	7	100.0	100.0	

Asked to say whether or no campaigns on wildfire have been done in local media 85.7 % said yes while 14.3% said no.

Table 4.37

LocalMedia

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	1	14.3	14.3	14.3
NO	6	85.7	85.7	100.0
Total	7	100.0	100.0	

This section wanted to establish if there is any call centre in ward 1 of Hwedza where wildfire incidents are reported. The responses show none

Table 4.38

CallCentre

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid NO	7	100.0	100.0	100.0

Table 4.39 below shows that there are some offenders who had been fined for breach of wild fire rules.

Table 4.39

AnyFined

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	7	100.0	100.0	100.0

Table 4.40 Below shows respondents' remarks on whether or not any one offender from this ward had been imprisoned for fire related offences. The answer was no as shown by 100% on no

Table 4.40

		AnyPrisoned			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	7	100.0	100.0	100.0

4.5 CHAPTER SUMMARY

This chapter focused on the presentation and analysis of data. The research results were discussed in line with the major research question stated in chapter one and the sub questions. The research results enabled the research to the perception of villagers in Hwedza ward 1 on effectiveness of wildfire fighting or management strategies. The next chapter focuses on the discussion of finding and aligning them to research questions .

CHAPTER FIVE

DISCUSSION

5.0 INTRODUCTION

This chapter is about discussion and analysis of finding presented in chapter four. The writer will attempt to look at each and every research objective and see how the findings address the research questions as they are presented in chapter one.

5.1 CAUSES OF WILD FIRES IN HWEDZA

The researcher discovered that in this area where study was conducted, in Hwedza, the are basically to alleged causes of wildfires which are natural causes and human causes. These shall be discussed in detail below.

5.1.1 Natural Causes

The sole alleged cause of wildfires is lightning. Research has discovered that when lightning strikes especially in areas with dense vegetation, there is a great probability of fires happening. During this research the responses in support of the idea that lightning can cause wildfires significantly however were very low. This shows that wildfire being caused by natural phenomenon like lightning are not as frequent as those caused by other means.

5.1.2 Human Causes

Major or regular wild fire outbreaks were reported to be mainly caused by human being in the locality. Results showed that both villagers and EMA employees concurred in most areas that the following human actions trigger wild fires and also cause the fires' spreading.

Hunting

Responses showed that both villagers and EMA employees unanimously concurred that hunting causes significant wildfires. This is where hunters start up fires in the forests in a way engulfing and trapping targeted animals within the encirclement. It is however unfortunate that the fire usually spins out of control as it is usually blown to unwanted areas by wind. This developed into some uncontrollable wild fires which leads to loss of vegetation, animal and human life in worst cases.

Smoking Bees

Villagers harvest honey from natural bee hives usually in winter. This is a period which is generally known that natural honey would be ready for harvest yet it is also the time when the grass is dry. The traditionally known method of harvesting honey begins with choking the bees by use of smoke burning grass. This weakens this inherently and naturally dangerous insect and leaves harvesting of honey easier. Respondents showed that they are sure that smoking of honey indeed may lead to wildfires as the fires started may be blown out of control by wind especially when the fire is left unattended when people are attacked by bees.

Cigarette Stubs

According to this research, those who smoke cigarettes are culprits in as far as the issue of starting of wild fires are concerned. They do not completely put out the fire on their cigarette stub and when the wind blows, there is a great chance of lighting the veld, however, responses from this research showed that according to the villagers, not much wild fires are from cigarette stubs.

5.2 WILD FIRE MANAGEMENT STRATEGIES IN HWEDZA, WARD1

5.2.1 Prevention Methods

This section looks at measures that authorities have put in place so as to deter would-be offenders. The methods are discussed in detail below.

Fireguards

These are a way of putting the otherwise vast track of land into blocks, separated by a deliberately cleared stretch of about 6 metres to 9 metres width to prevent wild fires from spreading. If properly done, fire guards should put an end to a wild fire at that particular moment when the inferno reaches that fire guard.

Education and Campaigns

This involves some training of villagers and citizens on the need to avoid starting of fires which will be difficult to control or which they will leave unattended. It is one way that EMA employees regularly train villagers on the importance of fire detection and fire suppression especially before it goes wild. Some volunteers have been put into some wild fire campaign groups.

Fines and Penalties

Authorities have put fines in place to punish those offenders as well as to deter those would-be offenders.

5.2.2 Detection Methods

Smoke

A rising smoke into the atmosphere is usually one way which villagers use to detect that a wildfire is ensuing.

Actual Fire

In most instances, villagers detect the fire by actually seeing the burning vegetation. This is usually when it is at an advanced stage.

5.2.3 Suppression Methods

This refers to means by which a wild fire is controlled in an effort to put it out. Methods which are available include:

Fire beaters

These are made from a flexible rubber material and are tied to a long wooden handle. This is used to beat the fire at its base to ensure it is put out.

Tree Branch Beaters

This involves plucking off of tree branches to use for beating fire until it is put out

Water and Bucket

Usually, in cases like at household level, where some fire seems to be going out of control, people would pour on water using buckets to put it out. This is also a strategy which is available to the villagers in Hwedza.

Bucket and Sand

Villagers in Hwedza ward 1 use buckets to pour sand onto burning fire to suffocate the fire as they try to put it out.

5.3 HOW AVAILABLE WILDFIRE MANAGEMENT STRATEGIES ARE PERCEIVED

This research aimed at looking at how fire would be controlled. These strategies include preventing it from starting. Then another method would involve early detection when the wildfire has started. This will enable responsible authorities or assigned individuals or groups to deal with the fire decisively and stop it from spreading. This is called suppression methods. Detailed below is the discussion of how the villagers responded to questions to show how they perceived about the effectiveness of the strategies.

5.3.1 Prevention Methods

Among the available fire prevention methods, villagers and EMA staff concurred that the most useful and effective method to prevent wild fires from starting is by educating villagers

not to start fires unnecessarily. Then on issues to reduce or stop spreading of fire is by creating fire guards which are as per standard. On the issue of fines. The villagers disagreed with the sentiments of the EMA staff that penalties were stiff enough to deter possible breach of fire rules. The villagers argue that fines have to be reviewed up wards to levels which will stop any potential starting of fires.

5.3.2 Detection Methods

The only way that the villagers would detect the fires would either be by some smoke as the fire is being started or by the actual fire as it consumes vegetation and grass while burning. Villagers feel that these alone are not enough since at times by the time they recognize the burning fire, it will be too late to put the fire out.

5.3.2 Suppression Methods

On fire suppression methods, the respondents gave credit to fire beaters and the use of tree branches to beat the base of the fire to put it out. There is however need for further training on use of these tools. The respondents generally had some reservation on use of buckets and water or buckets and sand to put out wildfires. These are not very effective means of putting out such raging and uncontrollable flames. If one attempts it might end up in loss of lives.

5.4 RECOMMENDATIONS TO IMPROVE WILDFIRE MANAGEMENT

More awareness campaigns on dangers of wildfires need to be carried out regularly until it sinks into the villagers' minds that wildfires are deadly and dangerous to the forests, the wild animals and even to human lives. Alternative solutions to issues demanding starting of fire should be used or fires should always be controlled and confined to areas which they are intended. More attention was to be place on farmers who burn grass and vegetation before cultivating crops. These have been seen as the most culprits especially in resettlement areas.

There is also need to try and use modern technology in fire detection. Such technology include sensors and cyrene to warn the villagers and residents. In the quest to monitor fires, recommendations from the villagers are that there might be some need to use such modern technology as drones which track the fires.

On recommendations to improve fire suppression, the respondents suggested the use of fire engines which blow water onto the flames to put out the wildfires. They recommended that each ward should have at least one vehicle especially in dry periods of the year.

5.5 CHAPTER SUMMARY

This chapter was mainly about discussion and analysis of findings which were presented in chapter four above. The next chapter, which is chapter six, will deal with conclusions especially trying to address research questions as they are presented in chapter one. It will also give recommendations for further study. This will be a way of showing future researcher some areas which present some research gap.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.0 INTRODUCTION

Chapter Six gives some summary of the research findings. It also goes on to give the related conclusion of the matter under study. This is the last chapter of the research project which therefore gives some recommendations especially of other areas for further study as is discovered during the research project

6.1 SUMMARY

The purpose of the study was to look at perceptions on the effectiveness of wild fire management strategies in ward 1 of Hwedza District, Zimbabwe in Zimbabwe

The literature review looked a collection of detailed relevant knowledge compiled by the writer from academic work contributed by various authors on almost similar research undertaken in the same area of study. This research generally helped to produce many ideas relevant to the study and enabled the researcher to try and relate the ideas. The researcher wanted to apply both qualitative and quantitative approaches. There are some instances where the research would have to use descriptive and content filled explanations and other where mathematical calculations were required..

In the research, the sample size is one important feature of any empirical study in which the final goal is to make inferences about the population from a sample. In the actual research study practice, the sample size used in a study is determined based on the expense of data collection, and eventually the need for the research process to have much sufficient statistical power. In most complicated studies, there may usually be several different sample sizes involved in the study.

In the research process this researcher used questionnaires which he made in a self-administered and ensured respondents are given a week to complete them. This was a way of giving them a chance to complete the questionnaires at their own pace. Furthermore, the

researcher took it upon himself to make a follow-up and contact those respondents where possible during the week ,to remind them about the urgency of the questionnaires.

6.2 CONCLUSIONS

It was deduced that there are some fire management strategies which are very effective in Hwedza, ward1. These include but are not limited to fire guards, fire beater and tree branches whilst other methods like water and bucket as well as bucket and sand were not very effective.

Recommendations from the villagers were mainly centred on the need for the Environmental management Agency to train villagers so that they do not unnecessarily start unattended and uncontrollable fires. Also some recommendations are that police officers need to enforce the penalties and arrest offenders so as to prevent would be offenders from breaching the rules on wild fire management.

6.3 LIMITATIONS OF THE STUDY

Generally , organisations in any industry tend to withhold key information pertaining to their main challenges. So it is one area that this researcher would face such a challenge of failing to get much positive response. However, during interviews the researcher tried as much as she could to try and gain the participant's confidence and belief by actually assuring them that their views and responses for the session would be held in the strict confidence it deserves. This was a way which was meant to allay any probable fear .

Moreover, we are in the area of the pandemic called COVID-19 .So some targeted respondents totally refused to talk to the researcher owing to the fear that they would or might get infected since the disease is highly communicable

6.4 RECOMMENDATIONS FOR FURTHER RESEARCH

The writer wishes to recommend further studies be carried out by the organisations such as Environmental Management Agency and other environment protection activists like non-governmental organisations. Also the researcher proposes that further studies should not limit themselves to Hwedza but should also look at other villages in the region and

internationally. This is because Zimbabwean case might not give a true picture good for study.

The study also wishes to recommend further research on sustainable funding methods for purchase of fire equipment for rural vocational wards. Such models should be targeting the villages and the other one targeting the resettlement areas in a sustainable way.

References:

AB-642 Wildfires, AB-642, 2019-2020 Reg. Sess. (Cal. 2021)(enacted).
https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB642

Agee, J.K., and Skinner, C.N. (2005). Basic Principles of Forest Fuel Reduction Treatments. *Forest Ecology and Management*, 211(1-2): 83-96. DOI:10.1016/j.foreco.2005.01.034

Ager, A.A., Palaiologou, P., Evers, C.R., Day, M.A., Ringo, C., and Short, K. (2019). Wildfire Exposure to the Wildland Urban Interface in the Western US. *Applied Geography*, 111. <https://doi.org/10.1016/j.apgeog.2019.102059>

Aguilera, R., Corringham, T., Gershunov, A., and Benmarhnia, T. (2021). Wildfire Smoke Impacts Respiratory Health More Than Fine Particles From Other Sources: Observational Evidence from Southern California. *Nature Communications*, 12. <https://doi.org/10.1038/s41467-021-21708-0> Amah

Mutsun Tribal Band. (2014). Amah Mutsum Land Trust Five-Year Strategic Plan: 2014-2019.

Anu Kramer, H., Mockrin, M.H., Alexandrew, P.M., and Radeloff, V.C. (2019). High Wildfire Damage in Interface Communities in California. *International Journal of Wildland Fire*, 28(9), 641-650. <https://doi.org/10.1071/WF18108>

Barillo, D. J., Brigham, P. a, Kayden, D. a, Heck, R. T., & McManus, a T. (n.d.). The fire-safe cigarette: a burn prevention tool. *The Journal of burn care & rehabilitation*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/10752750>

Bruck, D., & Ball, M. (2007). Optimizing Emergency Awakening to Audible Smoke Alarms: An Update. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 49(4), 585-601. doi:10.1518/001872007X215674

Carroll, J., & Bright, A. (2010). Integrative complexity of public beliefs toward wildfire management: development of a scale. *Journal of Applied Social Psychology*, 40(2), 344– 359. Wiley Online Library. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1559-1816.2009.00577.x/full>

Coles, C. D., Strickland, D. C., Padgett, L., & Bellmoff, L. (2007). Games that —work! using computer games to teach alcohol-affected children about fire and street safety. *Research in developmental disabilities*, 28(5), 518-30. doi:10.1016/j.ridd.2006.07.001

<https://www.ema.co.zw/>

Fisher, G. S., Baker, A., Koval, D., Lishok, C., & Maisto, E. (2007). A field test of the Cougar Home Safety Assessment (version 2.0) in the homes of older persons living alone. *Australian Occupational Therapy Journal*, 54(2), 124-130. doi:10.1111/j.1440- 1630.2006.00604.x

McCaffrey, S. 2008. Understanding public perspectives of wildfire risk, Wildfire risk, human perceptions and management implications. Resources for the Future, Washington, D.C.

Morris, M. et al., 1998. Maize Seed Industries in Developing Countries, Technical Economics, and Policy Issues, Boulder, Colorado, USA, pp. 35 – 54.

Mtambanengwe, F. et al., 2012. Climate change and variability: Smallholder farming communities in Zimbabwe portray a varied understanding, *Journal of African Crop Science* 20(2): 227 – 241.

Nkomo, G.V., Sassi, M. 2009. Impact of veld fires on land on resettlement farmers in Cashel Valley Cashel Valley in Zimbabwe, *Natural Resources, Agricultural Development and Food security, International Research Network* 9 (2):. 1–17.

Nyamadzawo, G., Kanda, A., Kuhlande. A., Masona, C. 2013. Understanding the causes, socioeconomic, environmental impacts and Management of veld fires in tropical Zimbabwe. *Fire Science Reviews* 2: 2

Appendix : 1

QUESTIONNAIRE

I am Chikohora Wadzanai, a Bachelor of Environmental Science (Honours) Degree in Natural Resources Management student at Bindura University of Science Education. This questionnaire is designed to collect information on an assessment of wild fire causes, impacts, and mitigation measures for wild fires in ward 1 of Hwedza rural district. This research therefore requests cooperation through your consent to answer as accurately as possible. Any information that you provide in this questionnaire will be treated confidentially and will be solely for academic purposes.

VILLAGE NAME

TICK WERE APPRIPIATE

SECTION A: DEMOGRAPHIC INFORMATION

1. **Gender**
MALE FEMALE
2. **What is your age group**
16-20Yrs 21-30Years 31-40 Years 41-50ears Above 50Years

3. **What type of employment (occupation) do you have**

Formal self-employment unemployment others

4. **Level of education**

Uneducated Primary Level O' level A' level Tertiary

5. **Marital status**

Single Married Divorced
Widow/widower

SECTION B: CAUSES OF VELD FIRES:

Hunting is the major cause of veld fires in our ward:

Strongly Disagree Agree Neutral Disagree Strongly Disagree

Lightning increases rate of veld fire in our ward

Strongly Disagree Agree Neutral Disagree Strongly Disagree

Smoking bees during honey extraction causes veld fire in Hwedza

Strongly Disagree Agree Neutral Disagree Strongly Disagree

Untrimmed vegetation fuels veld fires in Hwedza

Strongly Disagree Agree Neutral Disagree Strongly Disagree

Cigarate stubs cause many veld fires in Hwedza

Strongly Disagree Agree Neutral Disagree Strongly Disagree

SECTION C:

FIRE MANAGEMENT STRATEGIES

Have you been educated on veld fire management strategies?

Yes

No

Do you receive messages of veld fire awareness campaign from agencies and authorities?

Yes

No

Do you have veld fire management groups in your ward?

Yes

No

Fire Beaters are very useful in putting out veld fires

Strongly Agree Agree Neutral Disagree Strongly Disagree

Bucket and Sand systems helps in putting out veld fires

Strongly Agree Agree Neutral Disagree Strongly Disagree

Tree branches are effective in putting out fire

Strongly Agree Agree Neutral Disagree Strongly Disagree

Bucket and Water system is effective in managing veld fire

Strongly Agree Agree Neutral Disagree Strongly Disagree

Fire Guards help in reducing spreading of veld fire

Strongly Agree Agree Neutral Disagree Strongly Disagree

Police penalties are stiff enough to deter starting of veld fires by people

Strongly Agree Agree Neutral Disagree Strongly Disagree

Recommendations of methods to reduce veld

fires: _____

6. **Gender**
MALE FEMALE
7. **What is your age group**
16-20Yrs 21-30Years 31-40 Years 41-50ears Above 50Years
8. **What type of employment (occupation) do you have**
Formal self-employment unemployment others
9. **Level of education**
Uneducated Primary Level O' level A' level Tertiary
10. **Marital status**
Single Married Divorced
Widow/widower

SECTION B: CAUSES OF VELD FIRES:

Hunting is the major cause of veld fires in our ward:

Strongly Disagree Agree Neutral Disagree Strongly Disagree

Lightning increases rate of veld fire in our ward

Strongly Disagree Agree Neutral Disagree Strongly Disagree

Smoking bees during honey extraction causes veld fire in Hwedza

Strongly Disagree Agree Neutral Disagree Strongly Disagree

Untrimmed vegetation fuels veld fires in Hwedza

Strongly Disagree Agree Neutral Disagree Strongly Disagree

Cigarate stubs cause many veld fires in Hwedza

Strongly Disagree Agree Neutral Disagree Strongly Disagree

SECTION C:

FIRE MANAGEMENT STRATEGIES

Have you educated villagers on veld fire management strategies?

Yes No

Do you send messages of veld fire awareness campaign to villagers?

Yes No

Do you have veld fire management groups in you ward?

Yes No

Fire Beaters are very useful in putting out veld fires

Strongly Agree Agree Neutral Disagree Strongly Disagree

Bucket and Sand systems helps in putting out veld fires

Strongly Agree Agree Neutral Disagree Strongly Disagree

Tree branches are effective in putting out fire

Strongly Agree Agree Neutral Disagree Strongly Disagree

Bucket and Water system is effective in managing veld fire

Strongly Agree Agree Neutral Disagree Strongly Disagree

Fire Guards help in reducing spreading of veld fire

Strongly Agree Agree Neutral Disagree Strongly Disagree

Police penalties are stiff enough to deter starting of veld fires by people

Strongly Agree Agree Neutral Disagree Strongly Disagree

1. Have you been involved in the fire suppression session?

YES

NO

2. Who organizes the team in the event of fire occurrence

.....
.....

3. What challenges do you face in your community in the management of wildfires?

.....
.....
.....

4. Which other organisations you work with in terms of fire management?.....

.....
.....
.....

5. Does EMA use local media to conduct fire awareness programmes

YES

NO

6. Are fire breaks inspected by EMA, if yes in which season of the year

.....
.....
.....

7. Is there a call centre where a fire can be reported daily?

8. YES
NO

9. Is the fine on causing veld fires stiff?
YES NO

10. If yes to the above , why do you say so

.....
.....
.....
.....

11. If no to the above , why do you say so

.....
.....
.....
.....

12. Is there anyone in the ward who has been imprisoned for starting a fire.....

13. YES
NO

14. Does the current wild fire management practice include education, fire breaks and enforcement in its plan

.....

