ENVIRONMENT AND CULTURE: A STUDY OF PREHISTORIC SETTLEMENT PATTERNS IN THE EASTERN HIGHLANDS OF ZIMBABWE

By

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To my Parents

ABSTRACT

There is always a symbiotic relationship between the physical environment and cultural behaviour of a society. The physical environment provides resources and options for subsistence, raw materials for economic development, landforms and landscapes that may later be imbued with iconic, associative, symbolic or religious values. Understanding the environmental conditions in particular cultural landscapes at particular periods may explain aspects of cultural behaviour of communities, especially settlement locations. This research is an investigation of the nature of the prehistoric culture-environment relationship in Zimunya, in the central part of the eastern highlands of Zimbabwe. The eastern highlands form a distinct physiographic region of Zimbabwe, and should have required or led to particular technological and cultural adaptations of the prehistoric communities that lived in it throughout the ages.

The results of this investigation show that there are patterns in the distribution of the archaeological settlements in the research area. A statistical investigation of the sites indicates that some of them are associated with particular aspects of the physical environment. Stone Age settlement sites are found on the hills that dot the gently undulating plains and along river valleys of the research area. They are also in close proximity to quartz outcrops, the quartz of which was apparently exploited as raw material for tool manufacturing. Sites of the farming communities occur in various situations, although sites with pit structures are located on the northern slopes of the upland areas of the Vumba mountains. Although sociological factors could have been significant, the detected patterns appear to be the result of the influence of the physical attributes of the landscape such as topography, proximity to water sources and climatic conditions.

Key words:
climate, environment, Eastern Highlands, GIS, palaeo-climate, settlement patterns, spatial archaeology, statistical analysis, Zimunya

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ABBREVIATIONS

ALM – Ancestral Landscapes of Manyikaland project

BP – Before Present

CDS – Centre for Development Studies

GIS - Geographic Information Systems

IT – Information Technology

NMHS – National Museum of Human Sciences

NMMZ - National Museums and Monuments of Zimbabwe

NORAD – Norwegian Aid for Development

NUFU – Norwegian Centre for International Cooperation in Higher Education

QUADRU – Quaternary Dating Research Unit

INTRODUCTION

The eastern highlands of Zimbabwe constitute a major ecological region of Zimbabwe and southern Africa. This zone is dominated by montane grasslands and isolated stands of rainforests whose characteristics reflect the influence of the physical environment and past climate. The eastern highlands have subdued temperatures and high rainfall. Archaeologically, the eastern highlands region is famous for the ancient agricultural terraces which have attracted the attention of historians and archaeologists since the early part of the 20th century. Various theories have been put forward to explain the development of the terraces and their use, the most plausible being that they are an indication of the adaptation of the prehistoric communities to the climate and the topography of the region (Soper 2002; 2006).

The ancient terraces do not form the only archaeological evidence in the eastern highlands, as there are remnants of ancient settlements in the form of pit structures, forts and other enclosures which show long term settlement in the region. If the environment could have influenced societies of the second millennium AD, there is no reason to assume that it could not have affected earlier communities in one way or the other. It is the aim of this research to investigate the relationship between prehistoric culture and environment in the eastern highlands, specifically the central parts of this region.

The influence of the natural environment on cultural developments is indisputable, although it is not deterministic. The way communities respond to changing environments is not uniform across the world, as this is partly influenced by historical and cultural experiences. It is also known that human cultures can also influence their environment (Childe 1957, 1981). There have been suggestions, for example, that the change in climate noticed in the 17th to 19th centuries AD in southern Africa was a result of both natural and anthropogenic factors such as the burning of forests which eventually affected the balance of ozone gases (Zwiers and Weaver 2000). Thus while climate and climate change are not deterministic, their role in influencing cultural developments is indisputable. Holmgren and Öberg (2006) have argued that changing water budgets must have ecological and socio-economic consequences. Their comparison of southern and Eastern Africa reveals that population shifts and some social changes in the last 1000 years were associated with climatic changes in both regions. Periods of favourable climate have been associated with societal growth and the emergence of new population centres of power.

The decision to investigate the eastern highlands was influenced by a number of factors. First and foremost was the location of the NUFU Archaeology project in the area. Secondly, the unique position of the eastern highlands in the ecological variations of Zimbabwe in contemporary times could have had a similar outlook to past communities. I was interested in finding out how the prehistoric communities could have related with the environment, in particular whether or not it was exploited for its unique ecology. In his work on the origins and decline of southern Zambezian states, Pikirayi (2001) sees the development of the Nyanga complex in northeastern Zimbabwe as one that was forced by historical and environmental circumstances to transform the marginal area of Nyanga into a productive zone. This research therefore, focuses on how the archaeological communities in the research area related with their physical and climatic environment.

Although the research accepts the influence of political conditions in decisions regarding settlement locations, emphasis is on the role of the climate and climate change. Changing locational patterns during different cultural periods reflects changing climate or changing social relationships. By relating the spatial patterns of prehistoric settlements, it might be possible to determine whether the societies related to those settlements were stable or not. It has been documented that shifting climatic conditions lead to changes in the social organisation (Flannery 1968). The process of investigation in this research assumes that there is some knowledge of the general requirements of particular economies such that under stable conditions their behaviour is predictable. Deviations from the expected conditions would be expression of environmental or social adjustments. The research question then would be to find out what the society was adapting to. As a reflection of adaptation, settlement patterns and the technological evidence reflected in the cultural material are indications of the conditions in which a society existed.

Archaeologists and palaeo-climatologists have revealed the inverse relationship between the climate of the central African equatorial region and the sub-tropical region of southern Africa. Holmgren and Öberg (2006) reported that during wetter periods in the Great Lakes region of east Africa, the environment was drier in southern Africa. An analysis of palaeo-climatic data in north western Botswana showed a similar inverse relationship with the palaeo-climatic indications from Angola (Scott 1996). Given these variations, it is not clear which climatic model had an influence in the eastern highlands. Previous research in the Nyanga area has suggested that there were moderate climatic variations after the last Glacial Maximum (Thomlinson 1973). There is no clear evidence that climate changed significantly thereafter to influence a change in the distribution of floral and faunal species. The current research in Zimunya is meant to evaluate this prognosis. The assumption is that settlement patterning will give an indication of climatic and social conditions during different periods. The location of settlements in close proximity to or in association with some elements of the environment should be related to what the environment offers as opportunities for survival.

As a study aiming at understanding the relationship between culture and environment, the research also assesses the relationship of this area and other areas that have been studied in the eastern highlands. The study documents the culture history of Zimunya using both surveys and excavations as relevant strategies for collecting archaeological data. The success of the survey data to inform us about prehistoric developments, settlement patterning and their relationship to the physical environment depends on reliable collection of the archaeological database.

The thesis begins by presenting the research aims and objectives, articulating the gaps that it seeks to fill about the archaeology of the research area. Chapter 1 discusses these aims, showing the paucity of the archaeological research existing prior to the research. The physical environmental setting is also presented. The presented culture history is derived from published material and oral accounts prior to this research. The various accounts concur that there were people of the Ngweme in the area before the arrival of the Zimunya dynasty during the 19th century AD. The Vumba and Zimunya areas thus represented a favourable environment for settlement during the middle of the 19th century AD.

Chapter 2 is a discussion of the theories and research techniques that have governed spatial archaeology. The chapter demonstrates several underlying assumptions in spatial archaeology, particularly that environment influences human behaviour in both subtle and explicit ways. The thesis refutes deterministic interpretations on the role of the environments to societal developments, but acknowledges that environment has a part to play. The chapter gives a model of how the physical environment and social factors relate in influencing cultural developments. The conceptual framework and methods for spatial research are presented. One fundamental aspect of the research is the utilisation of information technology in conducting the spatial analyses. Geographic Information Systems (GIS) is a tool that archaeologists are now applying to research. The historical growth towards confidence in the use of GIS in archaeology is presented. Chapter 3 is a detailed presentation of the methods utilized in this thesis. It outlines the way the archaeological data were gathered and classified to enable investigating the research problems.

Chapters 4 and 5 present the data obtained from the surveys and excavations, respectively. The research is one that can be conducted using survey data alone if there had been detailed archaeological research in the area prior to this work. The limitations of the data already available required further excavations to improve its reliability for spatial analysis. The two methods of data recovery thus complement each other in bringing about a fuller account of the culture history of the research area. In addition, the excavation data enables inferences to be made on climatic conditions during the various cultural periods represented in the archaeological record.

Chapter 6 presents the results of the spatial analysis of the settlement sites in Zimunya from the Stone Age to the historical period. Statistical methods are used to evaluate the reliability of the results of the spatial analysis. This chapter is followed by a presentation in Chapter 7, of the palaeo-climatic implications that can be read from the data. Comparison is made with climatic models that have been proposed for southern Africa, particularly those from the Shashi-Limpopo basin, about 600 km south of the research area. Palaeo-climatic data from Mozambique, western Zimbabwe and north eastern Botswana, Namibia and Zambia are also presented, together with some references to the past environments from east Africa. The aim of this chapter is to assess the extent to which the environmental parameters used in the analysis are similar to those obtaining in prehistoric periods and consequently, to assess whether the spatial patterns observed are a product of the influence of the physical environment or the social environment. Chapter 8 presents the major findings of the research and summarises the role of the physical environment in cultural developments in Zimunya. It also discusses the future outlook of spatial studies in Zimbabwe, emphasizing the role of technological developments.

CHAPTER 1

The archaeology of eastern Zimbabwe: Background and research problems

"The kind of settlements which an individual group of people may establish reflects decisions, either conscious or unconscious, by the members of a society about how they will relate both to their environment and to one another" (Yellen 1976, p. 48).

1.1 Introduction

The archaeological study of man-land relationships has a long history (Childe 1957; Chisholm 1962; Clarke 1968; Flannery 1968; Steward 1936, 1949; Thomas 1973; Willey 1953, 1956; Willey and Sabloff 1993). Despite this however, archaeologists are still grappling with issues of the relationship between ancient human communities and their environments in various parts of the world. The research problems are quite often stimulated by the development of new research methods, new theories, or the mere need to understand cultural developments in previously unexplored areas. As Steward (1949, 1955) observed, man-land relationships and other cultural processes cannot be generalised since situational environments always result in different trajectories of cultural development. It follows therefore, that the development of any particular culture is specific to the geographic area in which it is located. Thus, even though the field of research may be fairly old, the geographic area under study requires to be understood in its own context. This research takes this last approach where it seeks to investigate the relationship between culture and aspects of the natural environment in the central parts of the eastern highlands of Zimbabwe.

The eastern highlands of Zimbabwe, stretching from Nyanga in the north east to Chimanimani to the south east, have not been subjected to rigorous archaeological study. In fact, apart from the Nyanga area (Summers 1958; Sutton 1983; Soper 2002; Soper and Chirawu 1996; Chirawu 1999), little is known about the archaeology of the rest of the eastern highlands. The current study arises from the realisation of this sparse coverage of archaeological studies in eastern Zimbabwe. Conceived within the context of the *Ancestral Landscape of Manyikaland Archaeology (ALM)* project, a cooperation project between the Archaeology Unit of the University of Zimbabwe and the Centre for Development Studies (**CDS**) at the University of Bergen, Norway, this research investigates the archaeology of the area that is immediately south of Mutare city, about 100 km south of the Nyanga area. It consists of the Zimunya Communal Lands, Burma valley, Vumba and Tsetsera Mountains (Fig. 1.1).

The ALM project, which was funded by the Norwegian Centre for International Cooperation in Higher Education (NUFU), commenced in 2002. For the past 5 years the project has conducted extensive archaeological research in the area, cooperating with local communities and the Eastern Region of the National Museums and Monuments of Zimbabwe (NMMZ). Similar archaeological investigations have been ongoing in the adjacent Manica province of Mozambique, funded by the Norwegian Aid for Development (NORAD). The current research on environment and culture in Zimunya is therefore part of that broad objective to understand the archaeology of the central eastern highlands of Zimbabwe and the western part of the Manica province in Mozambique. It is my conviction that the techniques of spatial archaeology lead to a broader understanding of the archaeology of the area. The multi-faceted nature of settlement archaeology provides a holistic investigation of prehistoric cultures.

1.2 Research aims and objectives

This research has two broad objectives; to contribute to our knowledge of the culture history of the research area, and to contribute to spatial archaeology in Zimbabwe. These objectives would be achieved by making an inventory and analysis of the archaeological evidence from the research area. The analysis investigates the spatial relationship between archaeological settlement sites and the physical environment in which they were found. This requires reconstructing the prehistoric environments during the periods represented in the cultural evidence. The aim is to understand the correlation of prehistoric cultural developments in the area to aspects of the physical environment such as climate, topography, hydrology, soils and vegetation. The physical environment provides options for subsistence and raw materials for various cultural activities, but the way each culture engages with the physical environment is usually unique to that culture and reflects the symbiosis between the cultural and natural environments. Researching on the relationships between culture and environment in specific contexts enables seeing beyond the physical environment, and facilitates a discussion of social aspects of the ancient inhabitants of an area.

The research aims to fill some gaps in the archaeology of Zimunya. The modern history of this part of Manyikaland begins from the time the Portuguese arrived in the area, around the 16^{th} century (Bhila 1982). The period before the coming of the Portuguese in the area has not been adequately examined. The social impact of the presence of the Portuguese traders is also inadequately discussed in the available historical documents as the Portuguese travellers were more interested in recording events that had to do with trade, mineral exploitation and political issues that affected their activities, than writing a social history of the communities they encountered (Pwiti 1987).

One aspect which lacks clarity in the research area is the relationship between the kingdom of Manyika and the Zimunya dynasty. Today people of the Zimunya dynasty inhabit the research area, and claim to have been in the area for more than two centuries (Storry 1976; Chigodora 2004, *pers comm.*). Whether or not the Manyika kingdom included the area south of Mutare city is not clear. The presence of the Zimunya dynasty in this part of the country is mentioned in historical texts, but little else is said about it except that it forestalled the southward expansion of the Manyika kingdom (Beach 1984; Bhila 1972; Liesegang 1970; Storry 1976). Further south of the eastern highlands, the existence of the Gaza kingdom in the 19th century is better known from historical sources. Thus there is a spatial gap where we do not know who exactly was in between these areas, both in prehistory and in the early part of the historical period.

Prior to the ALM project, only three archaeological sites from south central Manicaland, including Zimunya, were known to the academic community. The first, Mutare Altar site, got to be known widely after Andrews's excavations in 1905 and the publication by Randall-MacIver (1906, cited by Matenga 1993) which discussed results of those excavations. The most interesting result of the excavations was the recovery of clay and soapstone figurines which could be as many as 136 (Matenga 1993; Bordini 1974). The site was also important because it represented the presence of the Zimbabwe culture in eastern Zimbabwe on account of the dressed stone walls that are there (Bordini 1974; Sinclair 1987; Matenga 1995). The second site is Muromo rock art site, which became popular after Cripps (1941) had drawn attention to the painted labyrinth motif that he regarded to be depicting the stone walls of Great Zimbabwe (Nhamo 2005, 2006). The third site is Murahwa's Hill which was excavated between 1964 and 1968 (Bernhard 1968). The material from this site had not been studied in detail prior to this research but the findings demonstrated the presence of early and later farming communities EFC and LFC) at the site. The next significant research prior to the ALM Archaeology project was the work by Matsikure (2002) which focused on the management of the rock art at Muromo site. The archaeological vacuum is therefore noticeable. As a result there was a real need for research into the prehistory of the area.

This research may not give names to the prehistoric inhabitants of the area, but the culture history and cultural processes can be documented. The research finds justification in its ability to shed more light to our vague understanding of the prehistory of this area. In addition, the environmental dimension resonates with contemporary interest in global warming and climate change in southern Africa. Several conferences have been convened to discuss issues of climate change in southern Africa and its implications for the future development of the region. It is of academic and historical interest to understand how our predecessors in the prehistoric periods coped with similar changes and challenges that are now threatening contemporary communities. As Holmgren and Öberg (2006) postulate, our efforts towards sustainable development depends on understanding how past communities were influenced by, and responded to similar processes.

Archaeological evidence has been used in several parts of the world to trace changing patterns of settlement distributions as prehistoric people adapted to, or manipulated the environment around them. Eastern Zimbabwe, with its high annual rainfall that is influenced by the mountainous environment constitutes the wettest region of the country (Vincent and Thomas 1961). The topography of the region is unique as is implied in the reference to the people from eastern Zimbabwe today as *vekumakomo* (those from the mountainous areas). However, there is no reason to assume the whole of eastern Zimbabwe went through a uniform culture history. From the little archaeological evidence prior to this research, there is indication that there were localised variations in cultural developments, which could have been influenced partly, by some aspects of the physical environment and partly by cultural values, perceptions and cognition (Beach 1984). The ancient agricultural terraces associated with the Nyanga culture for example, are not found everywhere in the region.

This study chronologically stretches from the Stone Age hunting and gathering period to the period of later farming communities. Most of the settlement and spatial studies in Zimbabwe have tended to focus more on the farming communities (Garlake 1978; Manyanga 2003; Prendergast 1979; Pwiti 1985, 1996; Sinclair 1987; Summers 1958; Swan 1994). Only a few researchers such as Summers (1969), Sinclair and Lundmark (1984), Sinclair (1987) and Walker (1995) have studied Stone Age communities within a spatial framework. Only the Matopo Hills in western Zimbabwe have a detailed account of the lifeways of late Holocene hunter gatherer communities that were studied using approaches that incorporated the spatial framework (Walker 1995). Further research is therefore needed in other areas of the country for comparison. The cultural and social organisation of hunter gatherer communities could not have been the same throughout the whole of southern Africa. In fact, Walker and Thorp's (1997) re-assessment of the Stone Age of Zimbabwe clearly shows that there are differences that can be noted across the country at contemporary periods. Thus, except at a general level, physical environments and other ecological aspects favoured by Stone Age communities in Zimbabwe are not sufficiently known. The cultural diversity observed during the Stone Age and during the period of farming communities could have been influenced by the ecological settings in which these communities settled.

The location of this research in eastern Zimbabwe, and the numerous rock art sites now known in the area, naturally calls for comparison with other rock art regions of the country. However, although comparison with other researched areas will be made to ascertain similarities or differences in settlement distributions, it is not the aim of this research to test any models or conclusions derived from these earlier researches. The focus of this research is to investigate and explain the nature of prehistoric settlement distribution in the research area.

Another aim of the study is methodological, where I intend to evaluate the archaeological research potential of Geographic Information Systems (GIS) in Zimbabwe. The introduction of GIS in archaeology the world over has enabled archaeologists to work with computers, mathematics and statistics in analysing georeferenced archaeological data (Anselin and Getis 1992; Doran 1970; Ebert 2002; Lloyd and Atkinson 2004; Orton 1980). GIS and computers make it easier to work with both quantitative and qualitative aspects of spatial data. GIS is a complex and technical application of information systems with a geographical bias in research. All archaeological data have inherent spatial components which make them amenable to GIS analysis (Anselin and Getis 1992; Lloyd and Atkinson 2004). There is however, growing need to interpret the results in human terms to consider the social aspects attached to the georeferenced data. Already there have been a number of publications that have attempted to apply GIS to solve cognitive problems in prehistory (Zubrow 1994; Aldenderfer 1996).

Although the use of the GIS research tool in Zimbabwean archaeology dates back to the 1990s and has been growing steadily since then (Hubbard 2005, 2006; Katsamudanga 2001; Manyanga 2003, 2006; Pwiti 1996; Swan 1994), available evidence shows that the system has not been fully exploited. Despite the limited application, it could be justified to say that the use of information technology in Zimbabwean archaeology showed that the discipline had come of age (Pwiti 1997). The research in eastern Zimbabwe provides an opportunity to pursue this line of research further by utilising GIS technology to solve archaeological problems.

1.3.0 The research area: physical geography

This research is situated in eastern Zimbabwe, south of the city of Mutare (Fig.1. 1), between 19º and 19°30′ south, and 32°15′ and 33° east. The area incorporates the Zimunya Communal Lands, Burma Valley, and the Vumba and Tsetsera mountains. The Zimunya Communal lands stretch from the western slopes of the Vumba mountains to the Odzi River to the west. The northern limits of Zimunya are in the southern fringes of the city of Mutare. To the south the limit is along the Wengezi River, more than 50km from Mutare city. Burma valley is separated from the main part of Zimunya communal lands by the Chishakwe, Chiuya, Chada and Ndorwi mountains that form an arc from northwest, west through south to link with hills to the east that mark the border between Mozambique and Zimbabwe.

The Vumba area has become a tourist resort with beautiful botanical gardens and scenic sights, but historically it used to be part of the Zimunya dynasty. To the north, the Munene river separates Vumba from the numerous hills and mountains that continue northwards beyond the city of Mutare to Nyanga. To the east Vumba extends beyond the border with Mozambique, while to the south it slopes steeply into the Burma valley. To the west, Vumba spills into Zimunya communal land. Tsetsera mountain is further south of Vumba but separated from it by the Burma valley. The range of mountains continues south to Chimanimani.

Although these areas are adjacent to each other, they have different physical and climatic characteristics. These differences influenced land ownership and landuse systems during and after the colonial period. In the communal land, maize is the main crop grown mainly for subsistence. The majority of the population own small fields such that farming is even being practiced on the hills, demonstrating the acute shortage of land (Whitlow and Zinyama 1988). Some of the hills, especially those with red soils are terraced to facilitate agriculture. Some villages such as Chigodora, do practise horticulture, making use of the water from the Hwangura, Muduma and Vumba mountains. Other villagers have developed water furrows similar to those found in the Nyanga area to irrigate their gardens.

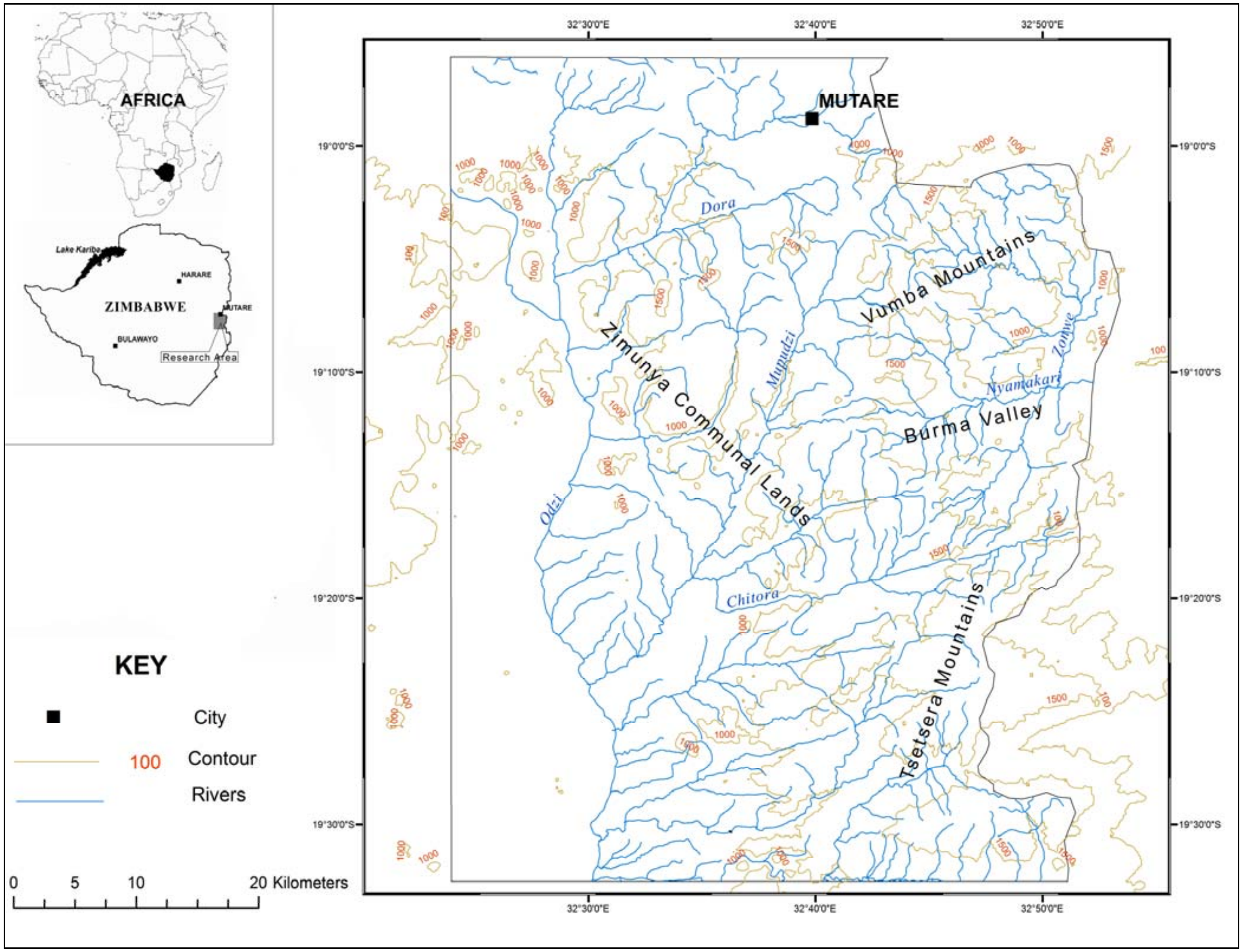


Fig. 1. 1 Location of the research Area

1.3.1. Climate

Zimbabwe can be divided into five agro-ecological regions (Vincent and Thomas 1961). These regions, which are still applicable to the agricultural practices of today, are based on the agricultural potential of an area as determined by the adequacy and efficiency of the average annual rainfall. This is because rainfall is the dominant natural characteristic of Zimbabwe (Vincent and Thomas 1961). Further sub-divisions of the regions and the varying systems of landuse appropriate for each region are based on soil characteristics and other topographic influences (Vincent and Thomas 1961, p.3). The characteristics of the soils together with the vegetation in each region influence the amount of moisture that remains available to crops and animals throughout the year. Table 1. 1 summarises these regions and their general characteristics.

Region	**Rainfall (mm)**	**Mean annual temperature (^oC)**	**Topography**	**Vegetation**	**Usage**
1	≥ 1000	18	Highlands	Montane forest	Specialised
2	700-1050	18-19	Subdued relief	Miombo woodland	Intensive
3	560-700	18-21	Undulating	Mixed woodland	Semi intensive
4	400-600	19-21	Broken	Deciduous woodland	Semi intensive
5	≤ 500	21-29	Flat/Broken	Mopane	Extensive

Table 1. 1. Zimbabwe's Agro-ecological regions (After Vincent and Thomas 1961)

Eastern Zimbabwe is a mountainous region and has the highest altitude of 2500 m on the Nyanga Mountains. These mountains rise sharply from the Ruenya river to the north and from the Save valley to the south (Watson 1964). To the east they fall steeply onto the plains of Mozambique. As a result of these mountains, eastern Zimbabwe lies in a high rainfall belt; the annual maximum figures sometimes exceeding 2000 mm. The south-easterly winds rising from the Indian Ocean influence much of the rainfall pattern which often comes as orographic rain. There is drizzle and light rain in eastern Zimbabwe even when it is the dry and cold season in the country (Vincent and Thomas 1961, p.10). Consequently, there is usually abundant water in the rivers and in the small streams that originate in the mountains. Temperatures are generally cool, averaging 18^{o}C throughout the year (Bhila 1982; Vincent and Thomas 1961). It increasingly becomes very cold in winter with frequent frost confined to the valley bottoms.

Eastern Zimbabwe is therefore a distinct territorial unit with a wet and cool climate that is influenced mainly by the topography. The eastern highlands region constitutes part of Region 1 of the agro-ecological classifications of the country, and is suitable for specialised agriculture (Table 1. 1 and Fig. 1. 2) (Vincent and Thomas 1961, p.10). Variations in rainfall amounts, temperature and aspect however, result in wide differences of climate within the region. High areas have a cool temperate climate while the deep valleys have a hot sub-tropical one. An examination of the physical characteristics of Vumba, Burma valley and Zimunya communal areas shows this variation.

The term Vumba is derived from mist which is a frequent occurrence in the Vumba Mountains. Rising to a height of 1911 m at Castle Beacon, Vumba receives moisture laden south-easterly winds from the Indian Ocean. These mountains have an average annual rainfall of more than 2000 mm. This high rainfall may not be suitable for crops such as maize, as it leads to excessive leaching. The production and yield potential of cereal crops is limited at the higher altitudes where there are cool temperatures averaging a minimum of 6^{o}C and a maximum of 26^{o}C, conditions which lead to longer growing periods (Wursten 2004, *pers. comm.*).

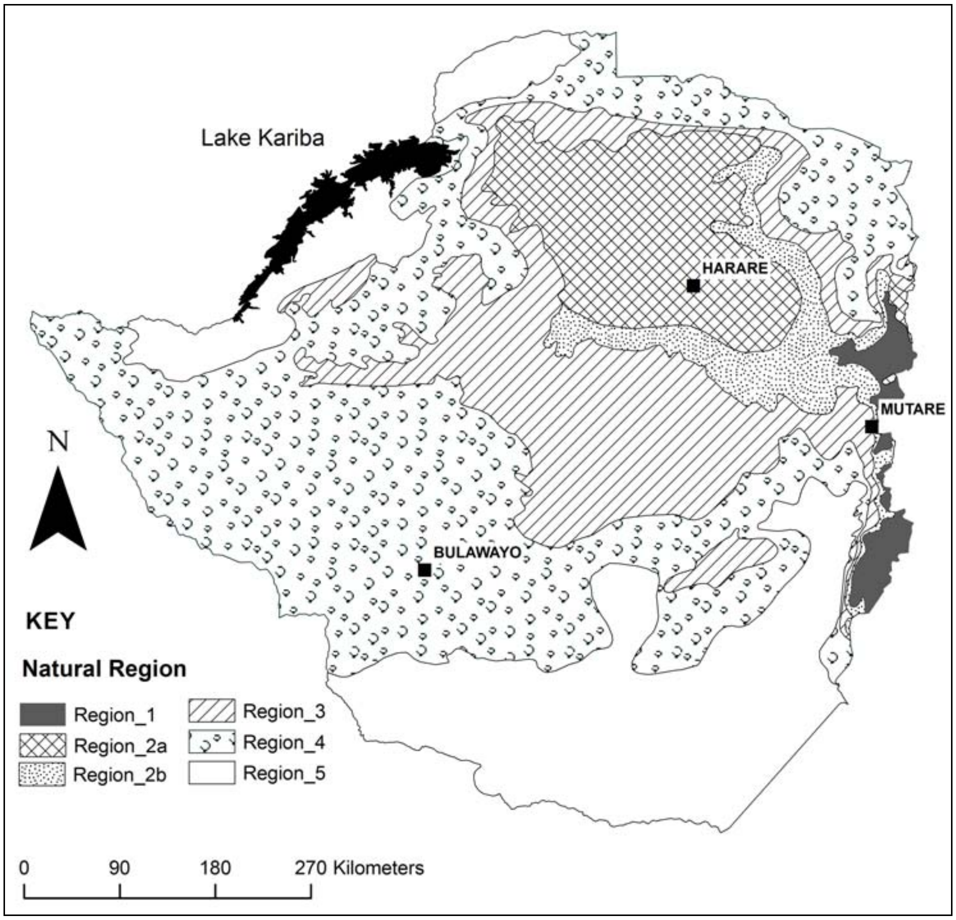


Fig. 1. 2. The Agro-ecological regions of Zimbabwe (Adapted from Vincent and Thomas 1961).

In comparison, Zimunya communal lands lie in the rain shadow of the Vumba Mountains. This means that effective rainfall for agriculture is different from that in the Vumba highlands. The agro-ecological significance rapidly diminishes from Region 1 in the Vumba Mountains to Region 4 in the western parts of the neighbouring Zimunya communal lands (Whitlow and Zinyama 1988). From an average annual rainfall figure of about 2000 mm in the Vumba, the figures drop to 900 mm in Zimunya communal lands, and much less towards the Odzi river. Using the map of agro-ecological regions of Zimbabwe (Fig. 1. 2) prepared by Vincent and Thomas (1961) the following summary was extracted for the research area:

Region 1B

This occurs largely in the Vumba and Tsetsera mountains. The area is suitable for diversified and specialised production such as tree plantation, coffee and orchard crops as practiced in the area today. However, only 10% of the land in this region is arable.

Region 2B

The region stretches over the eastern parts of Zimunya communal lands, and includes the entire Burma valley. It is suitable for intensive crop production (such as banana plantations) supported by livestock, but only 20-30% of the land is arable. The southern parts sub-tropical

Region 3-4

This covers the larger part of Zimunya communal lands stretching westwards to the Odzi river, and to the south and south west of the research area. This region is suitable for semi intensive livestock production with support from small grain crop production. The percentage of arable land is larger although rainfall is low and soils are not very fertile.

Apart from the Vumba and Tsetsera mountains and Burma valley, agriculture in Zimunya is mainly subsistence farming. Although the mean annual rainfall amount varies significantly in the area, it seems however, that the most limiting factor in subsistence farming is inadequate land and poor soils. Even though an area might have good annual rainfall figures, other factors such as vegetation, geology and soil type may affect the amount of water available for farming and domestic use. Mountain slopes are being denuded of vegetation for agricultural purposes, facilitating increased surface runoff which has resulted in serious erosion in some parts of the area. These factors are influencing the low crop yields hence the present communities supplement through market gardening; some even grow maize and wheat under irrigation using the water from the mountains where this is possible. Such is the case along the Nyachowa and Nyamakari streams. However, such permanent streams are few, and this is creating localised hydro-politics in the community (van der Zaag and Röling 1996).

1.3.2. Geology and Soils

Granite is the dominant rock type in the research area. This extends for about 100 km southwards from Mutare. Along an east-west axis, the granite stretches from beyond the Zimbabwe-Mozambique border to beyond the Odzi river, about 30km into Zimbabwe. The granite forms broken country of bornhardts, castle kopjes, whalebacks and hills in Zimunya. The Burma valley is bordered by granite hills as well while other granite outcrops also appear on some high points on the rolling mountains of the Vumba. Dolerite dykes and sills that run along a north-south axis also extensively extrude the area (Watson 1964). These sills and dykes are seen in the Vumba Mountains, around Hwangura hill and the areas surrounding Chigodora village, on the fault line along Mupudzi river and in the Tsetsera Mountains. Further south the dolerite becomes more pronounced extending to Chimanimani. The dolerite extrusions in the research area are a result of faulting. In the research area, evidence of this faulting occurs as the deep chasm along the Mupudzi river. Other geological regimes in the area are basement schists and serpentines as well as some quartz veins (Watson 1964). In the current state of knowledge, there are no minerals of economic value. The Mutare Gold Belt found to the north does not extend into Zimunya (Phaup 1937; Watson 1964).

The soils have a strong dependence on the characteristics of the parent rock from which they are derived (Vincent and Thomas 1961). For much of southern Mutare, especially in the communal areas, the soils are generally sandy to sandy-loams with a few pockets of red clays. This is because the dolerite hills that characterise the north and the higher areas of the eastern highlands are replaced by granite hills of the post-African erosion cycle (Lister 1965; Watson 1964). The soils are highly weathered and leached; even in areas with lower rainfall they do not retain water easily because of their coarse texture. However, there is a stretch of dolerite-derived red soils along Mupudzi river and in some parts of Vumba and Tsetsera mountains.

According to the FAO soil classification, the research area has the red and yellow ortho-ferralitic sandy to medium textured soils formed on granites and Umkondo sandstones. The FAO GIS soil datafile shows that there are 4 types of soils in the research area. The Ortho-ferralitic group of soils is part of the Kaolinitic order that is highly porous and susceptible to leaching. Of these, what occurs in Zimunya are the Rhodic Ferralsols. Rhodic Ferralsols are deeply weathered soils with low capacity to retain nutrients. They have an oxic or ferralic B horizon that is more than 30 cm thick and is red to dusky red in colour. In terms of physical structure, ferralsols are well drained and have a good structure because of their deep profile. These properties enable them to be less susceptible to erosion. However, they have poor chemical properties as the physical structure facilitates leaching under sub-humid conditions with high rainfall. Consequently, they are low in nutrients and organic matter. The bulk of plant nutrients are within the first 10-50 cm (Driessen and Dudal 1989). It is argued that farming may lead to the depletion of plant nutrients if the crops grown have low input to the nutrient cycle. The other type of soil in Zimunya is the category of Luvisols, which are of two types; Chromic and Ferric luvisols. The Chromic luvisols have a strong brown to red B horizon while the Ferric luvisols have ferric properties. There is also a category of Lithosols that is found around Mutare city.

Although soil characteristics for Zimbabwe are dependent upon geology, in the eastern highlands climate is also significant, especially in the higher areas. The FAO classification reflects the role of climate in shaping the soil characteristics of the eastern highlands. According to Nyamapfene (1991), there is a relationship between rainfall, vegetation and soils, especially with regards to the susceptibility to leaching. This is true for the Vumba where variations in soil colour and other properties occur even in the same locality. Some soils resemble those from granite; others are loamy, some are leached red, while others are friable sandy loams with a soft crumb structure. This is evident in the rolling montane grasslands along the Vumba road in the mountains. A survey in the Vumba revealed that the bulk of the higher altitudes have sandy soils that are infertile due to heavy leaching. These require intensive use of lime if they are to be used for crop production. Thus, although the Vumba receives high rainfall, this does not make it a good area for most crops. The evergreen vegetation creates less humus and the soils are susceptible to erosion and leaching. This is worse when the soils are exposed through farming.

Due to the cool temperatures, most crops do not grow well except at the bottom of the valleys where it is warmer. However, even the red soils derived from dolerite, although heavily textured, are susceptible to sheet wash erosion due to the steep slopes in the mountains. Intensely weathered soils in some areas form colluvial coverings over the weathered granites and can be sufficient to keep the soil moisture all year round (Whitlow and Zinyama 1988). Where dolerite is decomposed to considerable depth, the probability of ground water supply is usually good.

1.3.3. Drainage

The present drainage system in the research area is a product of denudation and erosion since the Permian period (Watson 1964). The effect of the faulting along the Mupudzi river is also important. The river system drains mainly to the south and southwest in Zimunya communal area while in the Vumba they flow eastward into Mozambique. As can be seen on Fig. 1. 1, there are small areas that act as catchment areas for the river system. These are mainly in the mountains, particularly Rowa, Dangare, Vumba, Chishakwe, Chiuya and Nyarupara. Mupudzi and Odzi are the major and perennial rivers in the Zimunya communal area. In the Vumba Mountains most of the streams are perennial, being influenced by the rainfall pattern and the abundant vegetation which increases the amount of percolation. To the south of Vumba these streams flow into Nyamataka which originates just below the beacon hill of Vumba and flows through Burma Valley. This merges with Nyamakari stream which originates in the Chishakwe mountain and draws water from the hills and mountains flanking the Burma valley. As the southern parts of the valley do not receive rainfall throughout the year, Nyamakari stream is not perennial. On the northern side of Vumba all the streams drain into Zonwe river which eventually merges with Nyamataka stream and then flows across the gap of the Gwindingwe hills onto the plains of Mozambique. The network of streams is higher in the Vumba mountains where topography is rugged with a few patches of flat land.

1.3.4. Vegetation

The vegetation of the eastern highlands is a mixture of evergreen rainforests, sub-montane to montane grasslands and some stands of miombo woodlands. In the plains of Zimunya communal lands, savannah woodlands dominate the hills, possibly relicts of once extensive forests. Altitude appears to be the most influential variable to the nature of the vegetation.

However, aspect, temperature and rainfall are also important, especially in the higher areas where these have led to the development of the evergreen rainforests and the persistence of the montane grasslands.

The rainforests resemble tropical rainforests with canopies reaching 40-55 m high. Some trees are briefly deciduous but the forests are generally evergreen. They are found on concave slopes and depressions, valley bottoms, bases of rock faces and hills, and on soils with higher water holding capacities (Muller 1999). They also occur on southerly or easterly aspects that frequently get nourished throughout the year by convectional and orographic rain, and winter mist (Muller 1999, p.224). These forests are found in the Nyanga, Bvumba, Tsetsera and Chimanimani mountains in Zimbabwe. They are also found in parts of Mozambique, South Africa, Angola, Malawi and parts of East Africa. In Zimbabwe these montane forests have affinities to others in high rainfall "islands" in the country such as Bikita and Mberengwa (Vincent and Thomas 1961). Vincent and Thomas (1961) think that this is evidence of the existence of a once extensive high rainfall flora in the past, meaning that there was once a much wetter climate than obtaining today.

The species composition of the Vumba rainforest includes *Macaranga mellifera*, *Polyscias fulva, Albizia schimperana* and *Sapium ellipticum*. These tree species dominate the central core of Bunga forest which is now a nature reserve to protect the climax montane forest in the Vumba mountains. In the shade of these species are various moss, orchids, lianes and indigenous tree ferns. The grasses and shrubs in the area include *Philippia, Hyparrhenia,* and *Anthospermum* species. These species are found at Chinyakuremba, close to the Castle Beacon Hill and on the hills flanking Chinamata river. The forest classification and species identification by Muller (1999) shows a variety of species making up the rainforests and grasslands of the Vumba mountains.

Grasslands are the dominant vegetation biome of the eastern highlands, found at higher altitudes compared to forests. These form dense swards of short perennial grass species which include *Loudetia simplex, Elyonurus argenteus, Trachypon spicatus, Monocymbium ceresiiforme* and many others. Between grassland and forests, shrubveld occurs as transitional vegetation to the forests. Tall coarse grasses are always present in these transitional zones (Muller 1999; Wild and Barbosa 1967).

There are also miombo woodlands that are dominated by the deciduous *Brachystegia spiciformis, Brachystegia randii, Brachystegia tamarinodoide,* and *Uapaca kirkiana* species that grow where water is less abundant, on the western slopes and on well-drained soils. There are marked breaks from the montane forests to the woodlands, just as there are sometimes abrupt changes of the forest into shrub or grasslands. The trees are very short (3-6m in height) and are found on the western slopes of the Vumba and Tsetsera mountains. The ground flora consists of grasses, shrubs and creepers. The western lower slopes of Tsetsera have *Upaaca kirkiana* tree species.

Much of the vegetation of the Vumba and Zimunya is secondary deciduous *Brachystegia* although there is still surviving a forest of primary Montane vegetation in Bunga forest and below the cliffs in the Vumba mountains. A larger part of the Vumba mountains now consists of tree plantations of wattle and eucalyptus species. In Zimunya and Burma valley the *Brachystegia* vegetation forms relatively dense woodlands on the mountains and hills. The valley has the dry savannah or deciduous miombo woodland because it does not receive rain and mist as often as the Vumba mountains. Away from these, the *Lantana camara* shrub is threatening to colonise the areas where primary vegetation was cleared. Most hill slopes and riverbanks are now covered with thickets of this shrub. In Zimunya the cutting down of trees by the local community for firewood and agriculture is changing the vegetation pattern, influencing the encroachment of the *Lantana camara* because the savannah woodland takes long to regenerate.

The absence of large forests of primary vegetation in the Eastern Highlands is thought to be a result of prehistoric activities such as agriculture and veld fires (Thomlinson 1973; Muller 1999). This has largely been the case in the Nyanga area where the ancient agricultural terraces and archaeological evidence attest to a long period of habitation (Summers 1958; Soper 2002, 2007). Although the current research area has evidence of some terracing, these are of recent origin and many are still being utilised. According to Muller (1999) there are regenerating forests in the lower slopes of Vumba that are in different stages of recovery after having been cleared in the past. These are identified by almost even-aged stands of trees that are 15-20m high, especially the *Albizia* species. It remains a mystery how the Bunga forest remained in pristine condition when other areas were being cleared.

1.3.5. Fauna

A study of the distribution of mammalian animals that was carried out in Zimbabwe in the 1960s showed that among other species, Zimunya area used to be a natural habitat of the oribi buck (*Ourebia ourebi*)(Smithers 1965). The elephant (*Loxodonta Africana*), rhino (*Ceratotherium sp*), giraffe (*Giraffa camelopardalis*) and other animals did not have permanent habitats in this area although they could have visited it during the drier periods of the year. For most of the larger animals, their closest habitats were in the southern lowveld along the middle and lower Save valley and the southern parts of Zimbabwe. The 1960s research was however not conclusive on the distribution of animals as only a selective sample of species was studied. The distribution of other animals, some of which feature on rock art such as the kudu (*Tragelaphus strepsiceros*), has not been studied. An inference can be made however by studying the vegetation and relating it to habitat preferences of animals. Inference can also be made on fauna in similar Afromontane forests and miombo woodlands in Africa.

In Zimunya communal lands there is very little wild life now, except for baboons (*Papio ursinus*), monkeys (*Cercopithecus sp*.), rock rabbits (*Procavia capensis*) and hares (*Lagomorpha sp*) although records with the National Parks and Wildlife Department show that eastern Zimbabwe, inclusive of the research area, used to have bigger antelopes such as sable (*Hippotragus niger*), eland (*Taurotragus oryx*), kudu (*Tragelaphus strepsiceros*), elephant (*Loxodonta Africana*) and rhinoceros (*Ceratotherium sp.*) among other animal species. The areas lying along the border with Mozambique however still have some of these larger animals. The absence of large settlements along the border as a result of the liberation war of Zimbabwe probably led to vegetation growth suitable for bigger animals such as kudu (*Tragelaphus strepsiceros*).

In the Vumba mountains, the Bunga indigenous forest supports communities of blue duiker *(Cephalophus monticola)*, common duiker (*Sylvicapra grimmia*), bushpig (*Potamochoerus porcus*), samango or blue monkey (*Cercopithecus mitis*), and leopards (*Panthera pardus*). The samango monkey favours montane rainforests and is considered endemic to the eastern highlands (Lawes 1990). There are reports that elephants and rhinos used to visit the rainforest from Mozambique or from the Save valley. There is no clear and comprehensive record of what animals used to be in the area before colonialism, although Cripps reported several encounters with lions (*Panthera leo*), leopards (*Panthera pardus*) and duikers. The Anglo-Portuguese delimitation commission also reported coming across some of the larger animals during the 1892 survey (Leverson 1893).

1.4 Previous archaeological research

A review of spatial studies in the archaeology of Zimbabwe reveals the paucity of such studies in the country. Northern and southern Zimbabwe are the only areas where studies of human responses to environment have been conducted (Pwiti 1996; Manyanga 2001, 2006). Zimunya communal lands and the Vumba only feature in the historical study of settlement patterns done by Whitlow and Zinyama (1988) whose time range covers the period from the 1920s to the 1980s. The patterns they found were that settlements in Zimunya communal lands evolved from a dispersed pattern prior to the 1920s to a linear model which followed rivers and foothills and later to a dispersed pattern. The patterns were determined by the enforcement of government policy, or lack of it, in land utilization and were also influenced by land pressure which prompted Alvord (the first agricultural officer for the rural areas) to call for the linear pattern to maximise land utilization (Whitlow and Zinyama 1988).

In terms of the prehistoric environment, the area is discussed generally as part of the eastern highlands in the paper by Summers (1960) who related environment and prehistoric cultural developments in the country as a whole. That paper however, was based on an inadequate database of archaeological sites such that the eastern highlands that he discusses is actually the

Nyanga area. In the south central eastern highlands, the Altar site, Murahwa's Hill and the rock art site of Muromo were the only known sites in the research area at this time. The archaeological survey database shows several sites that were reported after the publication of Summers' paper in 1960. The surveys for this research are deemed to make a significant addition to the database.

The excavations of the stone walled Altar site and Murahwa's Hill remained the only major archaeological research done in the area prior to the year 2002. First excavated in 1905 by Andrews and later by Bordini in (1974), the Altar site is important in the prehistory of the area because it represent the extent of the Zimbabwe culture in the country identified by the enclosure at the site. An initial date of 1580 +/-100 AD which was later corrected to give possible dates of 1460, 1485 and 1500 AD, was recorded and confirms the designation of the site as belonging to the Zimbabwe culture (Beach 1980; Sinclair 1987). Later, Matenga (1993, p. 78) obtained a date of 1550 +/-40 (Pta 1411) but this does not change the temporary affiliation of this material as it remains within the later phase of the Zimbabwe tradition.

The Altar site is also important because of the 136 soapstone figurines recovered (Bordini 1974; Matenga 1993). The figurines were found below a stone wall built of dressed stone, hence the name Altar site. In 1938 the stone walls were restored by Lionel Cripps, but there is no detailed report of that restoration and what was found during the process. The site was revisited in the 1970s but there were no figurines that were recorded (Bordini 1974). Although the figurines show depictions of animals and birds, most of them depict human beings; both male and female (Plate 1. 1). The figurines are particularly interesting because of their liberal display of male and female human genitalia (Matenga 1993, p. 78). Researchers regard these figurines as ritual material because most of the soapstone figurines are smoke-blackened, suggesting they could have been sacrificial objects (Matenga 1993).

(a).  (b). 

Plate 1. 1. Some of the figurines recovered at the Altar site in 1905 (Courtesy of MHS)

Murahwa's hill was excavated between 1964 and 1968 and revealed interesting finds that showed cultural succession from early farming communities of the Ziwa culture to the Manyika people of the historical period (Bernhard 1968). Also interesting in the excavations was the identification of the presence of band and panel pottery which is associated with the Khami phase of the Zimbabwe tradition. Bernhard (1968) had erroneously interpreted this material as belonging to the Rozvi people of the Changamire dynasty, a group that rose after rebelling against the Mutapa rulers in the 2nd half of the 17th century and collapsed in the 19th century (Beach 1994a, 1994b; Pikirayi 2001b). The Rozvi problem is, in fact, becoming a subject of debate in Zimbabwean archaeology (Machiridza 2005).

Apart from the archaeological research at these two sites, the other notable work in the area during the colonial period was Cripps' copying of the rock paintings in Zimunya and nearby areas between 1937 and 1940. Although Garlake (1997) refers to Cripps' rock art copies, there is little published work about this art. Since he did it mainly as a hobby, Cripps' rock art copies remained a private collection until well after his death when the material was donated to National Museums and Monuments of Zimbabwe (NMMZ) (Nhamo 2006, 2007). Only the site of Muromo appeared in the print media when Cripps described the main panel at the site as depicting the plan of the Great Zimbabwe monument (Cripps 1940; Nhamo 2006). A picture of the site appeared in the *Native Affairs Department Annual* (NADA) journal of 1941 and later in Cooke's *A Guide to the rock art of Mashonaland* (Cooke 1974).

Other sites were later reported to the Monuments Commission and the National Museums and Monuments of Southern Rhodesia (now NMMZ) in colonial and postcolonial times but very few of these have been visited by archaeologists. The range of sites reported include pit structures and enclosures of the Zimbabwe and Nyanga types, rock paintings, iron working sites as well as scatters of pottery and sporadic finds of stone tools (NMMZ records). At the beginning of this research in 2002, only 29 sites had been recorded in the NMMZ Archaeological survey database.

Other reports of interest made reference to areas further away from the Vumba and Zimunya communal lands. A 1932 geological map of the area north of Mutare shows an ancient fort named Chitungwiza in the Mutasa area. Bate (1930) had reported on an enclosure in the Makoni area which was named Chitungwiza of Manyika. It is not clear if this is a different fort from the one that is marked on the 1932 geological map. Martin (1940, 1941) reported on 19th century beads and pottery of the Manyika people. These papers and maps are useful in the comparative analysis of sites and material from the core area of this research.

Much of the archaeological research in eastern Zimbabwe has been on the Nyanga agricultural terraces and pit structures (Summers 1958; Sutton 1988; Chirawu 1999; Soper 2002). There is now increased interest in southern Manyikaland after the realization that little was known about the area (Pwiti *et. al.*, 2007). However, apart from the unpublished archaeological impact assessments done by the Mutare museum for the construction of Mupudzi dam, much effort in recent years was directed towards the rock art site of Muromo (Matsikure 2002). Perhaps its status as a national monument attracted attention and this resulted in a Masters thesis which discussed the site from a heritage management perspective (Matsikure 2002). Matsikure (2002) excavated a 1 m^2 test pit at Muromo rock shelter. Since her research was mainly on managing the rock paintings, the excavation was not a major component. However, the Stone Age evidence is useful in the broader analysis of the period in this part of Manyikaland. Although there is no date from the excavated test pit, the material was described as mainly Later Stone Age (LSA) dominated by scrapers. Pottery with EFC affinities was also recovered. From the foregoing, it can be noted that there is insufficient information on the archaeology of southern Manyikaland.

1.5 Overview of the cultural sequence in eastern Zimbabwe.

The foregoing section on the previous archaeological research in the central parts of Manicaland can enable us to discuss the culture sequence and traditions in the research area and compare them with findings from eastern Zimbabwe and other parts of the country, and the southern African sub-region. I discuss the various Stone Age industries and ceramic traditions of the Farming Communities in the sub-region as presented in published sources and assess where and when evidence from eastern Zimbabwe fit in the sequences. Since this is only meant to facilitate discussion and to identify gaps in the culture history of Zimunya, I only make a summary of the currently known cultural industries and / or traditions.

The Stone Age of sub-Saharan Africa is divided into Early, Middle and Later periods, a system begun by Goodwin and Van Riet Lowe in 1929 (Deacon and Deacon 1999). In southern Africa, the ESA is divided into three industries. The first period is identified by crude stone tools (mainly choppers and scrapers) that were produced mainly by direct percussion and called the Oldowan after Olduvai Gorge, Tanzania, where these tools were first discovered. Although there are differences between sites, this tradition is characterized by the absence of standardised stone tools, most of which could have been formed by simply banging two stones together to solve situations that required cutting or chopping (Deacon and Deacon 1999; Klein 2000; Mitchell 2002; Phillipson 2005). This industry is known much better from East Africa at sites such as Koobi Fora (Kenya), Olduvai Gorge (Tanzania) and other sites in Ethiopia. In southern Africa, the Oldowan industry, described as a starter-level technology, was discovered at Sterkfontein and is dated from about 2 million years ago (mya) to between 1.7 and 1.5 mya (Deacon and Deacon 1999).

Stone Age research shows that the ESA has four stages in Zimbabwe, which are Oldowan, Acheulean, Bembesi (Sangoan) and Charama (Proto-Stillbay) (Walker and Thorp 1997). A synthesis of the available evidence shows that the Oldowan has limited evidence in the country, only two pebbles having been found at Lochard and Lydiate in Matebeleland in 1946 (Jones 1946, cited in Walker and Thorp 1997). Lying generally between the South African and East African sites, the Oldowan of Zimbabwe is dated by approximation to the timeframes represented in the two regions.

The second ESA phase is named the Acheulean, after the site of St Acheul in the Somme Valley of France where stone tools of this tradition were first identified (Phillipson 2005). This is a widespread tradition that is found in Africa, Europe as well as in Asia. It is characterized mainly by large bifacial handaxes and cleavers. Other tools include picks, choppers, hammerstones, scrapers, adzes and knife flakes (Walker and Thorp 1997). According to Klein (2000), the industry was initially divided into 8 stages, but currently it is divided into an early and a later phase only, the distinction being based on tool thickness, presence of trimming and symmetry or lack of them (Phillipson 2005). While early Acheulean tools are much thicker, not extensively trimmed and less symmetrical, the later ones are thin, highly symmetrical and extensively flaked using prepared cores to produce predetermined flakes (Klein 2000). Early Acheulan sites in South Africa include Sterkfontein and Kromdraai while the later Acheulean artefacts were discovered at several sites that include Elandsfontein, Amanzi springs and Duinefontein, among others (Klein 2000; Mitchell 2002). The two phases lasted from 1.7/1.5 mya to 250/200 thousand years ago (kya) in East Africa and South Africa (Deacon and Deacon 1999; Klein 2000; Mitchell 20002; Walker and Thorp 1997). However, as with the Oldowan artefacts, the Acheulean industry is not clearly represented in Zimbabwe. Bond and Clark (1954, cited in Summers 1960) found limited occurrences of Acheulean stone tools in exposed gravel close to the Victoria Falls along the Zambezi Valley.

In its terminal phase, the Acheulean shows an increase in prepared cores, a trend that is thought to be generally characteristic of the Middle Stone Age (Mitchell 2002). These highly symmetrical, thin and small tools are sometimes considered to be a third phase of the Acheulean. In South Africa this phase is called the Fauresmith and occurs in the area south of the Limpopo river. In the area north of the river, this phase is known as the Sangoan. The

Sangoan however, has crude handaxe-like core axes and picks, and is considered a forest industry because the tools show a distribution that can be associated with forest environments (Klein 2000; Tryon and McBrearty 2002, 2006). The tools also show utilization damage that together with the distribution pattern is regarded to have been adapted for cutting wood. On the contrary, there is argument that the Sangoan might have occurred at a time when environmental conditions were drier and forests were restricted, making the association of the industry with forest environments coincidental and less convincing (Tryon and McBrearty 2002, 2006; Phillipson 2005).

In Zimbabwe, the Sangoan industry is sometimes termed Bembesi and is distinguished by a predominance of blade cores and the rarity of handaxes and cleavers (Walker and Thorp 1997). Walker and Thorp (1997) agree that this industry was a later phase of the Acheulean. Like most of the ESA industries in Zimbabwe, it is mainly found in the western parts of the country such as at Hope Fountain, Pomongwe, Bambata and Gweru Kopje among others. It is not apparent if this is not a bias of Stone Age research coverage in the country. In Zimbabwe, the Fauresmith/Sangoan phase is relatively dated by its stratigraphic position below the MSA assemblage at Pomongwe and Bambata (Klein 2000; Walker and Thorp 1997). At Wonderwerk in South Africa, the Fauresmith was dated through Amino Acid Racemisation to more than 200 kya while at Rooidam it was dated through Uranium series to 174 +/- 25 kya (Mitchell 2002).

The last of the ESA industries in Zimbabwe is the Charama, earlier called the Proto-Still Bay, that was found at Bambata (Jones 1940b, cited in Walker and Thorp 1997), Pomongwe, Khami Waterworks, Charama and at Cranmore Farm and was considered to be a developed form of the Sangoan (Cooke 1966b, cited in Walker and Thorp 1997). It has a characteristic higher percentage of retouched points and core choppers, and fewer handaxes and picks than earlier phases of the ESA. According to Walker and Thorp (1997) there is confusion in the dating of this industry since the >42 200 bp date that Cooke (1984, cited in Walker and Thorp 1997) got did not match most of the ESA dates. Using faunal remains from Redcliff, Klein (1978) suggested that Charama was replaced by the MSA before 130 000 BP. This makes the >42 200 bp date suspicious and aukwardly too young to be the minimum age range for the ESA Charama industry. The Charama phase seems not represented in the South African ESA sequence.

The MSA assemblages are characterised by well shaped flake tools, especially blades and points, which show preparation of the cores from which the final tools were made (Phillipson 2005; Walker and Thorp 1997). There is also an absence of handaxes in these assemblages compared to the ESA. The MSA assemblages have been interpreted as a possible continuation of the late Acheulean from the ESA. Walker and Thorp (1997) identified two MSA industries in Zimbabwe; that is the Bambata (also known as the Stillbay) and the Late MSA (which is also termed Magosian or Tshanguala). In comparison with evidence from South Africa where the MSA has 4 phases of MSA1-3 and Howieson's Poort (Mitchell 2002), the Bambata (Stillbay) and the Late MSA (Magosian or Tshangual/Umguza) industries make up the MSA in Zimbabwe. In South Africa, the entire MSA period is dated from about 250 000/200 000 years bp to about 22 0000 bp, although in the Kapthurian formation in Kenya, the MSA is now considered to have begun earlier than 284 000 years ago (Tryon and McBrearty 2002, 2006).

In Zimbabwe, the evidence for the MSA has been found mainly in the Midlands and Matebeleland provinces (Walker and Thorp 1997) where reference sites for the Bambata phase include the site of Bambata Cave itself, Pomongwe and Nswatugi in Matebeleland, and Redcliff near Kwekwe in the Midlands. However, the industry has also been found at Zombepata in northern Zimbabwe (Larsson 1996, 2000), and in the Nyanga area in eastern Zimbabwe (Robinson 1958). Characteristic tools of this industry in Zimbabwe include bifacial and unifacial points, scrapers of various types, backed blades and large segments. It is thought that this industry continued until 35 000 years ago but experiencing a gradual decrease in tool size (Walker and Thorp 1997).

The Late MSA or Tshangula variant of the MSA has a predominance of bladelet cores, segments and small scrapers. Most interesting are the bone artefacts and ostrich eggshell beads that begin to appear during this period as they show diverse skills in crafts, and development of a sense of aesthetics. The industry is called Magosian or Umguza, named after the Umguza river in Matebeleland where it was found in younger gravels. According to Walker (1995) the lower component of this late MSA industry contains LSA artefacts and pottery, ground stone palettes and bored stones, and is dominated by scrapers. Larsson (2000) regards the Tshangula as a transitional industry from the MSA to the LSA. His excavation at Zombepata in northern Zimbabwe and at Ruchera cave to the north east of the country produced inconclusive dates for this industry. The conclusion that Larson (2000) makes is that the change to LSA could have occurred at different periods in different parts of the country. Other scholars such as Mitchell (2002) and Klein (2000) however, have problems with the Magosian industry and the use of the term Magosian. First, it was long discovered that the type site from which the industry is named was disturbed, thus making the use of the term Magosian problematic (Clark 1974). Secondly, most of the sites from which this industry was later discovered also appear to have been disturbed. In this regard, the Magosian is not really a useful category until its status has been clarified.

It is not clear how the Zimbabwean MSA compares with the MSA of South Africa. It can be suggested that Bambata/Stillbay could be contemporaneous with the MSA2 of South Africa. The Howieson's Poort found at Klasies River Mouth and other sites in South Africa is not known in Zimbabwe although large Tshangula segments found at Nswatugi in the Matopo Hills are considered to resemble artefacts of this phase. It has been argued that the problem with the MSA sequence in Zimbabwe is that there are few sites that reflect a long sequence, apart from Redcliff. The shelters excavated in eastern Zimbabwe have few artefacts to allow for adequate characterization of the MSA industries (Robinson 1958).

In the sub-region, the MSA is replaced by the LSA microlithic tool assemblages around 20 000 years ago although in the Matopos (Zimbabwe) the appearance of the LSA seems to have occurred around 13 000 years ago (Walker 1995). Other researchers such as Klein (1984) think the transition to LSA could have occurred about 40-30 000 years ago. It cannot be expected that the transition should have similar dates throughout the sub-region. The LSA assemblages have thumbnail scrapers, crescents, bladelets, choppers, hammers, adzes, bored and grooved stones, points and many other artefacts that are of very minute size. The period saw the use of tortoise carapace and ostrich eggshell as containers. According to Walker and Thorp (1997), this is the best understood period of the Zimbabwean Stone Age despite the rapid technological changes it has compared to earlier periods. For example, there is evidence of backed tools that were probably used as arrow heads. There is also an increase in crescents, thumbnail scrapers, and an increase in ostrich egg shell beads. In addition, Walker (1995) saw evidence of bone working and rituals dealing with death in the Matopo Hills.

There are six phases in the LSA period of Zimbabwe. These are the Terminal Pleistocene microlithic Industry, Maleme Industry, Pomongwe and contemporary industries, Nswatugi and related industries, Amadzimba and contemporary industries, and the Ceramic LSA where ceramics similar to those of the western stream of the Bantu migration into southern Africa have been found (Walker and Thorp 1997). The differences in these phases are based on geometric properties of the dominant tool types, sizes of the artefacts, frequency of particular artefact classes and the raw materials preferred.

The Terminal Pleistocene or early LSA of Zimbabwe corresponds to the Robberg of South Africa and the Nachikufu 1 of Zambia, and is characterized by the dominance of small blade tools and bladelet cores. This phase is dated between 30 000 and 13 000 years ago although it is thought that it might have started earlier. In South Africa, the Robberg industry is dated between 19 000 and 12 000 years ago. In eastern Zimbabwe, a date of 20 000 BP was obtained at Duncombe Farm north of Harare for the early LSA industry. Walker and Thorp (1997) think that this phase might be widespread in Zimbabwe but there is no adequate basis for such an assumption. The Duncombe Farm material has finer and less regular backing and the assemblage is small. Suggestions that this material could be present at Pfupi site in Mashonaland are hampered by the fact that the whole LSA material was treated as a single unit (Walker and Thorp 1997). The early LSA is followed by the Maleme, which is the first definite LSA in the Matopos, found at Cave of Bees and Pomongwe, and dated between 13 000 and 11

000 years ago. The Maleme phase is a microlithic scraper industry which suggests that it has ancestry in the MSA (Walker and Thorp 1997).

The Maleme phase is followed by the Pomongwe industry which is dated between 11 000 and 9 400. There is no clear characterization of this Pomongwe phase and therefore is most likely contemporary to the Oakhurst complex of South Africa (Deacon and Deacon 1999; Phillipson 2005). Walker and Thorp (1997) however describe Pomongwe industry as characterized by convex scrapers of various sizes, some quite small. A date of 10 000 bp recorded at Diana's Vow (Cooke 1979) associated with backed microlithic tools places this material in the Pomongwe phase.

The Nswatugi or Wilton phase that follows after Pomongwe is the best known and seems to be widespread in Zimbabwe. This industry was found at Hillside and Nswatugi in Matabeleland and at various sites in eastern Zimbabwe, Masvingo and Mashonaland. It is also known as the Matopan in Matabeleland, and Pfupi (after Pfupi shelter) in eastern Zimbabwe. Its characteristic tools are backed geometric segments or crescents and small convex scrapers. However, there are some differences in the frequency of particular categories of stone artefacts of this phase between sites and between Matabeleland and Mashonaland, an aspect which Walker (1995) explains to be a result of social signalling and fashion pulses. For example, there are more side scrapers in Mashonaland (e.g. at Mtemwa) than there are in Matabeleleland. There are also more backed segments at Pfupi than there are at Mtemwa, both sites in Mashonaland.

The last two phases of the LSA are the Amadzimba and the Ceramic LSA. Amadzimba has more bone tools and is dated from mid to late Holocene (4 800 – 2 200 bp). At Nyazongo in Nyanga, the industry is associated with polished axes. Other tools include tranchets, shell pendants, bone link shafts, ostrich egg shell canteens and bone disc beads. The Ceramic LSA, as its name suggests, is associated with the occurrence of ceramics in LSA contexts. Scrapers are important and are the distinguishing trait. The phase has been labelled Ceramic Matopan or Dombozanga reflecting the sites from which it has been found. Sites associated with this phase. The occurrence of ceramics in Stone Age contexts has been observed at other sites in the country, including Bambata Cave in the Matopos, although the term Ceramic LSA has not always been applied to classify the assemblages (Burrett 2006; Thorp 2004, 2005). In terms of dating, Amadzimba industries and the Ceramic LSA are probably contemporary to the Interior or Late Wilton and Smithfield in South Africa, respectively.

Most of the research on the Stone Age of Zimbabwe has been confined to the western and central parts of the country. Martin's (1938) research at Nyazongo site and Robinson's (1958) excavations in Nyanga recovered material that was classified as Stillbay. No other MSA tradition was discovered in eastern Zimbabwe. The next stone tool tradition in the eastern highlands of Zimbabwe is the LSA Wilton industry described in Cooke's (1978, 1979) publication of his research at the same site of Nyazongo and at Diana's Vow. The date of 10 000 bp at Diana's Vow however would place the stone artefacts in the range of the Oakhurst complex which is dated between 12 000 and 8 000 years ago (Deacon and Deacon 1999). Burrett (2003) excavated the site of Gosho near Rusape in Manicaland and recovered predominantly LSA material which he considered to be of the Pfupi phase. The most recent research by Thorp (2004, 2005) in central and south eastern Zimbabwe also recorded a predominance of LSA material which she describes as Pfupi as well.

Klein (2000) and Mitchell (2002) conclude that the Zimbabwean Stone Age sequence does not clearly illuminate the available chronology. Rather, the two scholars note that there is possible confusion in the characterization of the assemblages and the stratigraphic contexts from which they were discovered. The problem is exacerbated by poor excavation techniques where for example, horizontal spits were dug at sloping deposits and sometimes the spits were too large for meaningful classification of the assemblages (Burrett 2005; Larson 2000; Mitchell 2002; Walker and Thorp 1997). Walker and Thorp (1997) also point out that some of the characterizations seem to reflect the interests of researchers more than illustrating the reality of trends in the archaeological record.

Around 200 AD, the appearance of early iron using farming communities that led a sedentary lifestyle in Zimbabwe and southern Africa is noted in the archaeological record. The period has generally been known as the Early Iron Age, although the term Iron Age is now regarded as a limited term which gave prominence to iron at the expense of other cultural elements (Pwiti 1996). Instead, there is now preference among archaeologists, especially in Zimbabwe and Mozambique, of the term Farming Communities. This term however has its own weaknesses (Phillipson 2005), and its use here is out of convenience. Sites of this period are identified by the remains of houses, evidence of iron processing or its use, and also by a prevalence of ceramics with typically thick profiles and thick out-turned rims with comb-stamping or stab and drag decorations, usually on the lips. These sites are ascribed to the Bantu expansion into southern Africa (Huffman 1989; Phillipson 2005). Three streams have been suggested for the

Bantu penetration into the region; the Western, Central and the Eastern streams. The differences are based on styles that include decoration techniques, motifs and placement, vessel profiles, firing, temper and surface finish. As these have been described in greater detail by other scholars, I shall only mention the traditions available and their distribution in southern Africa.

The earliest ceramic assemblage is now considered to be the Bambata ware (Maggs 1984; Reid *et al* 1998; Hall and Smith 2000; Mitchell 2002). These ceramic assemblages however are problematic as they are found in both Stone Age sites such as Bambata Cave and as well as in the lower levels of open settlement sites of farming communities (Schofield 1941; Robinson 1964, 1966; Jacobson 1984; Huffman 1989, 2005; Reid *et al* 1998; Hall and Smith 2000). It is still not clear if the LSA hunter-gatherers manufactured it or traded for it from pastoral or farming communities. Debate concerning the origin of this ceramic tradition has continued to the present, and has featured in various publications (Huffman 1989, 1994, 2005; Reid *et al* 1998) and at major archaeological congresses and conferences such as the Pan African Association of Prehistory and Related Studies, the Association of Southern African Professional Archaeologists (ASAPA) and the Society for Africanist Archaeologists (SAFA).

The Bambata ware is characterized by 'extremely fine, thin walled pottery with various decorative motifs' (Jacobson 1984). Huffman (1989) has suggested that the pottery has closer affinities with those of the Western stream of the early farming communities. This seems to be confirmed by its distribution which is restricted mainly to the western parts of Zimbabwe, in Namibia, eastern Botswana and some parts of South Africa (Jacobson 1984; Reid *et al* 1998). It can perhaps be best seen as belonging to the contact period between the LSA hunter-gatherers and pastoral communities or Bantu people who by the middle of the 1st millennium AD were in southern Africa (Maggs 1984; Hall and Smith 2000).

Archaeological evidence of the Early Farming Communities (EFC) or Chifumbaze complex as Phillipson (2005) prefers to call them, can be traced to East Africa where Urewe ceramics are considered the earliest tradition, followed by Kwale, Matola and Msuluzi or Lydenberg traditions, all of which form the eastern facies of the EFC. The Central stream has ceramic traditions that include Nkope in Malawi, and Gokomere/Ziwa, Coronation and Maxton in Zimbabwe, The Western stream is considered to have passed through western Zambia, into Botswana. The EFC ceramics of the Kadzi tradition discovered in northern Zimbabwe are not clear on whether they belong to the western or central stream, although they have affinities with some ceramics in Zambia (Pwiti 1996). The same problem is found with the ceramics in the Shashe-Limpopo valley at Schroda, Bambandyanalo and Mapungubwe (Maggs 1984).

Although the end of the EFC is not clearly defined, it is generally accepted that it occurred around the 10th century AD. The subsequent Late Farming Communities (LFC) period saw the emergence of complex state systems such as the Zimbabwe, Torwa (Khami) and Mutapa states. The change to LFC is accompanied by transformations in settlement layouts and locations. Whereas EFC settlements were generally situated along river valleys, those of the LFC do not show that close attachment to water source (Pwiti 1996; Pikirayi 2001b). With reference to ceramics, new decorative techniques appear, such as bead or fibre impressions, hatches, incisions and slashes all developed into various motifs such as triangles, arcades, pendants, cross hatches as well as bands and panels. Some pots are finished with two colours such as the polychrome ceramics of the Khami phase. These characteristics vary from one tradition to the other and from one region of the country to the other.

As with the Middle and Later Stone Age periods, there is also much regional variation during the period of farming communities. The causes for the changes that brought about the LFC are a subject of debate. Earlier notions reflected a migrationist explanation (Huffman 1978), while later interpretations explain the changes as autochthonous transformations in the EFC traditions influenced by local ideological shifts, among other factors (Pwiti 1996; Katsamudanga and Pwiti 2006). Other scholars suggest that climate change could have been significant in the shift in settlement behaviour and possibly in the change reflected in material culture (Huffman 1996b; Sinclair and Lundmark 1984).

LFC ceramics of western Zimbabwe following Zhizo have been grouped chronologically as Leopard’s Kopje and Khami. In northern Zimbabwe the LFC sequence begins with the Musengezi which overlaps with Zimbabwe tradition, and eventually followed by the Portuguese and Refuge periods. To the south the Zimbabwe tradition has dominated the discourse on LFC communities. On the highveld, there is Harare and Musengezi traditions while to the north east there is the Nyanga assemblages. In the north east, there is a possible presence of the Zimbabwe tradition although this is not well documented. The distribution and detailed characterisations of these traditions has been discussed in several publications (Chirikure *et al* 2001; Huffman, Pikirayi 1993, 2001; Pwiti 1996; Soper 2002, 2006) and as such their characteristics will not be presented in detail.

From the 15th century the Portuguese were penetrating the region, especially in the east and northeast of the country where they remained until the end of the 17th century when they were driven out after the wars with the Changamire (Beach 1984; Bhila 1972, 1976, 1982; Storry 1976). This period has been termed the Portuguese period (Huffman 1971). The settlement sites of this period are divided into those of the Portuguese travellers and traders and those of the African communities (Huffman 1971). In eastern Zimbabwe, the Portuguese continued to exert influence on African communities until the 19th century when they became interested in signing formal treaties with African chiefs. The last vestiges of Portuguese influence in eastern Zimbabwe came with the Anglo-Portuguese skirmish at Mutasa's residence and the Anglo-Portuguese border settlement of the late 19th century (Bhila 1972).

The 19th century is generally termed the Refuge period. Most local communities were facing internal and external military pressures associated with the Nguni and European incursions. Sites of this period can be divided into European camp sites and African settlements. The latter sites are identified by their inaccessible locations (Beach 1988; Huffman 1971; Mazarire 2005; Pikirayi 1993; Summers 1958). After the Refuge, all other ancient settlements are described as Recent. These are assumed to have been abandoned after 1900 AD and are identified through material culture that is almost similar to that found among contemporary local rural communities.

The sequence of early farming communities in eastern Zimbabwe is as poorly defined as that of the Stone Age. The known sequence starts with the Ziwa, followed by Coronation as EFC phases. The Coronation phase was reported in the Tsetsera mountains and near Nyanyadzi in Chipinge (Summers 1969). This research treats Ziwa and Coronation traditions as one and the same since the two phases are not clearly separable (Soper *pers. comm.*). From Ziwa tradition the sequence is followed by the Nyanga culture, then the Portuguese and the Refuge periods. There is a very large gap between Ziwa and Nyanga in the north east of Zimbabwe that is not adequately explained. Soper (2002) suggested that the earlier phases of the Nyanga culture could have been contemporary with the Zimbabwe phase noted at some sites in the Nyanga area and near Rusape. His recent research (Soper 2006) is however not clear regarding the period between the EFC Ziwa culture and the beginnings of the Nyanga tradition. While to the south, this gap is partially covered by the presence of the Zimbabwe tradition at Mutare Altar site and at Murahwa's Hill (Beach 1980; Bernhard 1968; Mupira 2007), the situation is not clear regarding the existence of the Nyanga culture. In the north east, the period after the Nyanga tradition is associated with the Refuge. However, it is not clear if the Refuge communities in many areas of eastern Zimbabwe were directly related to people of the earlier periods.

1.6 Conclusion

The chapter has presented the physical geography and the current climatic conditions of the research area. It has been demonstrated that the research area consists of contrasting physical landscapes. One is Zimunya communal land, which is open land dotted with granite bornhardts, castle kopjes and hills that have resulted in poor sandy soils for much of the landscape. Another consists of the Vumba and Tsetsera mountains whose climate and vegetation is different from the rest of the research area, characterized by a subdued climate and patches of rainforest. The other is a valley location whose confinement represents a different environment altogether. The settlement history of these areas has been overshadowed by the attention that has been given to the Manyika kingdom and the activities of the early Portuguese traders and travellers. In spite of what is known about the Portuguese during the prehistoric period, there is not much that is known about the indigenous prehistoric communities in these areas, and their adaptation to the physical environment. As Sinclair (1987) shows, the cultural succession from the Stone Age times to the Portuguese contact period is not precisely known.

This research is expected to fill in some of the gaps that have been observed in the culture history of this area. The existing literature has not managed to show convincingly the nature of the archaeological sequence in the area. In addition, the relationship between some of the archaeological traditions that have been observed in the previous researches, namely the Zimbabwe and the Nyanga traditions, is not clear. This research is expected to illuminate on these shortcomings and show the extent to which the physical geography of the area might have influenced the cultural behaviour of the prehistoric people of this area.

CHAPTER 2

Theory and method of spatial archaeology

"Archaeology is inherently a spatial discipline…" (Lloyd and Atkinson 2004, p.151)

2.1 Introduction

This chapter presents an overview of the trends in the study of environment and culture within and outside Zimbabwe. I discuss the theories and methods that have governed spatial studies in the past, giving due attention to the 1940s because this marks the beginning of serious research in prehistoric settlement issues. The historical account of the evolution of spatial methodologies is meant to bring us to the modern techniques such as Geographic Information Systems (GIS), one of the current approaches that has revolutionised spatial archaeology. The GIS approach is the methodological framework within which settlement patterns in the eastern highlands of Zimbabwe will be studied. The theories and methods influencing spatial archaeology are discussed together in this chapter because they frequently influence one another in practice. An outline of problems frequently met in spatial research is given, together with the reservations that have been expressed concerning some of the methodological tools employed in such studies. I also trace the intellectual developments that have followed these criticisms in an effort to locate the position of GIS today.

2.2. Environment and culture: a review of global trends

The relationship between environment and culture has long been known to be symbiotic. In the last century the nature of this relationship in prehistory has been studied within the sub-disciplines of spatial archaeology. Today the study of the spatial significance of archaeological settlements has been subsumed under landscape archaeology which is thought to provide a more holistic approach towards understanding past human behaviour with respect to space utilisation (Sabloff and Ashmore 2001). However, what is significant is not the appropriateness of the nomenclature given to the study, but the theoretical scope and methodological approaches employed towards understanding the intricacies of social dynamics and their relationship to the natural environment.

In the 1960s, settlement studies focused on complex systems with monumental structures that provided undisputed evidence of social complexity. The locations of such systems were often interpreted in terms of economic models. In the post processual era, questions of the role of cultural factors in influencing settlement behaviour followed, demonstrating the awareness that prehistoric communities had on their own decisions regarding settlement location. At present, models analysing cultural behaviour are demonstrating the adaptive capabilities of prehistoric communities towards their environments. These models are emphasizing technological and cultural innovation as a counter measure against harsh weather or environmental conditions (Manyanga 2006).

The premise behind settlement archaeology is that archaeological data are evidence of the "human geography of the past". There are inherent spatial qualities to the data as everything happened or left evidence somewhere. Settlement archaeology deals with the distribution of archaeological settlements and the use of space at those sites. The basic assumption is that in one way or another, the physical environment influences the activities and decisions of mankind, particularly settlement location.

Today the definition of settlement archaeology has broadened. Sabloff and Ashmore (2001) regard settlement archaeology as the study of social relationships using archaeological data. This is because most studies of archaeological settlements have tended to give undue emphasis to the natural environment as background to the location of archaeological sites in space. In reality however, human behaviour is not always directly influenced by the environment, but may be related to some cultural concepts and perceptions that manipulate the environment. I agree with the position that although societies are naturally bound to settle somewhere, they are not at the mercy of the environment as earlier thinking reflected through environmental determinism (McGlade 1995; Symcox 2003). Cultural controls and technological levels influence what can be exploited from the environment. For example, while human beings exploit physical environments that provide them with comfort in terms of food resources, water and health assurance, it is their social relationships, cultural controls (such as taboos) and technological limitations that determine what a food resource is, how it should be exploited and who should exploit it. There is indeed a strong symbiosis between environmental manipulation and cultural relationships. This work discusses the cultural aspects in past human spatial behaviour in eastern Zimbabwe as an adaptation to the physical environment.

Spatial studies have had a long history in archaeology as reflected in Willey's (1953, 1956) research. Today settlement studies are regarded as the most critical theoretical and methodological innovation to have been developed in the second half of the 20th century (Sabloff and Ashmore 2001). Settlement studies are also viewed as the most reflective of social, economic and environmental conditions surrounding humanity. Although there were different opinions between processual and post-processual archaeologists regarding both theories and methods used, current approaches to settlement studies seem to have accommodated the two rival camps on the role of the natural environment in cultural development (Kvamme 1997). The criticisms that post processualists brought have broadened the scope of settlement archaeology from the narrow focus of environmental determinism to other issues that include social organisation and cognition (Aldenderfer 1996; Boaz and Uleberg 2000; Gaffney, Stancic and Watson 1996; Kvamme 1997; Llobera 1996; Zubrow 1994).

Studies of prehistoric settlement patterns are crucial in understanding the perception that prehistoric communities had of their territories. They are also useful in investigating the process of decision making and examining the opportunities and constraints under which particular locations could have been chosen for settlement. The continuity or discontinuity in the patterns and choices allows us to direct attention to social organisation and relationships that promoted such patterns among the prehistoric societies. Settlement studies have however been criticised in the past for dwelling too much on the economic aspects of society at the expense of other social issues such as cognitive concepts about the land (Aldenderfer 1996; Hodder 1982a; Llobera 1996). In this research I focus on both the economic and social issues that can be inferred from the evidence. I view settlement patterns as an expression of human spatial behaviour that is based on the interpretation of various aspects of the environment or landscape.

While several publications and researches have discussed the environments surrounding archaeological sites, for most this has largely been aimed at placing the sites in a context for discussion only, with the symbiotic relationship being given cursory treatment. Some accounts that tried to relate environment and culture occurred in the late 19th and early 20th centuries AD. Although these had no significant impact in archaeological research (Summers 1960), they showed the potential of understanding human cultures in relation to the environment. Indeed some of the uses of the environment formed the racist anthropological accounts of the late 19th century AD (Symcox 2003). Based on Ratzel's work these formed the foundation of the deterministic school of thought (Symcox 2003). In the early 20th century, the work by such scholars as Crawford and Cyril Fox in Britain, and Schliz in Germany, for example, had a stimulating effect on the subject (Summers 1960). Fox's 1943 work is regarded as the earliest known research that had significant impact in archaeology although it too was laced with aspects of geographical determinism (Daniel 1962). Fox had combined ecological distributions of archaeological sites, a concept that had been developed by Crawford, with Vidal de la Blache's nascent ideas on environmental possibilism (Daniel 1962). It is argued that Fox had managed to show the "Personality" of Britain because his study dealt with a well defined geographic unit (Summers 1960). On a continental scale, research in Europe had highlighted the significance of geographical factors in influencing human cultures (Childe 1929, 1954, 1957; Summers 1960). These works were followed by Steward and Willey's research in the 1940s and 1950s in America. All these works showed the influence that the environment has on the development of human cultures.

The work by Childe in accounting for the rise and spread of civilization from the Near East to European civilizations (1929, 1954, 1957) was significant for its detail but was later criticised for chronological problems and that it relied too much on migration and diffusion concepts (Hodder 1982b, Trigger 1980). Steward's multicultural evolution ideas offered a theoretical explanation to the various ways in which different cultures respond to similar environments in different geographic areas (Steward 1955). His explanations put to rest the 19th century anthropological accounts on the influence of environment on racial qualities, and also highlighted the limitations of the diffusionist and migrationist explanations to culture change (Steward 1949, 1955). Steward's work viewed environment as a significant variable in cultural developments, although the specific manner in which cultures evolved varied depending on ecological settings. This placed much emphasis on specific geographic areas rather than broad regions. Steward was borrowing from Geography for his ideas had already been anticipated in the 1920s, first by Vidal de la Blache and later by Lucien Febvre in 1922 in a concept that they termed environmental "possibilism" (Symcox 2003). Whatever the origin of his ideas, this archaeological work by Steward led to the birth of cultural ecology and reinvigorated the ecological character of settlement studies that had been started by Crawford and Fox in the early part of the 20th century. Encouraged by Steward, Willey improved the theory of cultural ecology by applying it in the Viru Valley of Peru (Willey 1953, 1956). Formal settlement pattern analysis in American prehistory is thought to have begun with this work by Willey (Trigger 1980, p.161).

There are several strands of archaeological research themes that emerged from the rubric of settlement studies ranging from predictive modelling to regional interpretations of social and technological change. Others became too focussed on the environment to the extent that environment was seen as the sole determinant of settlement behaviour. In the 1960s and 70s several works followed, examining the concepts of cultural ecology initially introduced by Steward and later amplified in the systemic concepts of the period. The discipline of environmental archaeology also contributed much as it dealt with palaeo-environments represented in archaeological contexts, giving archaeologists a means to follow the temporal changes in the environment that could have affected human cultures. The interest in systemic thinking among the "New Archaeologists" provided a framework within which the complex interrelationships of environment and culture could be discussed in a scientific manner (Butzer 1982, p. 5). Thinking in environmental and ecological terms has been evident in such spatial studies as the site catchment and site territorial analyses of Vita-Finzi and Higgs (1970) and Higgs (1972), site distributions of Hodder and Orton (1976) and Orton (1980). From the pioneering work of Flannery (1968) in the application of systems thinking in archaeology, it can be seen that the basic principles of systems theory were essential in integrating the environmental dimension in a contextual archaeology (Butzer 1982, p. 6). Environment is thought to have stimulated processes of cultural development or adaptive mechanisms that would contain the stress induced on a culture or would result in a different reconfiguration of society.

These early studies on settlement locations were conducted within the positivist mood of the New Archaeology of the 1960s which argued that human spatial behaviour is not random, but patterned (Clarke 1968; Gibbon 1989; McGlade 1995). The processual archaeologists, as the New Archaeologists were also known, believed that there is always a reason for every action, and that it is possible to get back to this reason by observing and analysing the evidence that was created by the action. In this optimistic mood, human behaviour could be quantified and measured, the results forming a basis of inference to get back to the cause (Gibbon 1989). By the late 1970s however, there was growing concern with respect to the potential of this new "science" as reflected in works of Hodder (1982a, 1982b). Within the New Archaeology, cultural changes were seen as responses to external stimuli, usually the environment, and this has been criticised on the premise that it led to the entrenchment of ideas about environmental determinism. Even the quantitative techniques that were used in data analysis were later regarded as dry approaches that reduced everything to numbers that could not capture accurately social and cultural processes (Wheatley and Gillings 2002). As McGlade (1995) asserts, rational behaviour and survival of communities under the guise of adaptation in the New Archaeology and systemic concepts are privileged at the expense of perception, cognition and action. Getting back to the actual cause of a cultural pattern or event as seen from the archaeological material is also a matter of probabilities as the archaeological record is not always complete. Furthermore, different actions or processes can result in similar patterns in the archaeological record (Steward 1949, 1955). In short, the problem with the approaches of the New Archaeology was the rigidity with which conclusions were made. It remains true however, that past human behaviour can be reconstructed. It is also accepted that the environment has influence on culture developments (Kvamme 1997).

In retrospect, these early works are seen as having been more descriptive than explanatory, partly because they lacked analytical means to explain the trends observed. According to Dalla Bona (2000), they failed to account for the settlement systems that were being studied. They were as limited as the earlier typologically based spatial patterns of migration and diffusion such as those espoused by Childe (1929, 1957). Human action was treated, not as part of the ecosystem, but as an intrusion onto the stable natural environment with a very predictable trajectory of cultural changes in the endeavour to adapt.

Although accepting the value of multicultural evolutionary ideas, the importance of the environment in influencing cultural developments continued to be appreciated mainly in America. In America the importance of the environment continued to be regarded highly as shown by ecological studies of the 1960s to 70s (Willey and Sabloff 1993). The predictive models of the 1970s continued to entrench these ideas, reinforced by their application in

Cultural Resources Management (CRM) where their predictive accuracy is more important than their interpretive validity (Gaffney and van Leusen 1995). In contrast, in Europe there were doubts on the importance of the environment in shaping cultural developments. Archaeologists soon realised that past societies were being suppressed under systemic models that only saw them as reacting to an external stimulus (the environment). Ethnographic studies in several parts of the world did not support the general laws of cultural change as enshrined in the New Archaeology. Researchers felt that space had meaning and that meaning was culturally constituted. Although the theory of environmental possibilism moderated the excesses of the quite often deterministic environmental models (Wheatley and Gillings 2002), its practical application and appreciation was not being reflected in the models. There was therefore need to develop approaches that acknowledge the active engagements and perceptions that prehistoric communities had of their environments.

Since the mid 1980s and especially in Europe, there has been an increasing interest and emphasis to approach settlement studies from the cultural perspective. This is considered a more humanistic and realistic approach towards a comprehensive understanding of human behaviour. The realisation that the space between sites can be meaningful has shifted attention from the sites themselves to the intervening space and the non-material aspects of societies and sites (Wheatley and Gillings 2002). Emergent concepts have tried to explore issues of cognitive perceptions in affordance (Llobera 1996; Webster 1999) and in the context of human ecodynamics (McGlade 1995). Others have attempted understanding the role of visibility as a function of religious cognition that influenced the location of settlement sites (Zubrow 1994). As Kvamme (1997) notes however, the physical environment is still significant because it is environmental aspects that are manipulated to give associative cultural or religious meanings.

For example defence mechanisms exploit the landscape. Religions can make use of natural landforms as icons of supernatural powers. To illustrate this further, among some communities in Zimbabwe, riverine and marshy areas are used for burial to "cool down" potentially violent spirits of deceased persons (Mahachi 1990). It is still necessary therefore to understand the environment, not as an end to itself but as a step towards a social interpretive framework.

This work looks at adaptive strategies through settlement preferences in the area under study. The work tries to replicate the vision of the prehistoric peoples in the way they made use of the environment. This is done within the framework of environmental possibilism where the environment is not deterministic but offers opportunities or affordance (Llobera 1996). The environment is the medium in which all cultural activities take place and are enacted (Kvamme 1997). It provides humanity with choices and constraints, and therefore influences it even in very subtle ways (Butzer 1982; Pwiti 1985; 1996; Manyanga 2001). It is important however to note that human beings interpret environmental conditions in terms of the comfort and safety that they offer in the widest sense of the terms (Aronoff 1991). The interpretations made of the environments and the responses to them are not always similar across communities. There could be several options to choose from both the physical environment and the cultural armoury to achieve comfort and safety. Thus the outcome of human interaction with the environment is not predetermined, but depends on the choices made and the ingenuity employed. It is the result of appraising the landscape and its environment in light of historical and cultural experiences and acquired technologies (Roberts 1996; Willey and Sabloff 1993). Thus settlement patterns are not the result of blind natural forces as Febvre says (Symcox 2003). Settlement distribution patterns may be able to reflect the options chosen and the interpretive perceptions envisaged on the environment. However, from probability principles certain combinations of factors must have been more influential than others in influencing human settlement behaviour in the past as they do today.

Methodologically, central to settlement studies has been the distribution map which is regarded as one of the main instruments of archaeological research (Clark 1957; Daniel 1962; Hodder and Orton 1976; Orton 1980). Distribution maps began to appear in the middle of the 19th century, some of which were exhibited at the Paris Exposition in 1957 although their potential then was doubted (Daniel 1962). Increased importance of distribution maps in relationship to prehistory was witnessed in the early decades of the 20th century with the most popular ones being the work by Fox (Daniel 1962). Although the significance of maps is appreciated, their meanings and importance depends on an adequate and accurate database, and the scale of the phenomena being represented. The map is a simplified model of reality. Since it is a representation of selective data, the map can sometimes be regarded as a representation of an interpretation. Since then, distribution maps have been an integral aspect of spatial studies. It is even much more so today given that archaeological research can now be entirely based on survey work alone (Ammerman 1981; Pwiti 1996). Regional cultural chronologies are now broadly known and excavations are now mainly meant to understand developments at individual sites. Furthermore, with chronometric dating such as C14 dating, absolute dates for specific sites can be obtained without recourse to the regional chronologies. However, it is always interesting and informative to compare the quite often generalised regional chronologies against site specific developments to identify divergent behaviour from established patterns. In addition, regional chronologies are also important when working with a large number of sites where chronometric dates for every site cannot be afforded.

Spatial studies by their nature generate a lot of data that results in huge databases. Using these databases manually is usually a cumbersome task and it may take long to produce results, hence the need to simplify the data. In the past the scope of spatial studies was quite often limited by the lack of adequate technology to move around and within the databases. For this reason, there was increased reliance on visual analyses of maps. Later, statistical methods were employed to facilitate inferences and interpretation of spatial relationships, but these could be difficult and tedious to work with when the areas being researched and the amount of data become large.

The 2nd half of the 20th century was a period of technological build up in research methods to understand and deal with spatial and environmental processes. Of significance were analogical methods to understand the way cultures related with environments. Most ecologically based ethnographic approaches in archaeology, for example in southern Africa, were a product of this consciousness of the role of the environment on cultural developments (Clark 1957; Lee 1976; Lee 1969; Summers 1960). Ethnographic studies conducted among the hunter-gatherers of the Kalahari and other regions demonstrated the influence of environment on cultural processes (Lee 1976; Lee 1969; Yellen 1976). The search for methods to handle and make sense of the spatial databases has been continuing and has culminated in the computer based GIS systems of the present day. These technologies have taken spatial studies beyond the limits of mere visual analyses to interpretive approaches that make use of both quantitative and qualitative assessment of archaeological patterns.

Spatial studies the world over have been carried out at two levels, the intra and inter site levels. The former applies when the investigation is based on single sites, investigating issues such as the use of space as seen in spatial distributions of material culture at individual sites. The latter looks at relationships of sites within a locality, region or area. With the former the information generated simply reflects activity areas at the site. This may give clues to cognitive ideas the inhabitants had on spatial organisation of their settlements. Such kinds of studies moved together with structural theories in archaeology, for example Huffman's Central Cattle Pattern (CCP) settlement models of the Bantu communities in southern Africa (Huffman and Hanisch 1987). His work on the Zimbabwe culture also argued for dichotomies of royal and commoner, men and women, upper and lower, back and front, and other aspects of the use of space at Zimbabwe type sites basing on a structural analysis of the spatial distribution of archaeological material (Huffman 1996a).

The computer age has done much for the enhancement and advancement of spatial studies which had experienced a decline in the latter part of the 1980s (Shennan 1999). The latest tool in spatial approaches is Geographic Information Systems, which has enabled easier handling of large spatial databases and providing means that allow for both qualitative and quantitative analyses of the data (Aronoff 1991; Kvamme 1997; Kvamme 1990, 2001, 2005; Stancic and Kvamme n.d; Gaffney and van Luesen 1995; Wheatley and Gillings 2000, 2002). Patterns on the landscape can now be mapped quite easily and with much speed. Although the use of computers in archaeology began in the 1960s as a result of the scientific orientation that archaeology was taking (Clarke 1968; Doran 1970), further developments in computer hardware and software have enabled data from diverse sources to be integrated within single software packages. For example, data from cameras, instruments for global positioning (GPS), total stations, satellites, digitisers and scanners can be integrated within a GIS for faster analysis and to generate new useful datasets from the input. Various GIS programmes allow easy storage, retrieval, manipulation and mapping of geo-referenced data. They also enable various kinds of manipulation such as statistics, mapping and simulation in addition to their being database management systems.

The growth of GIS has seen greater expansion and increased interest in settlement and landscape studies (Hunt 1992; Shennan 1999; Lock and Harris 2000; Wheatley and Gilling 2000). The earlier models on human behaviour and settlement systems that used such technologies as D-curves to identify site clusters have been replaced by much more robust software systems that can enable modelling the landscape with a high degree of accuracy. Although GIS has been criticised for depending too much on environmental factors, these criticisms are actually helping to improve its use in archaeology. There have been promising results mainly from Europe on the potential to model elements of the ancient mind. Research has gone beyond the issues of site territories and catchments to landscape perceptions, defence strategies, issues of visibility and other cultural themes (Aldenderfer 1996; Mitcham 2002; Wheatley 1995). These approaches make the study of settlements and communities holistic and more humane as they combine both physical environments and their manipulation for cultural ends (Kvamme 1997; Gaffney and van Leusen 1995).

2.3 Spatial archaeology in Zimbabwe

Zimbabwe has not lagged far behind global trends in spatial archaeology, both in theory and methods. This can be demonstrated by environmentally based spatial studies which began in the late 1950s in Zimbabwe (Summers 1958; Summers 1960), just a few years after the initial and earliest researches by Willey (1953) in America. Summers' distribution maps of the 1960s reflected the spatial biases in archaeological research in the country which tended to follow major roads and the railway axis. Although he acknowledged this as a weakness which affected his work, the approach demonstrated great potential with adequate archaeological surveys. In 1967 Summers published a distribution map of archaeological sites in relation to tsetsefly-infested zones in the country. He concluded that the relationship of the two datasets showed that since prehistoric times, the low-lying areas of Zimbabwe were less favourable to human inhabitation because of the tsetsefly (Summers 1967). This work has been criticised for using contemporary environmental data whose nature in the archaeological record was not demonstrated. Even the archaeological database was based on inadequate surveys that had been done then. In addition, Summers (1967) did not try to look for the evidence of tsetse fly in the archaeological record. It is possible that the map of agro-ecological regions of the country that had been published a few years earlier by Vincent and Thomas (1961) could have influenced him. In short, the variables used were too few to offer acceptable conclusions. Monocausal explanations had since been abandoned in archaeology. Later, Summers (1969) tried to relate the distribution of Zimbabwe type sites to the occurrence of gold deposits. His conclusion was that the Zimbabwe type sites were related to ancient gold mining, indicating the significance of the occurrence of gold fields (Summers 1969). This observation was also found wanting on chronological grounds where the Zimbabwe type sites and the ancient gold mines were not necessarily contemporary (Pwiti 1997; Swan 1994). In addition, Pwiti (1997) argues that since the Zimbabwe Tradition had at least three phases, locational determinants would not have remained constant throughout its period.

Garlake (1978) argued that there was an environmental correlation in the distribution of the Zimbabwe type sites and good pasture for livestock. His interpretation was that the distribution of these sites suggested the influence of transhumance and existence of a cattle based economy among the people of the Zimbabwe culture. He argued that most of the stone walled sites were located on the edges of the Zimbabwe plateau, meant to utilise the pasture of both the highveld and the lowveld (Garlake 1978). The pasture of the highveld is believed to be sweet in summer and unpalatable in the dry winter season. Cattle were therefore taken to the palatable grazing of the lowveld in the dry winter season, and back to the highveld in summer. The transhumance interpretation however, could not be sustained in light of research at Great Zimbabwe and in northern Zimbabwe which showed a cattle economy inconsistent with the transhumance model (Pwiti 1997 and references cited).

In 1979 a spatial study in the Darwendale area showed the preference for sandveld and riverine locations by prehistoric farming communities (Prendergast 1979). The interpretation of this pattern regarded the level of technology as significant in influencing settlement choices. According to Prendergast's (1979) evaluation, the use of hoes in farming is more effective in the lighter soils of the sandveld than on heavier soils such as the red soils of Zimbabwe. This conclusion could have been contributing to the red soils debate in Zimbabwean history, and must have been influenced by the so-called traditional view that colonial white farmers were justified in occupying the red soils of the country because they were not being used by the indigenous communities up to the end of the 19th century (Mackenzie's 1974; Mtetwa and Chennells 1975). Mtetwa and Chennells (1975) however, suggested that rainfall and the need for defensive strongholds could have influenced the settlement patterns.

More spatial studies came in the 1980s and 1990s (Sinclair and Lundmark 1984; Pwiti 1985; 1987; 1996; Sinclair 1987; Swan 1994; 1996) making various uses of the distribution of archaeological sites. Swan (1996) investigated the distribution of dolly holes as potential evidence of mining and mineral processing areas. This was a significant departure from the emphasis on Zimbabwe culture stone walled sites. She found a close relationship between the dolly holes and ancient gold, copper or tin mines, and iron smelting sites. Some of these later researches managed to expose the weaknesses of earlier interpretations such as that by Garlake (1978), while others also brought their own shortcomings.

Most of these studies were inclined towards the environmental influences to settlement/site distribution. Secondly, they also reflect the concern with single causes for site distribution. The concern with tsetse fly (Summers 1967), pastures (Garlake 1978), gold deposits (Sinclair and Lundmark 1984; Swan 1994; 1996), proximity to reliable water supplies and fertile agricultural lands (Pwiti 1985; 1996) all show the functional utility of the studied landscapes. Thus, economic needs such as subsistence and trade were interpreted as determinants of different settlement patterns of the Early and Later Farming Communities (E/LFC) respectively. For example, Sinclair and Lundmark (1984) interpreted the movement of communities from the south of Zimbabwe to the north as an expression of the influence of the presence of gold fields in the north. While these interpretations might have been correct, there was less effort to test if other factors could not have resulted in similar associations. The shortcomings of these works could have been a result of the nature of archaeological information where it is easy to map environmental data than it is to map cultural variables (Kvamme 1997). Cultural data require a lot of research before any aspects can be put into map format (Kvamme 1997).

A different strand on the study of settlement patterning took a structural approach, looking at the organisation of space within household units and at homestead level. The use of space at individual sites may incorporate adapting to the topographical environment, but the patterns essentially reflect mental templates of the inhabitants (Mahachi 1990). Such structural studies are seen in the ethnographic research on settlement patterns by Mahachi (1990) in northern and southern Zimbabwe, and Huffman's (1996a) work on the Zimbabwe culture. The issue of environment is barely mentioned because it is considered mainly applicable when focus is beyond household units and homesteads (Mahachi 1990). I however think that the structural approach can also work with environmental aspects even at the site level. Iconic symbols are sometimes drawn from the physical environment, especially with extensive settlements where topography can be exploited to that endeavour. The work by Llobera (1996) demonstrates this aspect using the location of ditches in Wessex, South England where visibility is thought to have been significant in their placement.

What can be deduced from the spatial studies in Zimbabwean archaeology are interpretations and conclusions that were mainly based on mere visual appearances with limited statistical validation (Summers 1960, 1967; Pwiti 1985, 1996). It is possible to see patterns where none exist, hence there is need to use independent methods such as statistical inferences to gain confidence in the visual patterns. The development of GIS is making it possible to combine visual assessments of maps with quantitative approaches, but the statistical component has to be understood. The limited use of such techniques can be explained in terms of prohibitive costs (Sinclair *et al* 1992). The advancement in computer software is likely to reduce costs, thereby improving access to the relevant spatial technology. Already there are signs that the situation is improving (Sinclair *et al* 1992).

Although the use of GIS in Zimbabwean archaeological research has been minimal, it has been applied with promising results in mapping the distribution of archaeological sites in the country (Katsamudanga 2001; Ndoro and Pwiti 1993; Pwiti 1996). The research by Pwiti (1996) came in the form of both micro and macro-level applications of GIS in northern Zimbabwe showing the distribution of some archaeological sites over the northern Zimbabwe landscape. The results showed a selective pattern that followed stream banks for early farming communities and diverse environmental preferences for later farming communities. Pwiti's (1996) research was followed by similar work in the Shashi-Limpopo valley (Katsamudanga 2001; Manyanga 2003). The results from this valley, although tentative, again showed significant proximity of sites to the river valley but with sufficient distance to stay off the flood plains. Ongoing analysis has detected no significant changes in the distributions of the archaeological communities in the valley through time, reinforcing the idea of resilience (Manyanga 2006). The weakness of the earlier interpretations is that they focussed more on the physical environment than on cultural influences. The resilience model (Manyanga 2006) has called for a reappraisal of the archaeology of this valley, challenging the inward and outward movement of people as postulated in earlier researches of Huffman (1996b).

The application of GIS methods in Zimbabwe shows that the country is also at the current worldwide threshold of spatial studies. The application of this technology in eastern Zimbabwe is expected to move Zimbabwean archaeology from merely experimenting with the technology to its adoption as one of the useful and standard tools for spatial studies.

2.4 A general review of criticisms of spatial studies

Settlement studies fall within ecological approaches and according to Trigger (1971, 1989) the ecological research focus targets geology, climate, vegetation and zoology as constricting agents that mould human behaviour. Trigger (1989) thinks that this approach and these factors create a context for interpretation which is limiting and does not take into account human cognition and agency. This criticism goes further to argue that those who believe in the significance of the physical environment are reincarnating the theory of environmental determinism and the primacy of subsistence and economic pursuits in influencing settlement decisions. Today most archaeologists involved with spatial studies believe that human beings make various interpretations of the environment and have several options or decisions to take. The choice of settlement locations clearly shows the awareness that people had of the environment surrounding them, but researchers now argue that settlement behaviour is not always conditioned by the environment. They argue that there is interplay of both cultural and environmental factors. Kvamme (1997) and Incuse (2000) demonstrate how cultural values are built upon the natural environment.

I agree with Kvamme (1997) that it is not easy to separate the physical environment from cultural issues. The degree to which either of these is openly expressed as the cause for particular human behaviour depends on the level of what can be considered a stable situation for the community involved. If cultural factors threaten the balance of security and comfort enjoyed in this stable condition, then those factors are likely to influence human behaviour. If natural calamities are likely to compromise the expected living conditions then environment would be given more priority in decision making. There are three theoretical conditions which result from the relationship between environmental and cultural pressures.

- Where environmental pressure is greater than cultural forces, then decisions will be based on environmental factors
- Where cultural pressure is greater than environmental pressure, decisions will be based on the cultural factors

- Where neither environmental nor cultural pressure dominates, settlement decisions follow no clear patterns

The measure of a secure and comfortable homeostasis is a function of both the environment and techno-social developments. The potential effect of environmental or cultural factors on settlement decisions can be measured against the technological and social preparedness of the society to deal with such threats. If there is nothing already existing in the technological kit to ward off the forces of change or danger, then new measures are engineered in the cultural system to deal with the matter. Among the San hunter gatherers, for example, girls are taught to be resilient against hunger (Gisele 1993; Nhamo 2005). If no solution can be garnered to deal with the threat and if the problem goes beyond endurable levels then the likely viable option would be to move to another area. The exploitation of technology and its effectiveness requires human intelligence. The nature of response to forces threatening stability depends on experience and / or the rate of change (or the gravity of the effect). The response could be either passive resilience or active engagement with the threat. Thus decisions always reflect adaptive and innovative mechanisms that combine human perception of both the physical and cultural environments. Settlement patterns therefore are linked to technological developments, hence the use of technologically based site classifications.

The last condition in the model presented above is difficult to deal with archaeologically because the pattern can result from conditions where both environmental and cultural forces are experienced at the individual level, where they cannot be considered general to a community. The problem with this model is that it would appear that all members of a community during a particular period under study would reason in the same manner and have similar settlement preferences. Furthermore environmental preferences are culturally perceived while on the other hand cultural perceptions and needs are neither finite nor are they necessarily stable. Generalisations are however acceptable to a certain extent, especially given that identifying individual actions through material culture is not an easy task. It is imperative for researchers engaged in settlement studies to determine the status of the environment contemporary with the cultural phases or traditions represented.

There are other factors that affect settlement distribution patterns. As Butzer (1982, p. 8) notes, researchers should be aware that some patterns are a product of surface preservation of sites rather than human behaviour. Several factors such as climate, subsequent use of the land and survey strategies have to be considered for they can also influence what survives and what is found as archaeological remnants (van Leusen 2002). Thus in spatial archaeology, as in any other branch of the discipline, we are always dealing with an incomplete record. The degree to which this incompleteness can affect interpretation need not be underestimated.

The value of spatial studies that make use of regional site distributions is sometimes limited in that most of them use sites relatively dated from surface indications of material culture. Excavations have often demonstrated that there are many sites with multi-cultural phases or traditions found in the occupation layers. In many cases these sequences are not visible until the site is excavated. Since we frequently deal with surface observations in establishing distribution patterns, this means that buried cultural phases are excluded in the final distribution maps. In addition, due to the unevenness of the topography, some sites are exposed by erosion and denudation while others are buried through deposition. It has been argued that distribution maps reflect patterns of visibility, sampling bias and effects of denudation forces rather than a prehistoric reality (Collins 1979; van Leusen 2002; Dewar 1994). As a litigator attempt, some researchers, such as Dewar (1994), have tried to formulate models that try to calculate the average number of sites that existed before the effect of these biasing factors took hold. However, there is no consensus on the reliability of such models. As a result researchers have continued to rely on the surface evidence to map the distribution of cultural traditions. It is necessary though, to always assess and estimate the effect of these factors on the recovered data.

In spite of their importance, distribution maps at the inter-site level make use of sites whose occupation might have been several years, decades, centuries or even millennia apart. The period of Early Farming Communities (EFC) in southern Africa for example, lasts for about eight centuries. While the temporal differences in settlement patterns may suggest influential factors for broad periods, the horizontal pattern at any particular instance is lost (except in general terms) because archaeological sites of different periods are grouped together. Dewar and McBride (1992) gave a very illustrative example of how short, middle and long term settlement processes may lead to biased interpretations of remnant settlement patterns. This is because short term changes as seen in cultural traditions, are difficult to deal with in environmental terms. As cultures change faster than environments, cultural traditions or phases (where they can be identified) would be suitable parameters to investigate indications of cultural influences to spatial behaviour. Such cultural factors are not easy to determine by merely looking at the location of individual sites, but through analysis of the other material evidence from sites of that particular tradition. The major challenge therefore is to identify meaningful cultural breaks or temporal units of occupation on which to anchor the analyses.

Without absolute dates and a clear understanding of settlement dynamics, it would be difficult to draw conclusions with any degree of certainty.

There is also a problem of site definition, which influences what the archaeologist will record as sites. No standard has been reached on what to record as sites because the identifying parameters vary and are always subject to intuition and personal judgement (Coles 1972; Pwiti 1996). Although it seems that there is no clear alternative, the ontological and epistemological problems of the term "site" have been discussed (Donnelly 1992). The issue of site definition is very significant if one is using public databases of sites accumulated over long periods of time. Several definitions have been given on what constitutes a site and what constitutes a settlement site. The problem of site definition is compounded by problems of site visibility where not all sites are visible to the researcher. In addition, a lot of material culture is lost in taphonomic processes such as natural decay, erosion, deposition, and cultivation or vegetation growth. For these reasons, archaeologists often conduct their own surveys to ensure control of data.

Although Dewar and McBride (1992) and Dunnell (1992) seem to concur that the distribution of artefacts might be more meaningful than the site on epistemological grounds, I find the site as a much more meaningful unit of analysis at the regional level. It reflects the archaeologist's interpretation of artefact association. Since it is costly to obtain absolute dates for every site, a basis for the relative accuracy of the periodisation of sites has to be established. This is achieved mainly through the perceived association of artefacts to form site categories. This means obtaining dates (both absolute and relative) from a sample of excavated sites and relating them tightly to a typological assessment of the material evidence from the sites to delineate cultural periods. It should be mentioned that this temporal association of sites is the major source of problems for settlement studies. Recognised since Fox's time, the problem is still persistent as there is no common agreement on the smallest temporal unit to consider in such studies.

Earlier models in spatial archaeology drew much from techniques and theories developed from Geography such as the location models by Christaller, Von Thunen and Webber (Clarke 1977). It has been realised that in archaeology the success of these borrowed models must be measured against their ability to "do" archaeology (Wheatley and Gillings 2002). Although the application of GIS in archaeology has faced some criticisms because of its failure to meet archaeological expectations, I find some of its techniques relevant for this research. According to Gaffney and van Leusen (1995) however, this is not a problem of the system but of the researchers who use GIS uncritically. I concur with Gaffney and van Leusen (1995) that the system has to be adapted to archaeological needs. It is important to appreciate that geographers (from whom some models in archaeology are drawn) deal with extant settlements while archaeologists deal with remnant settlement systems where not everything is available for use in the enquiry (Dewar and McBride 1992).

Still on the methodological arena, it is important to note the strong link between theory and method. The new approaches on spatial and specifically settlement studies have been necessitated by availability of suitable tools such as GIS. The growth of these tools was influenced by the theoretical issues at hand and the failure by earlier methods to provide convincing results. Although the old methods are still applicable, it is their operational environment which has improved. For example, databases have been in use in archaeology since the 1960s (Clarke 1968; Ebert 2002; Richards 1998; Richards and Ryan 1985), but it is in their integration with mapping software that they can be applied to much broader regions with the sheer quantities of raw data used still being manageable (Wansleeben and Verhart 1997).

Studies of settlement sites also look at the accumulation of debris and other manifestations to infer on the period of settlement occupation. The amount of debris is considered a measure of preference and may show continuity of suitable living conditions. Shorter periods of occupation seen from surface indications may indicate unfavourable conditions that could have been environmental or cultural. Although this has been noted as a function of several variables, with adequate screening of possible factors impacting on the remaining evidence, the amount of debris can be a useful indicator of settlement duration. Some researchers have even attempted to establish a model that calculates the average number of sites that existed in an area before the loss from erosion and other factors (Dewar 1991; Dewar 1994; Schacht 1984). This line of research will not be pursued in this work. I argue however that the presence of any type of archaeological material is an indication of the use of the landscape in one way or the other and should not be ignored in understanding the exploitation of the landscape.

The approach in the methodology, as will be elaborated in Chapter 3, is one that seeks to inductively derive conclusions about settlement dynamics in the prehistory of Zimunya. According to Kohler (1988, p.37 cited in Dalla Bona 1994) inductive approaches begin with survey data and then estimate the spatial distribution of the population of archaeological materials from which the sample was drawn. Inductive approaches have been criticised for being at the mercy of biases inherent in the data and that what is achieved are mere descriptions of distribution patterns instead of explanations (Dalla Bona 1994; Wheatley and Gillings 2002). For this reason inductive approaches are considered less useful. I however see advantages in this approach if the data are objectively collected and integrated with other forms of evidence. Interpretations from inductive methods are not constrained by imagined theories, especially where time and resources are limited.

The use of GIS in studying spatial patterns has been met with mixed reactions. Gaffney, Stancic and Watson (1995) see the increased use of GIS as inhibiting the natural growth of archaeological theory if not applied carefully. They see the uncritical use of GIS reviving and entrenching the much criticised empiricist ideas in environmental determinism. Emerging trends however are trying to use GIS to understand cognitive landscapes (Aldenderfer 1996; Wheatley and Gillings 2000; Wheatley and Gillings 2002; Conolly and Lake 2006). Gaffney, Stancic and Watson (1996) even argue that the use of GIS is actually facilitating the identification of human agency in landscape studies, a problem that Trigger (1989) lamented about. The criticisms and evaluations of GIS will be discussed, but suffice it here to observe that it is one of the methods that I used to handle the spatial data of southern Manyikaland.

2.5 Conclusion

The earliest forms of spatial studies in archaeology were couched within migrationist and diffusionist ideas and relied upon typological classifications to identify routes of culture change. Subsequent theoretical approaches to spatial archaeology have been labelled empiricist and materialist because they focussed too much on economic issues as central to human decisions in the use of space. Although no real theory (in the hypothetico-deductive sense of the processualists) is being proffered for southern Manyikaland, the theoretical standing in this research is that environments offer human populations choices and constrains to cultural developments. The constraints faced and the choices made can be revealed in the spatial distribution of the archaeological remains relative to the nature of the prehistoric environments.

In the late 1970s and into the 1980s there were theoretical and methodological concerns that the approaches used neglected the influence of cultural variables in explaining human behaviour in settlement studies. The use of GIS in archaeology has revived interest in spatial studies, although the system has been met with varied reactions. At present archaeologists are worried that the same deterministic views of the 1920s and 1960s might be revived as a result of uncritical use of GIS systems.

CHAPTER 3

Strategy and methods of data recovery and analytical techniques

"…the successful application of…accepted scientific approaches to field archaeology requires the constant intervention of thinking human beings" (Redman 1987, p. 249). "There is no single textbook approach to archaeological investigations…" (Redman 1987, p. 257).

3.1 Introduction

In this chapter, I discuss the various methods employed in data gathering and give an overview of the analytical techniques applied. The issues covered include survey design, the actual field surveys and the analytical strategies that were employed. A critical issue in settlement archaeology is the significance or reliability of the survey data in inferring settlement behaviour of prehistoric societies. With 100% survey coverage there would be a close match between the observed data and actual archaeological reality on the landscape, at least in theory. Problems arise when survey areas are too large for available resources and time to the extent that they have to be surveyed using sampling techniques. The question that arises is: "to what extent is the sample representative of the archaeological character of the area under study"? This question is answered by the nature of the survey design. This chapter discusses the survey design and presents the cultural aspects that were documented at the archaeological sites.

3.2 Methodological approaches: an overview

Settlement archaeology is the study of the selection criteria and implantation of human settlements on the landscape, their relationships with the physical surroundings and the impact of humanity on the natural environment. It has as its aim the holistic reconstruction of the cultures of ancient communities. Due to the diverse issues that it covers about past communities, settlement archaeology is a multidisciplinary enterprise requiring expertise, or borrowing ideas, from various disciplines such as the natural and social sciences. It also requires sound techniques of documenting the archaeological evidence so as to recover data and information that enable and is relevant for spatial analysis. Options are however limited by the objectives of the study. In this case for example, I am limited to those techniques that allowed effective gathering of data about archaeological settlements such as their types, locations, and the nature of the physical backdrop on which they are found. Analytical techniques relevant are ones that permit determining association of the cultural evidence to various variables assumed to be related to settlement patterns. As Redman (1987) mentions however, there is no need for a strait-jacket or textbook approach in archaeological research designing due to the fact that there is no complete knowledge of what the archaeological record has in store prior to the research.

As we are dealing with spatial data, it was decided that GIS was the appropriate tool in analysing the data. There is now widespread consensus that GIS is one of the most versatile tools for the management and analysis of spatial data (Aldenderfer 1996; Conolly and Lack 2006; Lock and Harris 2000; Wheatley and Gillings 2002). This approach provides an invaluable way of properly locating and analysing spatial and temporal data. It has been observed that trends in spatial and environmental studies are not only a result of the influence of changing theoretical orientations, but also of changing data gathering techniques. Technological developments such as those approaches geared towards solving and improving retrieval and analysis of large spatial datasets have also accelerated further the interest in spatial archaeology. The possibility of representing spatial concepts in a GIS environment has enhanced the power of the system (Aldenderfer 1996). Continued research in spatial technologies has resulted in most GIS software being able to relate data of different scales making it possible to combine various forms of data and broaden the range of possible sources of information. It is possible to relate culturally relevant continuous and discrete environmental data to discrete forms of archaeological evidence, so as to enable quantitative and qualitative assessments of the relationships. In addition, GIS manipulations result in illustrative graphical and non-graphical outputs that highlight trends of spatial phenomena. The ultimate aim of such endeavours is to facilitate balanced and informed interpretations.

Thomas (1978) warned that the modern archaeologist is easily enticed by gimmicks and gadgets. There have been implied and explicit assertions that GIS is facilitating and confirming that opinion (Gaffney and van Leusen 1995; Kvamme 1997). It is recognised however, that one of the positive aspects of computing in general is that it has removed the tedious aspects of spatial analytical methods that required expert knowledge, a fact which has been hindering extensive application of these techniques. In playing around with the “gadgets”, greater innovations on how to use them may be developed. The application of spatial concepts to analyse archaeological settlement sites on the landscape has benefited significantly from GIS technology.

Having gathered the relevant variables, the analytical procedures I used consist of a series of overlays of archaeological sites of particular cultural periods with environmental variables. Statistical analyses of the association and correlations of archaeological sites with environmental factors were carried out using the Spatial, Geostatistical, Image and 3D Analyst modules in the Arcview GIS software. I also analysed the cultural and non-cultural material to trace other clues on the relationship between environment and cultural changes. The resultant maps and surfaces enable visual assessment of settlement distribution across the landscape. Some patterns that may not have been apparent to the human eye could be detected in the statistical investigations.

Within the broad method of GIS however, is the gathering of archaeological and historical information, field reconnaissance, map and photo interpretation and excavations as traditional methods of data acquisition. Although settlement patterns can be investigated from survey data alone (Ammerman 1981; Pwiti 1996), I found it relevant to conduct excavations to obtain material that can be dated to establish a secure chronology of cultural developments in the area. The chronology would provide useful insights into the patterning reflected in the distribution of sites at different times in prehistory. The results would also enable the reconstruction of the past environments and life-ways in the area relating to economy, resource utilisation, technology, social practices and organisation of space. It is important not to simply take description of geographical patterns as an end in itself. Rather, one has to go beyond these patterns and infer on their cultural significance. The continuity or discontinuity of both cultural and natural conditions from the past to the present has to be determined before the patterns can become meaningful. Towards this endeavour, three sites were excavated, two of them Stone Age occupation rock shelters and the other an open farming community settlement site.

The framework of investigation is an inductive one, in the sense that I do not prescribe a model of settlement behaviour in the research area. This research tries to identify the nature of the spatial distribution of the archaeological evidence in the area. Predictive models may later be developed from the results obtained. Although criticisms have been levelled against inductive research, I find it a useful starting point for understanding some aspects of the prehistory of the area. I agree with Ebert (2000) that inductive approaches can be a waste of resources if they fail to predict anything. However, inductive approaches do not necessarily have to be predictive, as they can only be meant to show the patterns on the ground. Predictive models have been derived from recurrent patterns in the inductive approaches and also when deductive approaches have been confirmed.

However, as Chenhall (1979) has said, there are always underlying assumptions in settlement archaeology. Indeed, most of the researchers in this type of archaeology have worked implicitly or explicitly under these assumptions which form the foundation of cultural ecology. Chenhall (1979) listed five hypotheses but I shall discuss only three of them as these seem to have significant bearing to this research. First, it is assumed that some environmental factors are important enough to influence settlement locations. As human behaviour is patterned we should be able to get back to that patterned behaviour by looking at the remains that it left on the landscape. The second assumption is that there are adequate techniques to evaluate our methods of reconstructing settlement behaviour. Our concern today is not only proving the validity of these assumptions, but also to expose the nature of the relationships in a particular area for a given period. The third assumption is Chenhall's fifth hypothesis that culturally relevant data in the locality under study either have remained unchanged, or have changed in such a way that the boundaries of each taxon remained approximately the same as they were since the time horizon being investigated. Clarifying this hypothesis is a prerequisite for settlement studies. One has to determine the past environmental conditions assumed to have been contemporary with the culture period in question. Valley locations for example, may be affected by deposits from upslope while hilltop locations may lose significant artefacts through surface run off (Hodder and Orton 1976). Environmental history is therefore significant in explaining the context and association of the archaeological evidence, as well as in assessing its reliability for environmental correlations.

Environmental history can be determined from the analysis of faunal and floral remains from excavated sites, as well as from pollen data recovered from cores. The past environmental conditions that existed during the time when the several identified archaeological cultures in southern Manyikaland were still "living" communities were obtained from existing published environmental records and from excavation data recovered in the research area. Of importance is the reconstruction of climatic changes in the Nyanga area by Wild (1958) and Thomlinson (1973). Correlations of these climatic patterns from eastern Zimbabwe to those of southern Africa identified by Tyson and Lindesay (1992), and by Huffman (1996b) were also used to assess the significance of the results from the research area. The analysis of the vegetation in eastern Zimbabwe by Muller (1999) was also significant because it includes a specific mention of the research area. These studies form a crucial base for examining the response of prehistoric people of the area to the climatic conditions of the time. It is unfortunate that most of the mentioned researches on past environments have been conducted either on a very broader scale or in areas quite distant from the research area such that the results had to be used here with caution. Independent data from the excavations was therefore a priority, as there could have been localised conditions different from the regional climatic picture. This is important given that micro-climatic factors can be very significant variables influencing human behaviour at the micro scale, as well as influencing what remains on the surface of the landscape.

Besides surveying for archaeological sites and excavations I also used ethnographic data on settlement patterns of both contemporary hunter-gatherers and farming communities for comparison with the archaeological evidence. The ethnographic evidence of hunter-gatherers however is distant in both time and space as it comes mainly from Botswana and South Africa. I applied the hunter-gatherer ethnography, with limitations, for the one reason that there are documented similarities in the archaeological evidence between this area and other regions where this ethnography was used, to suggest people of similar cultural traditions and cosmology (Nhamo 2005).

For the farming communities, especially the later ones, there are accounts from Portuguese traders that are useful. Pikirayi (2003) has made extensive use of these documents in trying to reconstruct the palaeo-environments of northern Zimbabwe. To a certain extent he was successful but these accounts are frequently suitable for events of short duration as most refer to specific journeys into southern Africa. Thus deriving regional environmental conditions from these accounts may be misleading, unless there was sustained reporting of the environment over a period of years and over a wide area. One other serious shortcoming of these accounts is that they cannot be projected back with accuracy from the Portuguese period (15^{th}-19^{th} centuries) to the Early farming Communities period. I therefore relied more on the patterns from the archaeological data than on the written accounts. The Portuguese records only played a complimentary role where they were applicable.

3.3 Archaeological settlement sites: Definitions

It is appropriate at this juncture to define the terms *archaeological site* and *settlement site* as used in this work. Among various definitions, *archaeological sites* have been defined as areas or points with material remains made or affected by people. Binford (1964, p. 431) defined a site as a spatial cluster of cultural features or items, or both. Plog *et al.* (1978), extending on Binford's (1964) definition, prefer a definition that regards sites as spatially bounded aggregations of cultural materials of sufficient quantity to allow inferences of human behaviour at that location. Matson and Lipe (1979) define an archaeological site as a conveniently mappable concentration of artefacts and/ or features. Dunnell (1992) has found limitations in the definitions given above. Most researchers who have taken the cultural landscapes approach see such landscapes as continuous, although showing various levels of activity areas. They argue that some activities leave no apparent evidence and it does not mean the seemingly vacant spaces were not used. They have a valid argument but in practice the empty space is identified by the observable clusters of cultural material (Feder 1997). The earlier definitions introduce a subjective assessment of cultural material to establish a "sufficient quantity" or a "conveniently mappable concentration" that would enable inference of human behaviour (Dunnell 1992; Pwiti 1996). The quantity of cultural material sufficient to make a site varies with the type of material, preservation conditions, the scope of the research and personal intuition. In light of these arguments, I consider a site as any significant concentration of cultural remains that can be determined to be archaeological.

The presence of rock paintings or engravings of a prehistoric character also define a site, the cultural period being determined by the type of art (hunter gatherer or farmer art). The hunter gatherer art of southern Africa is believed to have been executed by the LSA hunter-gatherers, particularly the San (Bushmen) communities. This art is believed to be older than 2000 years but can be younger where San communities have continued to exist. Generally the art shows naturalistic impressions of animals, people, therianthropes and formlings that were executed in strict conventions of depiction (Deacon and Deacon 1999; Mguni 2004, 2005, 2006; Smith 1997). Farmer art is associated with the Bantu-speaking farming communities, and is therefore younger than 2000 years. According to Smith (1997), there are seven traditions that are known to be associated with the Bantu agriculturalists. These art categories are distinguished by the differences in the style of execution and the motifs represented, but generally farmer art was finger drawn and shows mainly geometric designs. In Zimbabwe, the rock art of farming communities is characterized as consisting of crudely daubed patterns, animals and humans drawn in white (Smith 1997). However, the traditions identified by Smith (1997) seem not to be widely applicable. Recent evidence in eastern Zimbabwe shows that some of the farmer art of Zimbabwe was executed in red paint instead of white (Nhamo 2005).

A *settlement site* in this study is any point with manifestations of archaeological material culture which reflects human habitation on a permanent or semi permanent basis. The extent to which a site was accepted as a settlement site was determined mainly by the type and amount of cultural material at the site, the size of the floor space and to some extent the morphology of the shelter. An isolated location with evidence of cultural material not enough to make a settlement site was not used in the settlement pattern analysis, but noted as a mere archaeological occurrence. Where there was no settlement site or other cultural deposits nearby indicating the use of the site for habitation, such occurrences could not be defined as settlement sites for inclusion in the final analysis. Instead they were only used to demonstrate the general presence of people in the area.

Following the criterion given above, settlement sites during the Stone Age period can be rock shelters with stone tools and/or rock art. According to Walker (1996, p.14) there is a very close association between art and living sites where the longer a shelter was lived in, the more numerous the paintings are in the shelter and the surrounding areas. Owing to the absence of ethnographic data for hunter-gatherers in the area, I decided to use Lee (1976) and Yellen's (1977) ethnographic research among the Kalahari hunter gatherers. Deriving from that evidence, I decided that shelters had to have the capacity to accommodate at least 4 people, basing on the approximation of the 3.7 average family size among the !Kung of Botswana (Walker 1995). The main criterion of determining whether rock shelters were settlement sites was evidence of material culture in the shelter and its potential to offer accommodation against the elements of weather, such as rainfall. A shelter must have a habitable floor area which could be used for sleeping. Consideration of seasons is also important here as some shelters could have been habitable in the dry season only, while others could have been utilized in both wet and dry seasons. Following this definition, some painted sites may not have been settlement sites if they were hardly habitable, although they would be indicators of the presence of hunter-gatherers in the area.

Open air Stone Age sites were to be considered as settlement sites if they were to show significant concentrations of stone tools and other relevant indications that point to use of the particular location for a considerable time. This could be a base camp which a group of hunting and gathering communities could have used for a period of time. Open air Stone Age sites are not protected from the vagaries of the environment compared to those in rock shelters and thus are less visible on the landscape due to denudation and anthropogenic processes. In addition, determining their status as either settlement sites or not is subjective.

For sites of the farming communities, middens, concentrations of potsherds and other debris were used as settlement indicators. With these sites there are other obvious forms of evidence of settlement such as remains of house structures, stone enclosures, pole impressed *dhaka*, iron implements grinding stones and other types of evidence. Sometimes there is also evidence such as burials, agricultural terraces and tools that indirectly indicate settled life. The settlement sites as defined here are mainly family homesteads.

3.4.0 Desktop research

3.4.1 Archaeological sites

Manyikaland had a long history of contact with the Portuguese, and some sites were mentioned in the documents they left. Unfortunately, in the research area reference is only made to a *feira* (Portuguese market place) and a gold mine in the Vumba area (Mudenge 1988; Bhila 1982). These were however, not found during the surveys. In the early 20th century when the research area was parcelled out for colonial settler farming, some farmers reported sites on their properties. One of these settlers, Lionel Cripps, developed a passion for recording the prehistoric evidence that he came across, not only in Manyikaland but in other parts of the country as well. It should be noted that the Monuments Commission of the then Southern Rhodesia launched an awareness campaign in the 1950s, which resulted in several archaeological sites being recorded nationwide (Ndoro 2001). The limitations of the archaeological survey database have been discussed in Chapter 2, but the desktop findings showed that 41 painted sites, and 5 EFC and 18 LFC sites had been reported in the area prior to this research. The other sites were a few occurrences of stone tools, burials, iron working sites, and some Zimbabwe and Nyanga culture enclosures.

3.4.2 Significance of environmental variables selected

According to Church *et al* (2000), some environmental variables have more significance than others in the way they affect society because some are less dynamic than others. For example, for Stone Age societies available rock types that are important as raw materials for tool manufacturing have the potential to anchor communities to a place if they are not ubiquitous resources. Among metal working communities, available mineral resources that are important in tools manufacturing or in trade such as iron or gold may have similar effects. The only change in these resources would be depletion with time, but their qualities remain the same. Variables such as rainfall or available water have an effect on other environmental aspects such as floral and faunal compositions and their distribution. The environmental parameters considered in settlement decisions might be important to human beings for their direct or indirect influence on the availability of subsistence resources, raw materials for tools, and for the visual qualities that they give to the landscape. Thus, one aspect of the desktop study was to gather environmental data of the area from published maps and botanical reports. The environmental variables considered include soil types, geology, topographic variation, vegetation, rainfall, temperature, mineral types and their distribution. I discuss here the variables extrapolated from various maps and field surveys to demonstrate how they relate to settlement issues among both hunter-gatherer and farming communities.

Rainfall provides water for wildlife, livestock and for human consumption. It is therefore an important variable for both hunter gatherers and farming communities. To hunter-gatherers rainfall is important as it ensures availability of a wide variety of edible flora and survival of game. To farming communities it ensures good pastures for livestock, good crops, and availability of game and edible wild plant foods. Rainfall amounts are however dynamic, and caution has to be taken to show the form in which it is available to communities and how it varied in the past. In addition to rainfall amounts, the status of river flows throughout the year is also a significant variable. This is where the comparative climatic data recorded for southern Africa was used.

Topography is significant as it can be related to farming activities, security from predators or warring communities, and water availability during the dry season. It is also significant when related to temperature where people may avoid settling in certain areas because they are too cold or hot, or that crops may not grow well at certain altitudes. Topography is also related to drainage patterns that may influence the amount of water available to people. The effect of topography in settlement preferences is most apparent when it is transformed into elevation, slope and aspect. For this purpose I used a Digital Terrain Model (DTM) of the area with a resolution of 90 m.

Soils have an influence on farming with regard to fertility and water retention. For farming communities, the importance of soils has to be understood in the context of the requirements of the crops that were grown as well as the farming technology available then. It is vital that we do not impose our present knowledge of soil properties as common knowledge for prehistoric communities. For hunting and gathering communities soils are significant through their indirect relationship with faunal and floral resources, especially when combined with rainfall amounts.

Geology influences soil types and fertility as well as distribution of useful minerals. Certain rock types such as quartzite, jasper, chert and diorite were useful in tool manufacturing among hunter gatherer communities in southern Africa. The importance of iron and gold in southern

Africa seems to have had a significant impact on settlement patterns of farming communities as well. For example, the gold fields of northern Zimbabwe are thought to have led to settlement shifts from southern to northern Zimbabwe (Sinclair and Lundmark 1984).

Vegetation is a useful variable on its own as it is related to edible plants as well as faunal compositions. Woodlands, forests and grasslands attract different animals and also offer opportunities and sometimes impose constraints on the exploitation of the resources in them. While being influenced by available rainfall/water and soil properties, vegetation also influences soil quality and pasture and can affect water retention. By analysing vegetation we may be able to detect the nature of past environments. The significance of these environmental factors to past cultures is varied. It is important therefore to understand the particular circumstances around the sites and come up with a clear statement about environmental preferences. Secondary environmental variables such as aspect and slope were derived from these primary parameters. Cultural perceptions that go beyond utilitarian functions are also built around both primary and environmental variables (Kvamme 1997).

3.5 Archaeological Surveys

3.5.1 Survey design

Valid archaeological conclusions about distribution patterns depend upon systematic fieldwork. Sporadic reports of sites cannot permit reliable estimates of site densities or culture-environment relationships to give a clear understanding of past human settlement behaviour. To provide for a statistically useful record of sites, the best way was to structure the surveys in a way that would enable the collection of data that is representative of the area under research. This required deciding on sampling techniques and how to deal with survey bias.

The stratified random sampling technique (Binford 1964; Chenhall 1979; Judge and Ebert 1979; Matson and Lipe 1979; Orton 2000; Shafer 1997) was regarded as the most appropriate in this area. The whole of the research area (Fig. 3.1) was first divided into three strata to provide balanced survey coverage. The strata were derived from topographic variations in the universe that form broad ecological zones of Vumba and Tsetsera (higher ground and mountainous), Zimunya (middle level plateau) and Burma Valley (a very narrow valley that opens into the Mozambique plains). These strata were further divided into cultivated and uncultivated areas using the 1:50 000 scale topographic maps of the area. However, agriculture is a dynamic practice which is easily affected by agricultural policies and population changes. The maps were prepared in the late 1970s and no longer accurately reflect current landuse patterns. However, the purpose of using landuse to stratify survey areas was meant to deal with the potential situation that the randomly sampled units would end up being restricted to either the cultivable and gently sloping areas that are easy to traverse or the opposite. In other words, the technique forces the investigators to conduct balanced survey coverage.

In dealing with bias, several approaches have been put forward on how to detect, evaluate and mitigate its effect on site recovery (Collins 1979; van Leusen 2002). Evaluating and correcting bias have become fully developed research topics. In the 1970s experiments were carried out, especially in America, to deal with bias (Collins 1979). However, mitigative measures can not be generalised as they depend on local conditions. Consequently, they will not result in the same rate of site recovery in different parts of the world. Although the potential effect of bias on site recovery in the research area could not be quantified, being aware of the biases was adequate enough to make sure fieldwork was conducted with due care. Mitigating measures were applied where vegetation density affected site visibility and where vegetation hindered the traversing of the landscape. An example can be cited for the montane forests of Vumba and Tsetsera where the survey team sometimes had to crawl or walk in single file to make progress in the mountainous terrain. In this case the survey strategy had to use local knowledge and aerial photographs to detect sites.

3.5.2 Sampling techniques

A pre-determined minimum sampling fraction of 33% of each land parcel discussed above and consequently of the universe, was judged to be a representative coverage in terms of obtaining reliable results while balancing resource use against time spent in the field (Plog *et al* 1978). The surveys also enabled direct observation of the vegetation, soil types, and the topography and possible water sources for the sites discovered. Several 1 km^2 survey units on relevant sections of 1: 50 000 scale maps of the area were randomly chosen for field walking until 33% of the stratum was covered.

The selection of survey units was conducted using the Microsoft Excel programme. All 1 km^2 units in either cultivated or uncultivated areas of each stratum were numbered and the Ms Excel programme was instructed to randomly choose calculated units that was equivalent to 33% of the target area. For example, Fig. 3.1 below show part of Zimunya in which an area 6 km x 8 km (the area between Eastings 60 and 68 and Northings 85 and 91) was chosen for pedestrian survey. The squares were numbered from 1 to 48 beginning from the top left square. 33% of the squares would be approximately 16 squares. The Ms Excel programme was then instructed to pick sixteen numbers between 1 and 48. The sixteen squares in solid bold lines in Fig. 3.1 represent the selected survey units.

The stratified random sampling strategy described above is applicable mainly within a suitable topography where it would not be costly to traverse from one survey unit to another. It was applied successfully in Zimunya and Burma valley where even the hills were negotiable. In the Vumba and Tsetsera Mountains where there are steep slopes and dense stands of vegetation, this method did not produce reliable results because it was difficult to cover adequately the survey units. Visibility in the rolling grasslands of the mountains is very low while the montane forests are sometimes impenetrable. Where penetrable, it was sometimes difficult to detect sites because of the biomass on the ground except when there were obvious visible structures such as stone walls. I complemented these surveys with the help from local farmers and other property owners in the area. Some of them have been in the area for a long time and had come across interesting features such as pit structures and enclosures.

However, using local knowledge has limitations in that it can be subject to the goodwill of the informants and depends on their understanding of the nature of archaeological evidence. Many informants have difficulties with identifying Stone Age evidence, except when it is rock art. Despite the limitations outlined, the survey team recorded several sites outside the sampled survey units that were known by the local communities. Approximately an area covering 1 km^2 around each of these sites was surveyed. Fig. 3.2 shows the areas that were finally covered during the surveys. Considering the areas that were covered between survey units, effectively more than 33% of the universe was surveyed.

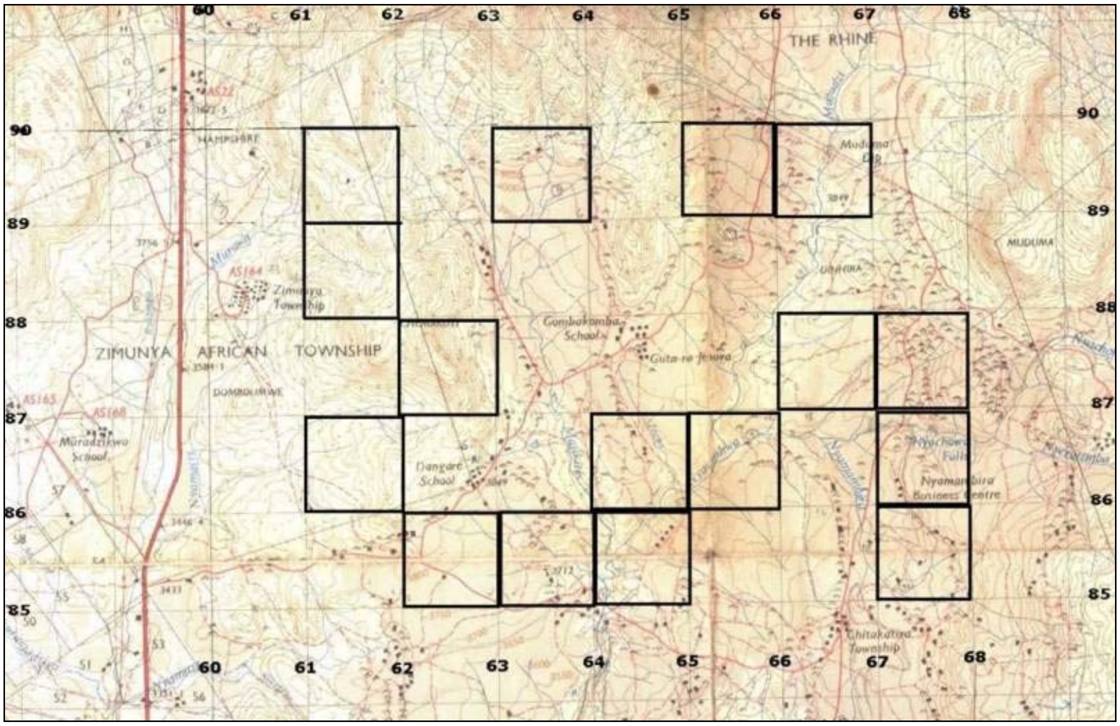


Fig. 3. 1. A scanned image showing randomly selected 1 km² survey units in part of the Zimunya Communal Lands

Aerial photographs with a scale of 1:24 000 were used to investigate the research area for sites, especially of the prehistoric Farming Communities. The images were scanned and visually assessed for potentially prehistoric human modifications to the landscape. The technique hoped to detect soil marks, crop marks and features that are much more visible from the air than on the ground. This technique was employed after its successful application in the Nyanga area where several pit structures and terraces were detected from the photographs (Soper 2002). However, in the current research, this method did not result in any sites being identified.

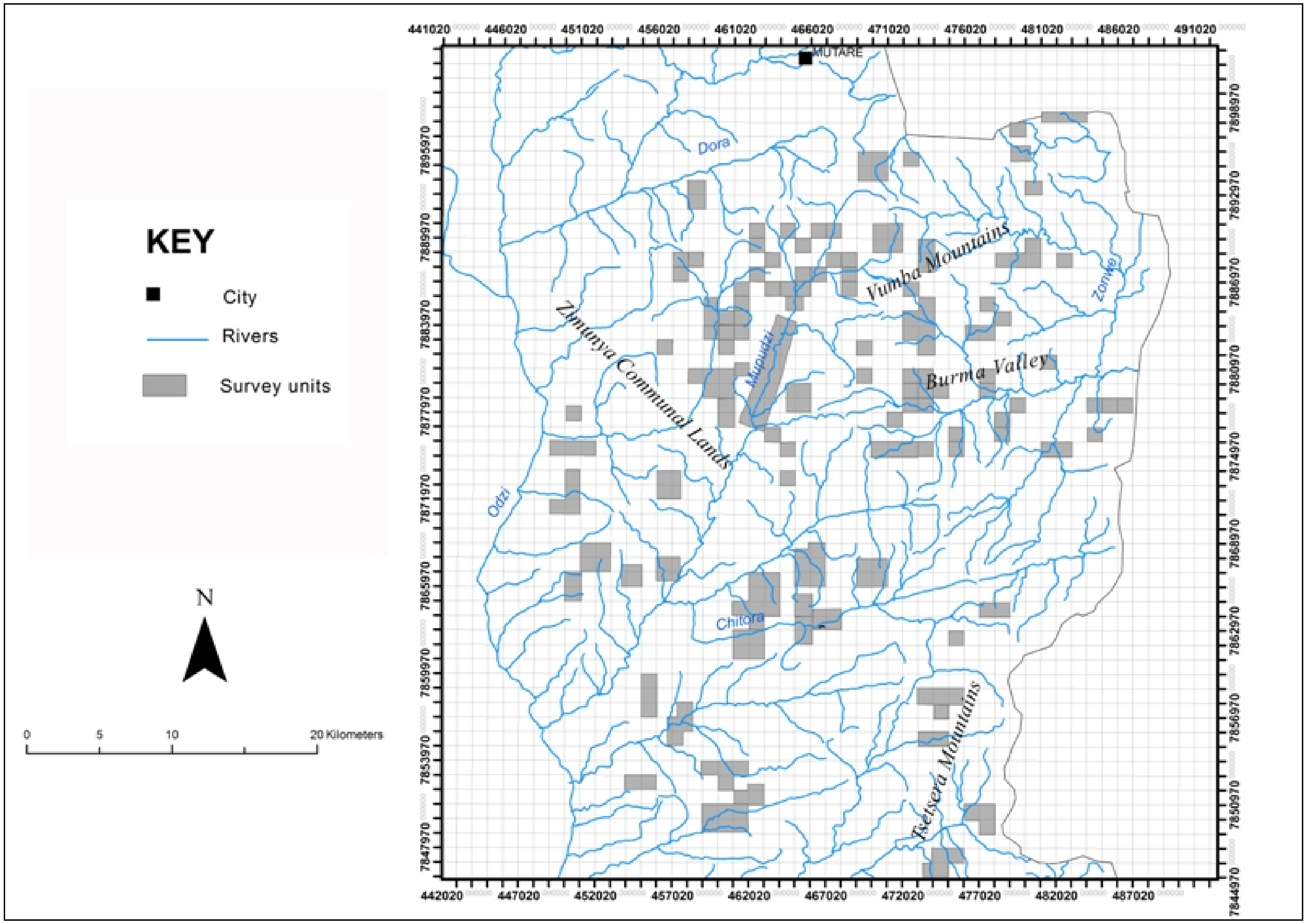


Fig. 3. 2. Map showing all the survey units

3.5.3 Site documentation

The site recording tried to capture as much data as possible using site recording forms and by photography. A hand held e-trex Garmin Global Positioning System (GPS) device was used to record the geographical position of the sites as x, y, z units where x and y are UTM grid units in metres and z is elevation. The accuracy of the GPS readings depended on the number of satellites available when the reading was taken, but it was possible to get accurate readings to the nearest 5 metres. The most important information about the sites for this research was the location and the nature of the cultural material, important in determining the cultural period to which the site could be assigned. The type of cultural material was also significant for the classification of sites into either settlement or non settlement as outlined in section 3.4 above. In addition, environmental details were also recorded during fieldwork for comparison with published maps of the research area.

3.5.4 Site cultural period

The cultural period of a site is one of the cornerstones of site distribution studies. Under this variable, sites considered to be contemporary are group together. Hodder and Orton (1976) note the limitations in the lumping together of sites to derive contemporaneity on the basis of material culture. As I have argued in Chapter 2, there is no way around this problem unless the sites can be absolutely dated. Having dates for every site is however impossible for practical and financial reasons.

The cultural periods to which sites were assigned are based on the comparison of surface material found to that already known in several parts of the southern African sub-region and in Zimbabwe where regional and local cultural sequences have been established (Burrett 1998;

Chirikure *et al* 2002; Deacon and Deacon 1999; Huffman 1971; Mitchell 2002; Phillipson 2005; Pikirayi 1987, 1997; Pwiti 1996; Sinclair 1987; Soper 2002, 2006; Walker and Thorp 1997). Of use in this endeavour are the stone tools and potsherds as demonstrated in the established sequences (Chapter 1). Archaeological sites were categorised first into two broad categories of Stone Age (SA) and Farming Communities (FC). These terms as explained in chapter 1 are used as a matter of convenience and to facilitate comparison and discussion, not as complete acceptance of the implied meanings.

Where possible, sites were further classified into Early Stone Age (ESA), Middle Stone Age (MSA), Later Stone Age (LSA), Early Farming Communities (EFC), Later Farming Communities (LFC), Historical (HIS) and Refuge (REF) sites (see Chapter 1, section 1.5). This second level of classification is the one more useful for this study as it reduces the generalisation that is in the first level where the Stone Age for example, covers several thousands of years while the farming communities span two millennia. Categorising the sites according to traditions or industries would further enhance the utility of the dataset. Due to the fact that there is significant diversity of cultural traditions in southern Africa, classifying sites according traditions requires further caution than accorded in the classifications using broad chronological periods presented above.

It can be argued that the basis of material classification for any research area has to be established from securely dated local sequences. The regional chronologies were used in the surveys with the intent to redefine them later if excavations in the area were to result in new definitions. Martin's (1938) and Burrett's (2003) research findings were used as comparative material for classifying the Stone Age while the material excavated from Murahwa's hill

(Bernhard 1968) and Mutare Altar site (Bordini 1974) provided a starting point in constructing a local sequence for the period of farming communities in the research area. The evidence of farming communities from these early excavations was complemented by that recovered by the Archaeology Unit of the University of Zimbabwe in the recent excavations at Murahwa's hill. In addition, published works about the Nyanga tradition (Summers 1958; Soper 2002; Chirawu 1999) were also used. Charcoal samples were collected for absolute dating to establish a chronological reference scheme for the cultural material recovered. The dated material was then used as a reliable reference for inferring cultural periods at unexcavated sites.

3.5.5 Site type

The classification of sites into types is based on Pwiti's (1996) categories, with some minor modifications. The sites were first categorised as either settlements (SS) or non-settlements (NS) on the basis of the criteria set out in section 3.3. Further classes from these broad ones are rock paintings (RP), stone tool or flake scatter (ST), pottery scatter (PS), iron working (IW), and burials (BU). This classification gives the character of the site in relation to the evidence found. It was meant to help in identifying different activity areas on the landscape and to distinguish settlement sites from others.

3.5.6 Site ranking

Sites were ranked to determine relationships amongst them, and not only with the physical environment. The ranking was based on the amount and extent of surface deposits of cultural material or the size of painted panels and shelters for rock art sites. Three classes of small, medium and large sites are used here. The ranking here is for all sites recorded, settlements or otherwise. With rock paintings the size of each panel was recorded by noting the length and the height of the panel to calculate the area covered by paintings. The result gave just an estimated size since the panels are not rectangular. The area together with the number of painted images on the panel or site and floor space, determined whether it could be classified as small, medium or large. The small sites are those where the number of images ranges from 1 to 25. Medium sites are those with 26-50 images while large sites are those that have over 50 images. For other sites the ranking was based on the criterion set in section 3.3 which used the extent and amount of cultural deposits at the site.

3.6 Analytical techniques

From the foregoing the most important aspect being dealt with in this research is an archaeological site; a location of archaeological interest that can be described using *(x; y; z)* coordinates. Most of the analytical techniques therefore would follow approaches applicable to the analysis of archaeological sites as points on the landscape. These techniques include statistical measures of the association between the sites and their surroundings so as to determine the presence and nature of spatial patterns. Most popular have been techniques such as logistical regression and correspondence analyses, although they have been applied with varying degrees of success.

I tried to stimulate the visual sense of analysis by placing the sites in their proper topographic setting through 3D effects. There are instances when visual assessment of phenomena is more clarifying than other approaches. Maps however, are not infallible. In fact, spatial statistics were developed to control the intuition that was associated with distribution maps. The limitations of statistical approaches have been discussed considerably in the debate between New Archaeology and post-processualism. By combining 3D representations with statistical analyses, GIS tries to iron out these limitations of maps and this partly explains why these systems are now a powerful toolkit suitable for the study of settlement patterns.

The accumulated environmental data was converted to digital format using ArcGIS Arcview 9.1 and ArcView GIS 3.2 for management, processing as well as analysis. Other computer aided analyses were done using Ms Excel and WinIDAMS statistical packages. Since we cannot sufficiently establish past environmental zones in the same way as we can with the present physical environment, it was envisaged that using the present environmental parameters in the overlays would help detect anomalies. The anomalies in the distribution of the sites with respect to current environment would indicate either cultural or environmental differences, between the present and the past. Similarities likewise would be viewed in the same light. However, it is the palaeo-environment evidence that would help in understanding whether it was the physical environment or the culture which had more influence in prehistoric decisions regarding settlement location in this area. As Gaffney and van Leusen (1995, p. 370) argue, GIS can be used to clean the data of environmental patterning, leaving a clearer view of the influence of cultural factors.

3.7 Conclusion

In this chapter I have set out the parameters defining settlement sites and outlined other facets of settlement studies such as data sources, field work techniques and analytical approaches. Although there are several techniques used in conducting archaeological surveys, the stratified random sampling strategy was considered as a reliable strategy. Where unsystematic surveys were conducted it was due to problems of dense vegetation and difficult terrain as experienced in the Vumba and Tsetsera highlands. Modern forest management practices in the Vumba have had a major impact on site visibility for these activities have resulted in the growth of dense vegetation that reduced site visibility. In the other areas I think the evidence is an approximate reflection of the actual data available.

The challenge in settlement archaeology is to accurately represent environmental and cultural data to enable reliable spatial analyses. The chapter has dealt with the approaches taken to improve the reliability of the survey results as well as the analytical outcome. The horizontal accuracy in the representation of both the locations of the sites and their associated parameters has improved as a result of the development of GPS technology. A solution to the problem of representing the temporal dimension in GIS analyses is to have secure dates from excavated sites. In the next chapter, I present the archaeological evidence recorded during the surveys.

CHAPTER 4

Archaeological Surveys

"There therefore can no longer be any doubt of the importance of survey as one of the techniques of data recovery in archaeology" (Pwiti 1996, p. 44).

4.1 Introduction

This chapter presents the results of archaeological surveys that were conducted over six field seasons between 2002 and 2005. Of these expeditions, three were conducted in Zimunya Communal Lands where a total of 75 sites of various types were recorded, with most of them being rock art sites. The fourth expedition was conducted in Burma Valley where 35 sites were recorded. Most of the sites recorded during this expedition were settlements of the early farming communities. In the Vumba area a total of 29 sites were recorded during the fifth expedition. These included pit structures of the Nyanga tradition and a stone walled enclosure of the Refuge type located on the Vumba Beacon Hill. The sixth expedition covered the remaining gaps in the Vumba mountains and Zimunya communal lands, and extended the surveys into Tsetsera Mountains which had not been surveyed in the earlier excursions. In this survey, 33 sites which include stone enclosures and rock art sites were recorded. Out of all these expeditions a total of 186 sites (Appendix A) were recorded.

The following sections in the chapter discuss these findings in detail. I conclude the chapter by presenting a summary of the archaeological evidence of the area in the light of the recent discoveries. This is important in comparing and contrasting these findings with the previously known cultural sequence in eastern Zimbabwe.

4.2 Sites Recorded

Table 4.1 below shows the sites that were recorded in the research area classified by cultural periods. The total numbers of Stone Age and Farming Communities sites include the 33 multi-component sites.

Cultural Period	**Number of sites recorded**
Stone Age sites	86
Farming communities	133
Multi-component sites	33

Table 4. 1 Archaeological sites recorded during the Zimunya surveys

4.2.1 Stone Age sites

The evidence of Stone Age sites is divided into two categories, i.e. stone tools and rock paintings. All the 86 Stone Age sites are painted sites. More than 50% of the painted shelters also have stone tools on the floor surface. The multi-component sites have rock paintings, stone tools and material culture of the farming communities. This does not necessarily mean that these cultures were contemporary. Although most of the shelter floors are intact, there are others that were disturbed by burrowing animals and goats. It is not clear if the absence of open-air Stone Age sites is a result of biasing preservation conditions, visibility problems or that this is the archaeological reality. It is possible that farming activities might have affected the visibility of stone artefacts located away from rock shelters. This issue will be pursued further in later chapters against the background of excavation data and reconstructed palaeoenvironments.

4.2.1.1 Stone artefacts

Stone artefacts were discovered in many of the painted shelters such as Chiuya, Manjowe, Madzimbabwe, and Manyoreke Hill. The range of artefacts discovered includes handaxes, cleavers, scrapers, blades and microliths of various geometric designs (Plate 4. 1). It was hoped that these artefacts would help in defining Stone Age traditions in the research area. However, although they were not quantified for each site to enable the identification of traditions/industries, the assemblage is quite small and as such cannot inform us much about the traditions represented. Due to this reason that the assemblage was small, only broad cultural periods of Early, Middle and Later Stone Age can be determined. The cleavers (Plate 4.1 h, i and j) seem to be heavy-duty tools probably of the Sangoan tradition of the ESA (Chapter 1). The ESA tools were found only at 4 sites, Chiuya, Manjowe, Manjowe-Muranda and Ma Bushmen. If they can be accepted to be Sangoan artefacts, then perhaps the association of this industry with forested areas might be justified as the rainforest of the eastern highlands are not far from the sites from which these tools were discovered (Mitchell 2002). However, in light of evidence from east Africa (Tryon and McBrearty 2006), this relationship between the Sangoan and the forested zones of Africa requires assessment of the palaeo-environmental evidence before it can be accepted.

Plate 4.1b is a well trimmed blade that is 4.5 cm long while Plate 4.1a shows microliths of various designs. These artefacts represent the ESA, MSA and the LSA periods. The ESA evidence was discovered in association with MSA material. Most of the larger tools are from dolerite while the smaller ones are mainly quartz. Only a limited number of sites such as Madzimbabwe hill which is located about 60 km south of Mutare city, have numerous microlithic artefacts on the surface. The artefacts from Madzimbabwe shelter could not be adequately documented because the site is sacred. In general, it can be concluded that the Stone Age evidence is not substantial at most of the sites. Although stone artefacts were observed at many of the sites, the assemblages were small such that it was not possible to identify cultural traditions. It was however, possible to identify the general broad cultural periods.

Plate 4. 1 Surface stone artefacts from Zimunya Communal Lands

a - microliths; b & c - blades; d - small handaxe; e - prepared core; f - handaxe? (left) and cleaver? (right); g - pestle?; h, i & j - cleavers

4.2.1.2 Rock paintings

The paintings in Zimunya are on single boulders, most with no suitable shelter for human habitation. Some of the larger shelters are elaborately painted, some with over 50 visible and recognizable figures such as human figures, kudu (*Tragelaphus strepsiceros*), baboons (*Papio* *ursinas*), elephants (*Loxodonta africana*) and rhinoceros (*Ceratotherium sp.*) among other animals (Nhamo 2005). All the large shelters have LSA stone tools on the shelter floors, suggesting that they were living areas. In some instances, the same shelters also have material of the farming communities such as pottery and/or grain bins. The rest of the painted sites have less than 50 figures on clusters of boulders with no habitable shelters (Nhamo and Katsamudanga 2006).

The rock art is significant in this research not only as evidence of prehistoric occupation of the shelters and the area, but also as an embodiment of evidence of the prehistoric environment of the area. It is presumed in this research that the animals and tree/plant species represented in the art existed at the time of the rock artists. Although they might not have been always from the research area, the animals and plants were supposedly available in the environments adjacent to this landscape or surrounding the sites. Table 4.2 is a list of the animals and birds depicted in the art. Although some figures could not be identified to species level, those that were identifiable inform us about their habitats and consequently the general climatic conditions of the period when they were painted.

The extent to which painted animals can inform us about the local environment is limited, but certainly some of the images represent animals that were contemporary to the painters. It has been argued that some animal species could have been seen in distant places, and were drawn as memories of journeys to distant places. While recognizable figures, especially of animals, could represent something that had been seen or experienced, the viewing of rock art as a diary has long been abandoned (Lewis-Williams 1981). While quantitative analyses of painted animal species help in investigating the significance of some of the animals to the painters and their society, the identity of the images can assist researchers to infer the nature of the physical environment. It has been argued that some of the animals may not have been seen from the immediate areas around the sites where they were painted. This can be true of animals that were drawn less frequently such as the giraffe (*Giraffa camelopardalis)* and the eland *(Taurotragus oryx)* in Zimunya. However, the reasons for painting were varied such that absence of some species in the art does not necessarily mean that they were not available in the natural environment around the sites.

Scientific term	**Common Name**
Syncerus caffer	Buffalo
Bos Taurus?	Cattle?
Lycaon pictus	Dog (Wild?)
Hyaenidae sp (cf. Crocuta crocuta)	Hyena
Taurotragus oryx	Eland
Loxodonta africana	Elephant
Giraffa camelopardalis	Giraffe
Tragelaphus strepsiceros	Kudu
Panthera leo	Lion
Struthio camelus	Ostrich
Manis temminckii	Pangolin
Hystrix africaeaustralis	Porcupine
Ceratotherium sp. (cf. Diceros bicornis)	Rhinoceros
Cricetomys gambianus	Rodents (giant rats)
Hippotragus niger	Sable
Geochelone pardalis pardalis	Tortoise
Phacochoerus aethiopicus	Warthog
Potamochoerus porcus	Bush pig
Papio ursinas	Baboon
Equus burchelli	Zebra

Table 4. 2 Animal species depicted in the rock art of Zimunya

Generally, some of the species represented in the art are still found in the area today or were reported in the recent past. Those that are no longer found such as buffalo, elephant, giraffe and zebra that are drawn at Manjowe, Muromo and other sites, most probably moved out of the area due to the depletion of forests and the increase of the human population. As late as the 1930s Cripps reported lions and leopards in the Vumba mountains. Leopards are still being reported in the Bunga forest while bushbucks are still found in the forests south of Burma valley. The kudu *(Tragelaphus strepsiceros)* is the most frequently drawn animal, appearing at all the rock art sites except two. The animal is a bushland species, but is not necessarily territorial. Its unique attraction to the artistes could only have been cultural rather than that it was the most abundant (Nhamo 2005).

A few painted sites show floral representations, some of which seem to be *Brachystegia spiciformis and Julbermadia globiflora* tree species that still form the primary vegetation of Zimunya Communal area.

(a).  (b). 

Plate 4. 2 Rock paintings depicting trees

Other rock art sites have, in addition to human figures, representations that include formlings, therianthropes and abstract images such as the labyrinth at Muromo site (Nhamo 2005). The human figures show various postures and activities. Hunting and dancing scenes are common.

The most fascinating therianthropic images are those at Nyarupara (Plate 4. 3c) which show human figures with baboon-like heads. Formlings are few and the one at Bopwe (Plate 4.3a) is very different from other formlings known in Zimbabwe (Mguni 2005, 2006). The formlings have been variously interpreted as termite mounds or beehives (Mguni 2005, 2006). However, the one at Bopwe does not easily match such descriptions. A few other sites have dots that seem to be bees or some other flying insects.

(a). 

(b). 

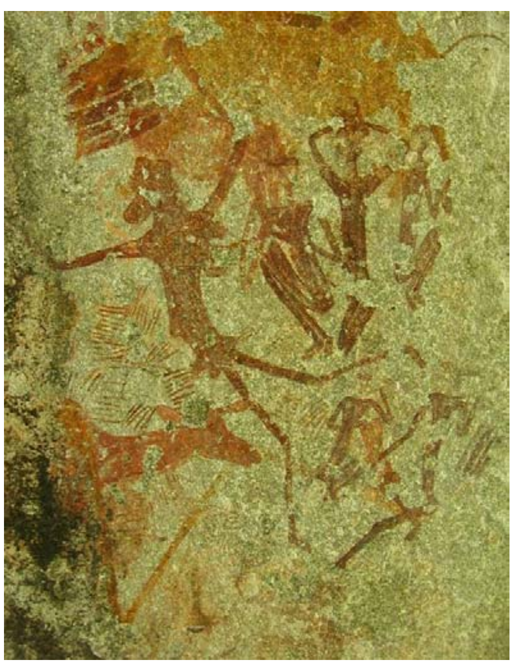
(c). 

Plate 4. 3 (a). Formling at Bopwe, (b). A male kudu at Chiuya 1, (c). Therianthropic figures at Nyarupara

There are also three sites, Tsvimbanwa, MaBushmen and Nyarupara, which have farmer art that consists mostly of geometric designs. Most of these paintings are in red although at Nyarupara there are white geometric designs (Plate 4.4). The rock paintings may not tell us much about the environment but are important as they give us an idea about the cosmology of the painters. Of significance to this research was whether the painted shelters were settlement sites or not. The associated material and the nature of the shelter in which the art is found may tell us more about the use of the sites.

(a).  (b). 

Plate 4. 4 Farmer art at (a). Tsvimbanwa, and (b). Nyarupara

4.2.2 Farming Communities

A total of 136 sites of the prehistoric farming communities were recorded. However, most of them are not comparable in size to the larger sites found in other parts of the country such as northern and north eastern Zimbabwe. I have alluded in earlier chapters that this disparity could be a result of either erosion in the cultivable areas or visibility problems in the dense vegetation of Vumba and Tsetsera mountains. Although agriculture can be a contributory factor, a lot of archaeological material has been discovered as a result of exposure by the plough in other parts of the country such as northern Zimbabwe. As a result, I expected more sites to be recorded in the cultivated areas. In Zimunya communal and Burma valley sites of the farming communities are located in the hills. Very few sites were recorded in the cultivated areas.

4.2.2.1 Early Farming Communities

The research area is conspicuous for its limited evidence of clear traditions of sites of the farming communities. There is little diagnostic ceramic evidence of these communities. Only three sites have few sherds of the Ziwa tradition. There was a report of the presence of Coronation material in Tsetsera Mountain, but this material could not be found at the reported site in the recent surveys. Coronation has some affinities with other EFC traditions (Soper 2004, *pers comm*.). Thus, it is possible that the Coronation reported is the same Ziwa material that was found in the area (Plates 4.5). The wavy lines on the Ziwa sherd (Plate 4.5, sherd (b) are also a feature of Coronation ware (see Pwiti 1996). Since only one diagnostic sherd was recovered at the site, we cannot say with certainty that this is an EFC settlement site. The same applies to the other localities with these isolated EFC sherds because they do not fit the criteria described in Chapter 3.

(a).  (b). 

Plate 4. 5 Early Farming Community pottery from Zimunya

The EFC sites present similar challenges as the Stone Age sites. It cannot be determined if the limited existence of the EFC sites is a problem of bias associated with surface preservation, erosion, vegetation cover or that there were generally few EFC communities in this area in prehistory. As some of these sites were discovered in cultivated areas, farming therefore cannot be the main cause for their limited occurrence. The evidence points to a general low presence of such communities in Zimunya. This problem is pursued in later chapters after considering the climate obtaining during the 1st millennium AD to which these communities are dated.

4.2.2.2 Later Farming Communities

The LFC communities are represented by the Zimbabwe, Khami, Nyanga and Refuge traditions. The Zimbabwe and Khami phase sites were discovered early in the 20th century at Mutare Altar site and Murahwa's Hill on the northern fringes of the research area. These are phases with stone walled sites and are distinguished from one another by differences in architectural style on the stone walls, in addition to the pottery. Whereas the Zimbabwe phase walls are free standing, those of the Khami phase are retaining walls that form platforms on which houses were constructed.

In the recent surveys no Khami phase enclosures were found but the band and panel polychrome pottery (Plate 4.6) associated with this period was recorded at 10 sites that form 3 clusters. One group is in the Vumba mountains while the other one is in the Zimunya communal area, a few hundred metres west of Dzobo Township. The third cluster is on the eastern foot of Manyoreke hill along Chitora river. Except for the cluster in the Vumba mountains the other two had very few sherds each. Murahwa's Hill also has band and panel

Khami pottery to show the existence of a village of this culture in the area. The material is found scattered all over the hill.

(a).  (b) 

Plate 4. 6 Khami pottery from Chitora

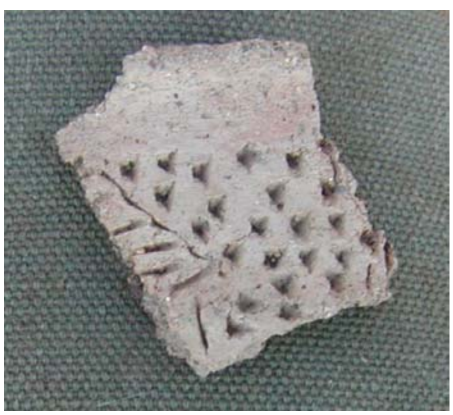
(a).  (b). 

Plate 4. 7 Other LFC potsherds

With regards to stone enclosures there is a Zimbabwe phase wall in P-style on the summit of Tsetsera Mountain. Other Zimbabwe type walls were recorded at Mutare Altar and Murahwa's hill sites in 1905 and 1964-8 respectively. In the recent surveys, it was recorded on the summit of Tsetsera mountain and in the Burma valley. The walls however, are not elaborate. The one on Tsetsera mountain (Plate 4.8) is about 5 m long and about 1.5 m high. Murahwa's Hill site has a few segments of walls built between boulders. The total length does not exceed 10 m and the height is about 1.5 m.

Plate 4. 8 Zimbabwe type wall on Tsetsera mountain

Plate 4. 9 Stone walling in Ngoya mountain

Other stone walled sites include the pit structures of the Nyanga tradition recorded in the Vumba mountains. There are also roughly constructed stone walls at Murahwa's Hill and Vumba Castle Beacon. Two sites in Chitora area, one site in Ngoya mountain and the other on the hill overlooking the turnoff to Chitora schools from the road to Tsetsera, have stone walls constructed to enclose the space below rock shelters (Plate 4.9). There are also sites with roughly constructed enclosures, for example, the site in Nyambeya forest south east of the research area. A site near Leopard rock in the Vumba and another one in the Burma valley has mere stone cairns. These could have been abandoned, or the construction of the cairns was stopped before they were fully developed into walls.

4.2.2.3. Iron Working Sites

17 of the farming communities sites have manifestations of iron working in the form of slag, blocks of furnaces, *tuyeres* and at one site the ore itself. The tuyeres (Plate 4.10), some with an average diameter of 3 cm, indicate that these are probably Later Iron Age sites. Research in other parts of the country has shown that EFC Iron working sites have tuyeres with larger diameters of 6 cm or more (Chirikure 2005). From the surface evidence and the number of sites recorded one can conclude that iron production or processing was ubiquitous although it was not done intensively at 12 of the sites. Only five sites had significant concentrations that show either iron processing for a longer time or processing at a significant scale, one of them is along the border between Mozambique and Zimbabwe.

An interesting aspect of the iron working sites is that many of them do not show association with settlements. It can be assumed that these sites could have been specifically iron processing areas situated away from residential areas, possibly at sources of the iron ore or water needed in the processing of the ore. Only the site of Bopwe in Chitora area was close to a residential area. However, an unusual feature at this site is the fact that some slag evidence and tuyere plugs are at the top of the hill as if this was a secluded activity. There were no intact furnaces recorded to associate with the slag and tuyeres. Two low *dhaka* walls (Plate 4.11) indicating the furnace outlines were recorded at the source of Wengezi river.

(a). 

(b). 

Plate 4. 10 *Tuyeres and slag*

(a). 
(b). 

Plate 4. 11 *Remains of iron smelting furnaces*

4.2.2.4 Pit Structures

There are 4 sites with pit structures, but perhaps the most extensive is the one in the Vumba National Park. Here there are 5 pit structures some of them showing collapsed connecting tunnels. The pits are stone lined and form an arch that encloses a large circular structure at the centre. This structure now remains as a protrusion of a low stone wall 30-40 cm high.

a.

b.

Plate 4. 12 Stone-walled pit structures from (a)- Redfern Farm, and (b) – Vumba National Park

The other sites with pit structures are along Chinamata river in the Vumba. One is in Redfern Farm but it was partially destroyed during the construction of a farm road. There is however one stone walled pit that the owner of the farm has tried to preserve (Plates 4.12a & b). The pit also has a collapsed tunnel that led into it from the northern side, the side towards the river. To the north of this site, across Chinamata river, there is another pit but this one shows no evidence of stone lining. Two similar pits were recorded on the Taylors Farm, just below Vumba Beacon Hill. These pits had been cleared for the cultivation of a maize crop during the 2003-2004 agricultural season. Some of the sherds found around the pits were decorated with punctates, but the assemblage was too small to be related to any known ceramic tradition in Zimbabwe. The area through which Chinamata and Zonwe streams pass is locally called *kumarindi,* meaning area with pits (Mutore 2004, *pers comm*.). This term implies that there could be more pits in the area besides the four sites mentioned, but the dense vegetation could have rendered them less visible.

4.2.2.5 Grinding grooves and Tsoro Game Boards

There are many sites with grinding grooves, some at places that show no other evidence of settlement. There are two types of grooves that were recorded in the area. There are the common ones with an elongated outlines (Plate 4.13a) which have been associated with food processing (Swan 1996; Popiel 2006). The other type (Plate 4.13b) consists of only two round grooves with a diameter of 20 cm. One was recorded on the foot slopes of Rowa mountain and the other is on a flat rock at the gap between the two kopjes that form Bopwe hill in Chitora area. This type of grooves has been recorded in various parts of Zimbabwe, and is associated with mineral processing (Swan 1996; Popiel 2006).

The grooves in Zimunya were not subjected to trace element analysis. As a result their function is inferred from previous research on the distribution and use of such artefacts in Zimbabwe (Swan 1996; Summers 1969). According to Swan (1996) there are records of and accounts by miners who experimented and even scraped the surfaces of the grooves to investigate their use. Although the results confirm the association of grinding grooves with grain and mineral processing by the farming communities, we cannot rule out the possibility that hunting and gathering communities could have used grinding grooves for food processing.

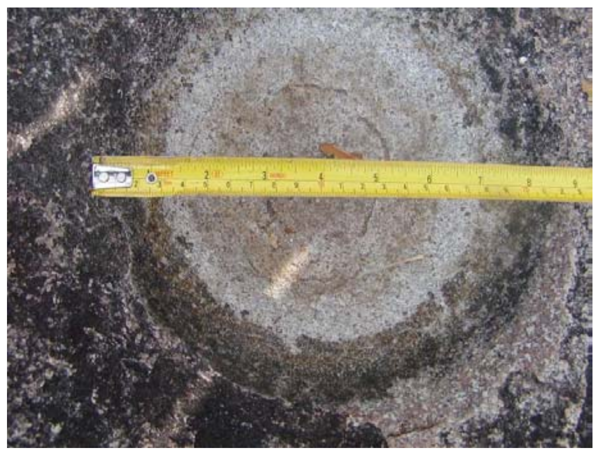
(a).  (b). 

Plate 4. 13 Dolly holes/grooves (from Tsvimbanwa (a) and Chitora (b).

Plate 4. 14 Game boards on Chikwira mountain

Game boards are the third type of grooves found on the flat and extensive rocks (*dwala*) in the research area. The game played on these small and shallow holes is called *tsoro* in the Shona vernacular of Zimbabwe. In Chikwira mountain there is a large *dwala* with several sets of these small grooves drilled into the rock (Plate 4.14). Like the other grooves, it is difficult to date the game boards. Since these games are still played today, it is presumed that they were used in the not so distant past. These days the *tsoro* holes can be drilled on a wooden board or in the ground.

4.4.4.6 Tunnels

There are numerous reports of tunnels in mountains which, according to the oral accounts, were used as refuge sites during the Nguni raids (Musabayana 2002. *pers comm*.). Some of these tunnels, such as the two openings at a side road in the Vumba mountains and near the pit structures in the Vumba Park, are so small such that they required crawling to get in. There is no clear evidence to support the idea that they were used by people. The survey team could not enter another claimed tunnel close to a co-operative farm in the Vumba for safety reasons. There are potsherds around this "tunnel" such that it might be true that people could get in. The local communities also see a relationship between the tunnels and the pit structures both of which are said to have been used during the "Refuge" period.

Other sites show scatters of pottery, burnt and pole impressed *dhaka*, grinding stones, middens and dolly holes. In the absence of diagnostic sherds and other collaborative evidence, it was difficult to assign the sites to any particular cultural tradition. Out of the 133 Farming Communities sites 69 can be regarded as settlement sites on the basis of the material evidence which consists of varying concentrations of pottery, grinding stones, grain bins and pole impressed *dhaka*. Of all the grain bins recorded only the floors remain (Plate 4.15). It is not clear if these structures were deliberately destroyed.

(a).  (b). 

Plate 4. 15 Remains of grain bins at (a). Bopwe, and (b). Tsvimbanwa

Other finds include iron fragments such as the arrow heads discovered at Chinyamutupwi and hoes pieces found on the southern slopes flanking the Burma valley. At Chinyamutupwi a soap stone pendant and Indian red beads were found on the surface. Blue glass beads were also found on the surface at Tsvimbanwa, Madzimbabwe and Mafuke sites. Grinding stones were recorded at almost every settlement site of the farming communities. Workers at the Wattle Company workshop in the Vumba reported coming across grinding stones in the plantations but not many were recorded during the archaeological surveys due to the thick moribund on the ground.

4.3 Culture sequence and summary of survey results

Tables 4.3-4 present a summary of the survey findings by type of evidence and by cultural period. Figure 4.14 shows the distribution of the sites according to their cultural tradition. This data will later be related to aspects of the environment in order to search for discernible patterns or distribution relationships.

Site Type	**Total**
Rock paintings (RP)	86
Iron working (IW)	17
Stone enclosures (ENCL)	7
Burials (BUR)	4
Pit structures (PIT)	4
Pottery scatter (PS)	133
Dolly holes (DH)	6
Game boards (GB)	3
Grain bins (GBN)	6

Table 4. 3 Frequency of sites according to the type of material evidence at the site

Much of the surface Stone Age evidence is of the LSA period. There are numerous small stone tools in rock shelters, especially where quartz is available in the vicinity such as at Madzimbabwe, Manjowe and Chitsanza. Although material that can be considered ESA and MSA was discovered at Muranda, Manjowe, Chiuya I and Chiuya III, and at Manyoreke, this is not substantial. Table 4.4 presents a summary of the type of sites that were recorded during the surveys. The table relates the sites to known traditions or industries in eastern Zimbabwe, using the term Pfupi for the LSA as it had not been challenged by the survey results. Names for traditions of the farming communities period were borrowed from Huffman (1971), Pwiti (1996), Burrett (1998) and Soper (2002, 2006). In the table, the column for the number of sites recorded does not add up to 186 because the classification is based on type of material culture, some of which occurred together at the same site.

The LSA evidence is mainly in the form of rock paintings which, although not directly dated, is known to be characteristic of this period. From the excavations at Gwenzi and Manjowe, pieces of red ochre which could have been used for the preparation of the paint used for rock painting were recovered in contexts dated to the LSA period. The evidence confirms that the shelters were used for habitation as they yielded shell beads and other faunal remains and stone tools (Soper 2005). The connection of the paintings to the occupation of the shelters is strengthened by the evidence of ochre found in some test pits at both sites. However, there are no parallel classifications of the rock art as in stone tool evidence to associate with the Stone Age industries (Chapter 1). Only the Pfupi industry which is contemporary with the Nswatugi LSA industry (Walker and Thorp 1997) is clearly documented in eastern Zimbabwe such that it is appropriate to associate it with the rock art in Zimunya. Thus, for eastern Zimbabwe, one can replace the term Nswatugi with Pfupi for the LSA assemblages.

Period	Industry / Tradition	Evidence	Number of sites recorded	Comments
ESA	Acheulean?	Stone artefacts	4	Found in association with LSA material
MSA	?	Stone artefacts	5	Found in association with LSA material
LSA	Pfupi?	Stone tools and rock paintings	86	All these sites have rock paintings. Some of the shelters have stone artefacts
EFC	Ziwa/Coronation	Ceramics	10	Rare sherds, 3 sites detected after excavations
LFC	GZ	Stone enclosures	4	Sporadic evidence
	Khami	Ceramics	10	Sporadic evidence
	Nyanga	Pit structures	5	Clustered mainly in the Vumba mountains
	Refuge	Ceramics	101	
Other sites	Undesignated	Dolly holes and game boards	9	

Table 4. 4 Frequency of sites according to cultural periods, traditions and phases

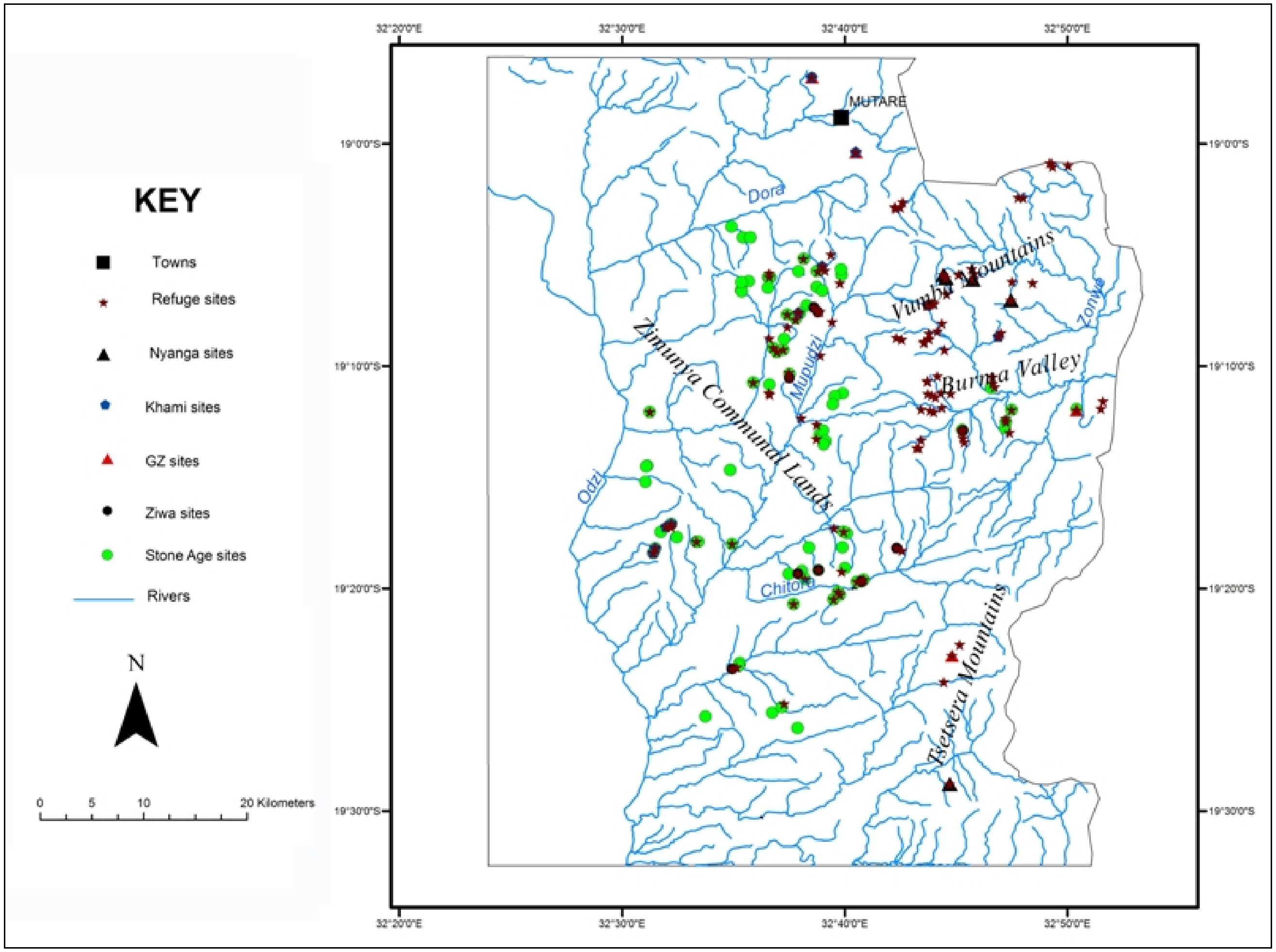


Fig. 4. 1 Map showing the distribution of the archaeological sites recorded during the surveys

Generally, farming communities are not significantly represented in the area. Most of the sites have very few potsherds, yet it is the most significant cultural material that can be used to identify cultural traditions (Pikirayi 1987). However, there are limited potsherds that indicate the presence of the Ziwa / Coronation tradition in this part of the country. Records in the NMMZ database have indicated the existence of ceramics of the EFC Coronation tradition in the Tsetsera Mountains, but recent surveys could not confirm it. This tradition has been reported in north-eastern Zimbabwe as well (Sinclair 1987) but there is not much evidence of it either. Although the presence of Ziwa in eastern Zimbabwe is known, its evidence in Zimunya is scanty.

The later farming period begins with the Zimbabwe tradition that has been identified on the basis of P-style walling at Mutare Altar site, at Murahwa's Hill and in Tsetsera Mountains. These sites are not extensive enclosures, which raises questions about the duration of occupation of this area by people of the Zimbabwe culture. These communities are known more from stone walls than from any other data. There is a contrast however when it comes to the Khami period whose presence is indicated by the presence of the typical band and panel ware at Murahwa rather than by typical stone enclosures. The presence of this tradition in eastern Zimbabwe has not been adequately investigated, although Pikirayi (2001) relates it to the expansion of the Rozvi in the late seventeenth century.

The pit structures in the Vumba represent the presence of the Nyanga culture in the research area. However, the four sites with pit structures do not show much ceramic and other cultural material on the surface. As the sites were not excavated it is not clear if this could be a result of the accelerated rate of deposition and decay of vegetal matter. In the Nyanga area, the pits are from the 15th century AD but the Nyanga culture is dated to between the 14th and the 17th centuries (Sinclair 1987; Soper 2002, 2006; Summers 1958). The dating of this tradition in Zimunya is based on evidence from Murahwa's Hill, which is the only excavated farming community site that has ceramics of the Nyanga tradition.

Some of the pit -structures have either granite or dolerite blocks while others do not have stone lining. The pit structures are the only evidence that demonstrate the existence of the Nyanga culture in this area. Various ideas have been put forward for their construction, but the popular view is that they were livestock pens (Chirawu 1999; Plug, Soper and Chirawu 1997; Soper 2002). They would have been suitable structures for animals as they are warmer during the winter and are more durable as livestock pens in summer than other forms of traditional structures for animals. The location of some of these pit structures however, makes it difficult to accept that they were exclusively used as livestock pens. In the Vumba National Park for example they are located close to the edge of a cliff, a very unsuitable setting for livestock pens.

Although there are agricultural terraces in the mountains such as on the slopes of Hwangura mountain and along Mupudzi river, it is doubtful if they are ancient. Some are currently under use such that one cannot tell how old they could be. People cultivating on these terraces said they were the ones who constructed them. It is not clear if they are related to the Nyanga culture. It could not be determined too if the furrows on the eastern slopes of Hwangura mountain are ancient. In addition, there are also no reports of prehistoric terraces from members of the pioneer farmers who settled in this area during the colonial period.

The role of the Portuguese in the history of Zimbabwe in general and Manyikaland specifically, has been discussed in detail by other scholars, including Beach (1980), Bhila (1982), Mudenge (1988), Pikirayi (1993, 2001). Pikirayi (1993) divides sites of this period into the Portuguese settlements inhabited by the Portuguese travellers themselves, and African settlements of the same period. However, there is no evidence that demonstrates the settlement of the Portuguese in this area. The Portuguese market (*feira*) reported in the NMMZ Archaeological survey database could not be located in the recent surveys. The oral accounts for the market at Chisango beacon could not be substantiated by material evidence. The absence of Portuguese settlements can be explained by the fact that their established base, Massequessa, was a few kilometres further east in what is today the Manica province of Mozambique. It was therefore unnecessary to establish further settlements nearby. The African settlements of this period are identified by material culture that is considered a product of external trade, or the influence of foreign technology or ideas (Pikirayi 1993; Pwiti 1996). In Zimunya, it is not clear if sites where glass beads were discovered could have been contemporary with the Portuguese. The beads could have survived well after their entry into the region through external trade.

The Portuguese period is followed by the Refuge period. There are sites in Zimunya which suggest unsettled conditions that can be associated with this period. The roughly constructed walls on Murahwa's Hill, Ngoya, Vumba and Tsetsera mountains can be described as refuge constructions. This is particularly so for the Vumba wall which blocks the only easily accessible side of the hill. The sites are also located on kopjes where there is a wider view of the landscape below. In addition to the walls and their location, the storage of grain in rock shelters in impregnable hills also points to unstable conditions. However, without absolute dates we cannot be certain of the time period.

Historical accounts tell us of the presence of the Jindwi or Zimunya dynasty in the 19th century. As noted in Chapter I, the identity of the people that the Jindwi found already settled in this area could be the Nengomasha who are also thought to have been earlier immigrants in this area. Although they are probably the last people to move into the area, it is thought that the Jindwi were powerful enough in the second half of the 19th century to forestall a possible southward expansion of the Mutasa dynasty (or Manyika Kingdom). Surprisingly, the stronghold (*Bingaguru*) of the Manyika Kingdom is known, but that of the Jindwi could not be established. Pikirayi (2001) discusses the spread and decline of the Zimbabwe culture in eastern Zimbabwe up to the late 19th century AD but does not seem to be aware of the Zimunya dynasty.

4.4 Conclusion

This chapter has presented the nature of the archaeological evidence in the Zimunya area. The ubiquitous rock art, its style and the various themes that the art shows constitute a significant body of data that broadens our knowledge of the prehistoric cultures in Zimunya. From the survey results, it can be concluded that the density of the Zimunya rock art is comparable to other rock art areas such as the Matopo hills in western Zimbabwe. Although stone tools and other material remains were discovered at the sites, ranging from the early Stone Age to more recent periods, there is no secure chronology of the culture sequence. Although it may be possible to characterise and refine the sequence of south central Manyikaland from the survey data, its reliability is limited by the lack of dating from undisturbed excavated contexts. Apart from the issue of chronology, there is need to gather other forms of evidence that would relate prehistoric environment to changes observed in the material culture at various periods.

Although research of the nature discussed in this thesis depends so much upon survey data, it is necessary that the data are assessed against excavated and securely dated evidence. It has been argued that survey data can equally contribute to our understanding of prehistory as the "heavy weight"- the excavation (Ammerman 1981; Pwiti 1996). However, the role of excavations to expand on survey data has always given the impression that survey data are not complete, and so may not be able to answer some important archaeological questions (Ammerman 1981). This is true in cases that are similar to the situation in Zimunya where the cultural sequence was not securely dated prior to the surveys. Complementary data from excavations was therefore required to aid the survey evidence, particularly in establishing the chronology of the cultural evidence and to enable reconstruction of palaeo-environments. The excavations were also necessary to make sure that the survey results are interpreted in the context of the local environmental conditions. Thus the nature of the evidence presented in this chapter would be compared with excavation data before being used in settlement pattern analysis.

CHAPTER 5

Culture History of Zimunya: Excavation data

"Excavation recovers from the earth archaeological evidence obtainable in no other way".

(Barker 1982, p. 11)

5.1 Introduction

Out of the 186 archaeological sites recorded during the surveys, three rock shelters representing the Stone Age and one site of the farming communities were excavated in August, 2003 and August 2004. The farming community site of Murahwa's hill, already known from the existing records of the NMMZ, was selected for excavation because it was one of the few sites with potential to inform about the farming communities. The site has evidence that spans from early farming communities to the late 19th century AD. It thus offered an opportunity to establish the cultural sequence of the area during the period of prehistoric farming communities in Zimbabwe.

The selection of the three rock shelters of Gwenzi II, Manjowe main site and Manjowe I was premised on the knowledge that these contexts accumulate material that may have indications of environmental conditions and that they also were some of the areas that were used for human habitation in prehistory. The shelters were also selected because they are some of the major rock art shelters in the area with well-preserved paintings and undisturbed floors such that prospects for a well preserved stratigraphy were high. The excavations also sought material for

C14 dating, and evidence relating to economy, resource utilisation, technology, environment, and other aspects of behaviour of prehistoric communities.

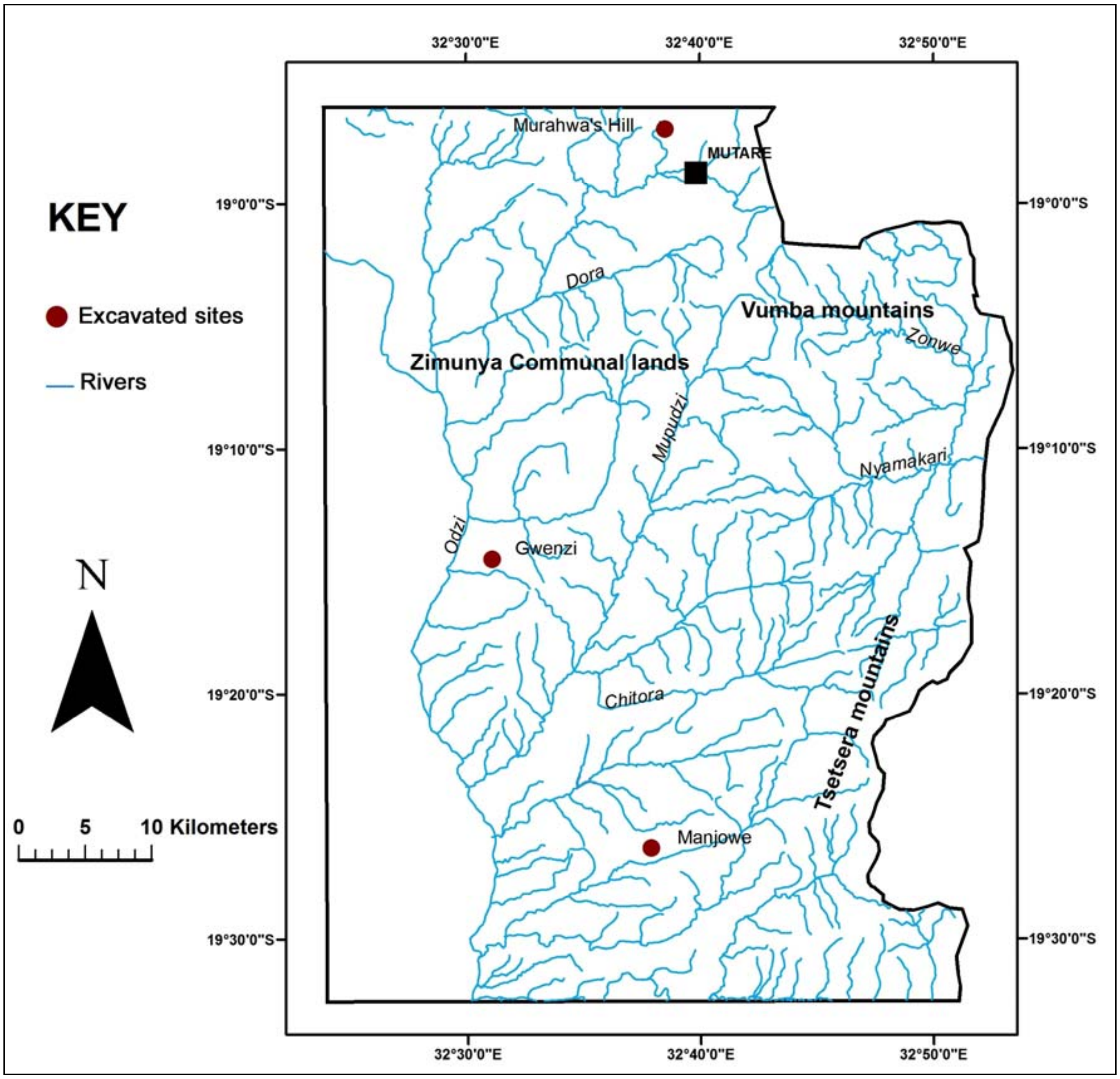


Fig. 5. 1 Map showing the location of the excavated sites in the research area

5.2 The excavations

It has been noted that very limited archaeological research had been carried out in the Zimunya area prior to the 21st century. There was no secure cultural sequence that could be used for comparative purposes. The main aim of the excavations therefore, was to recover material that could be used in developing a culture sequence that is specific to the research area. This sequence would then be used to refine the evidence discovered during the surveys. In addition, the excavations were expected to recover data that could be used in reconstructing aspects of the prehistoric environment, cultural change through time, and economic organization (Mupira and Katsamudanga 2007).

The excavations at the three shelters proceeded by intervals of 10 cm spits on all the excavation units for reasons of stratigraphic control. Although it is now thought that spits that are thicker than 5 cm would contribute less to the understanding of the stratification of cave deposits (Burrett 2005; Thorp 2005), the excavations used 10 cm spits due to the problem of identifying cultural layers in granite shelters (Burrett 2005). I note with hindsight that the use of arbitrary spits makes it difficult to correlate natural layers. For this reason, although the illustrations of cross-sections show natural layers identified after the excavations, the description of the stratigraphy follows the spits. All the soil from the excavations was dry sieved using a 2.5 mm sieve.

5.2.1 Gwenzi II Hill Site

The site of Gwenzi II is located about 40 km south of Mutare city and about 4km west of Chinyauhera Business Centre (Fig. 5.1). The excavated shelter is one of two rock art shelters found in Gwenzi mountain and consists of a large boulder with the shelter facing to the south. The shelter is easily approached from the east, while it is a steep climb to approach the site from the south. To the west the slope is negotiable although there are several boulders. The shelter is open to the south easterly trade winds but offers enough protection from the rains and commands a good view of the valley to the south. It is 15 m long, 8 m at its widest point and approximately 5 m high (Fig. 5.2). The shelter is situated about 2 km east of the main and perennial river in the area, the Odzi river, and also close to a perennial stream about 500 m to the south. A smaller seasonal stream is found 200 m to the east. Apart from a small water channel on the eastern edge of the shelter there is no significant evidence of run off water in the shelter.

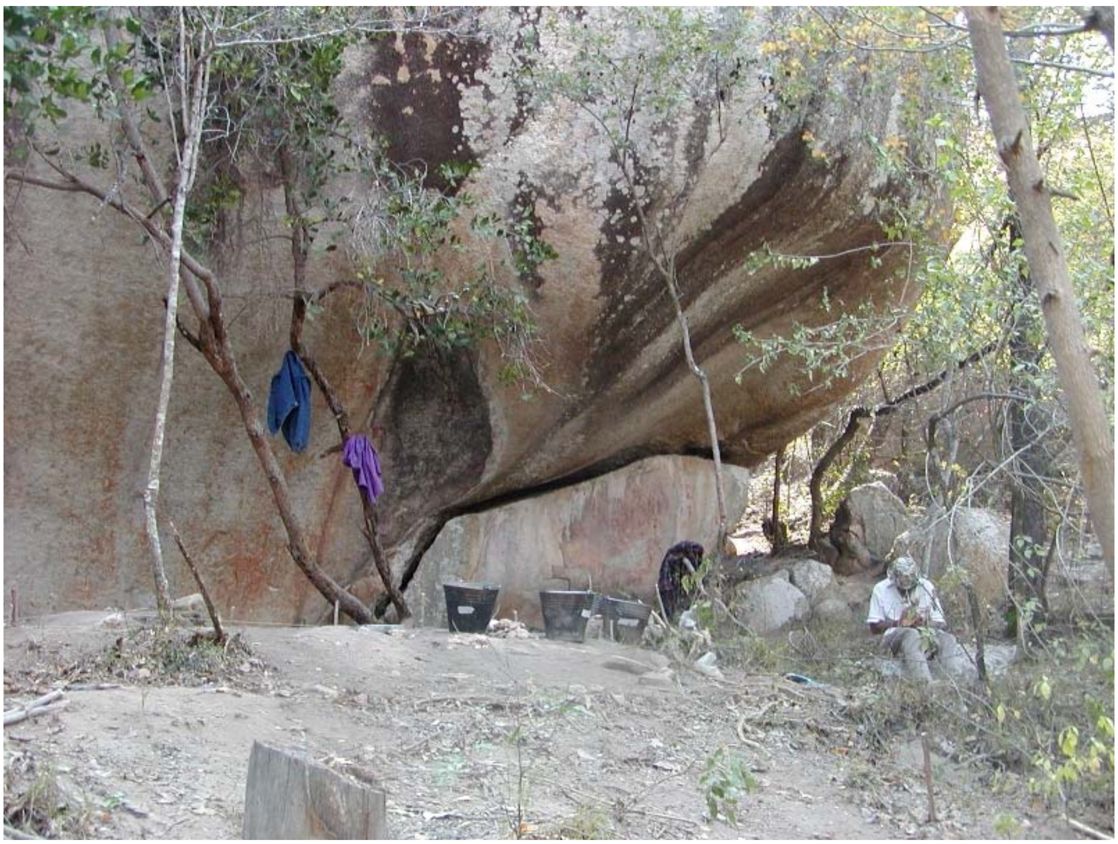


Plate 5. 1 Gwenzi rock shelter

The shelter has three panels of rock art painted in red and dark red colour. Although the paintings are in monochrome shades of red, there are a few images that have white markings. These are seen on the arms and legs of the human figures, as well as on arrows that are found in sets of five (Nhamo 2005). There is also a procession of human-baboon like figures, some of them now faded. Some of the human figures are very tall and seem to be bending down while others hold “weapons”. There are blackened figures of antelope, warthog and zebra. On the eastern side of the shelter, there is the main panel of the site with an estimated 75 to 100 images. Here there are distinctly 7 male and 15 female human figures that show leg muscles and feet. The women appear to be wearing “aprons” and one appears to be holding a crescent shaped object. Tall human figures are also drawn on this panel (Nhamo 2005). One of them is in a lighter red colour (Plate 5. 2). Its association with the rest of the images on this panel is not clear.

Plate 5. 2 The main panel at Gwenzi showing tall human figures to the right

Stone artefacts and potsherds that had been found scattered in the shelter during the surveys raised prospects of recovering more material in the stratigraphy. Six cores were sunk to test the depth of the stratigraphy and the likelihood of the occurrence of cultural material. The cores indicated a shallow depth for much of the shelter except near the drip line. Later, the floor space was divided into 1m X 1m grids. On the basis of the results of the augering, six 1 m² pits were excavated (Fig. 5. 2). The reason why Test Pits 1 and 3 were sunk closer to the back of the shelter where coring had indicated a shallow depth was that sometimes there is spatial patterning of activities in the shelters which could have been missed by concentrating on the outer edge. This is also the same reason why the six test pits were scattered about within and outside the shelter. Only Test Pit 2 was later extended by 3 m² because as it yielded more cultural material than the others, there was hope for more.

5.2.1.1 The stratigraphy

Although the scatters of pottery and stone flakes indicated the prospects of a deep stratigraphy of the shelter, the excavation revealed that generally the stratigraphy at Gwenzi is shallow compared to other excavated shelters in the eastern highlands of Zimbabwe such as Nyazongo (Martin 1938) and Gosho (Burrett 2002). With the exception of Test Pit 4 which went down to a depth of 130 cm, the outer edge of the shelter averaged a depth of 70 cm while Test Pits 1 and 2 at the back of the shelter had profiles that averaged 20 cm. Limited cultural material was recovered from all the test pits except in Test Pit 2, 2a, 2b and 2c.

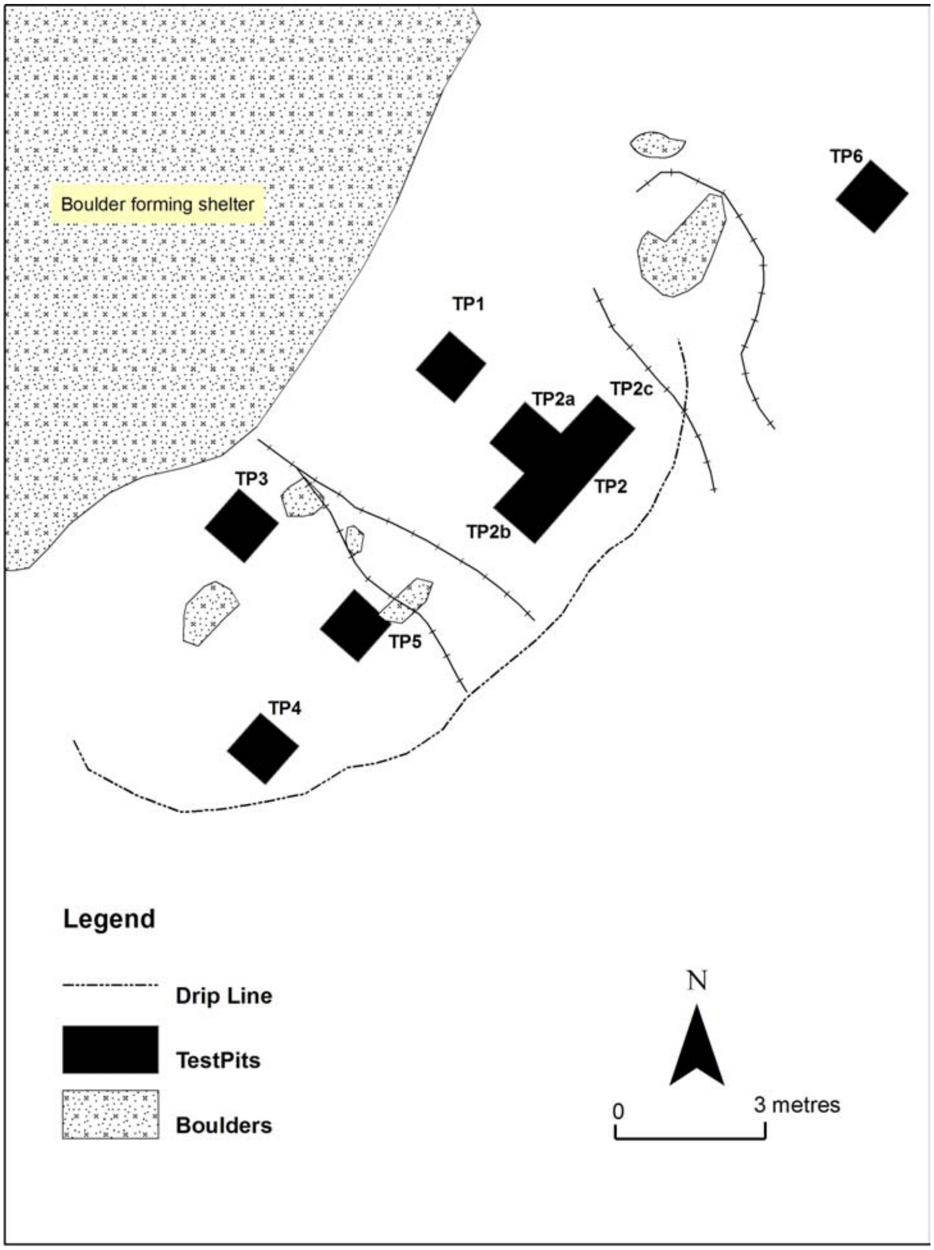


Fig. 5. 2 Gwenzi site plan

5.2.1.1.1 Test Pit 1

Test Pit 1 had a very shallow depth, going down to 20cm as had been indicated through coring. There was no cultural material on the surface. Layer 1 was very compact with dark grey soil that changed to brownish orange in Layer 2. The brown colour is the colour of the decomposing granite bedrock below Layer 2. There were some thin sections with ashy grey soil but they did not go deeper than the 20cm. This pit yielded 2 plain potsherds, quartz flakes, *Achatina* shell and a shaft bone.

5.2.1.1.2 Test Pit 2

Test Pit 2 was the richest of all the test pits at Gwenzi. The soil colour and texture changed from the humic grey at the top to ashy grey in the middle levels and then to the yellowish gritty/gravel from the granite bedrock encountered at 70 cm below surface. Layers 1 and 2 had darker ashy grey soil influenced by humus from the outer edge of the shelter. Layer 3 had light grey ashy soil which appeared moist at some sections. Layers 4 and 5 had a brownish tone while Layer 6 was yellowish brown that was influenced by the decomposing granite. Layer 7 was the bed rock. A lot of quartz and dolerite flakes, potsherds and faunal remains were found. The faunal evidence recovered includes reptile vertebrae, metacarpals and phalanges of bov 1-3 species, rodent teeth, as well as *Achatina* shell. The *Achatina* shell fragments were recovered throughout the layers. The rock exposed in Test Pit 2 showed evidence of encrustation indicating that this was once exposed.

5.2.1.1.3 Test Pit 2a

This test pit is the northern extension of TP 2 (see Fig. 5.2). The soil colour and texture was similar to that of TP 2 above, being dark grey that gradually develops into ashy grey. Plain body potsherds were collected in the topsoil and in Layers 2 and 3. A tibia fragment of *cf. Ovis capra,* and other non-identifiable bone fragments were also recovered. In addition, *Achatina* shell fragments and stone artefacts were also collected.

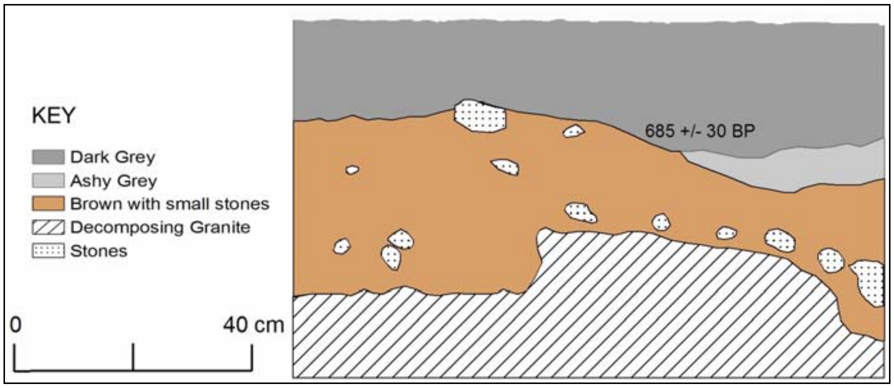


Fig. 5. 3 East section of Test Pit 2a

5.2.1.1.4 Test Pit 2b

This is the western extension of Test Pit 2 and the profile was similar to the 2 pits described above with ashy grey soil that yielded potsherds, stone artefacts and bone fragments. The grooves and crevices on the rock that made the bottom layer of this pit had evidence of encrustation, a probable indication of a once exposed surface. A shaft bone and a phalange of a bov 3 size animal species were recorded.

5.2.1.1.5 Test Pit 2c

This test pit is the eastern extension of Test Pit 2 (Fig. 5.2). It had very friable and humic soil, probably a result of capillary action as the pit was close to the edge of the drip line. In addition to pottery and stone flakes, faunal remains of bov 1-3, hares (*Lepus saxatilis*) and pangolin (*Manis temminckii*) were recovered. Also recovered was a piece of red ochre, which could have been used in manufacturing the paint.

5.2.1.1.6 Test Pit 3

Material found in this test pit includes a sooty covered potsherd, quartz flakes, *Achatina* shell and a carpal fragment of zebra (*Equus burchelli*). Layer 1 was light grey and appeared washed. Layer 2 was brownish and layer 3 granular from the decomposing granite. The test pit was abandoned at this level (30 cm) after encountering a sterile layer of decomposing granite. A core was sunk in the trench after hitting the sterile layer and it went on down to 70cm without yielding any cultural material and showing no change in soil colour and texture.

5.2.1.1.7 Test Pit 4

The test pit was excavated to a depth of 130 cm making it the deepest excavation unit at the site (Fig. 5.4). Worked stone began to appear in Layer 1. Layer 2 was a brownish compact layer with charcoal pieces that continued into Layer 3. Evidence of burnt *dhaka*, bones and a grinding stone was found between 20 and 30cm below surface. The grinding stone that was found was in an inverted position. Levels 4 to 7 had granular clayish soil which yielded quartz and dolerite stone flakes. It is not clear why the stratigraphy in this test pit is not matched elsewhere in the shelter.

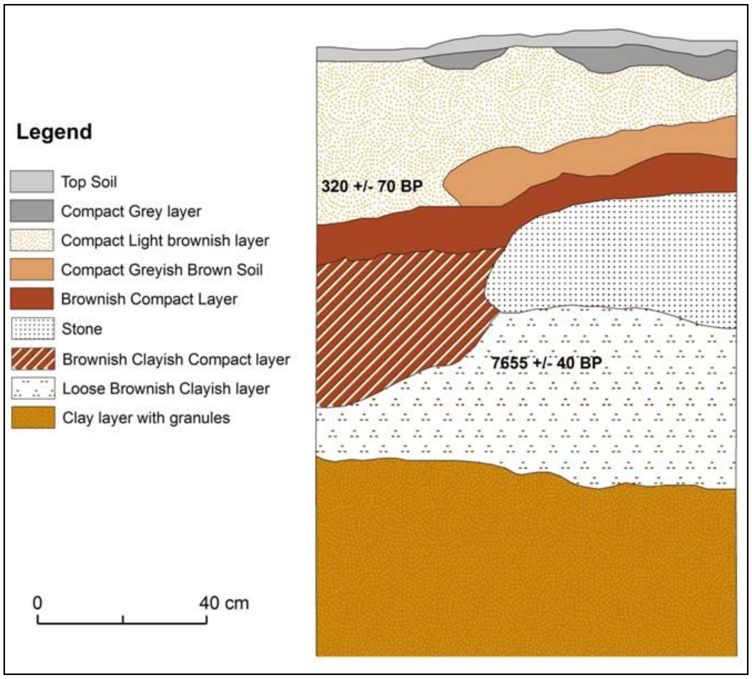


Fig. 5. 4 North profile of Test Pit 4

5.2.1.1.8 Test Pit 5

This test pit was sunk near the drip line and went down to a depth of 50 cm. The material that was recovered includes stone flakes of quartz and dolerite, and a chert blade. The soil was very loose at the bottom of the test pit such that the profiles collapsed on very slight shocks or sudden movements like walking round the edges (Plate 5.3). Some rock spalls were observed in this trench, but they had no paintings.

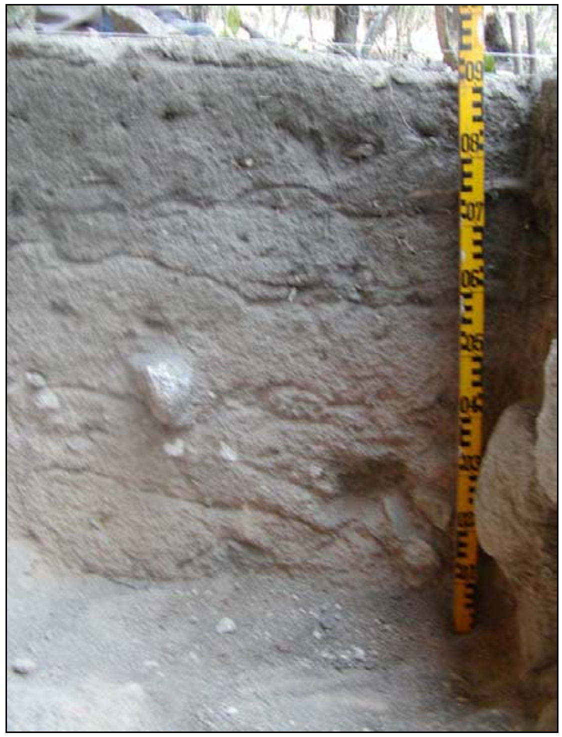


Plate 5. 3 North profile of Test Pit 5

5.2.1.1.9 Test Pit 6

This pit was located at 4 m away from the shelter as shown in Fig. 5.2. The colour and texture of the soil changed markedly from the humus rich topsoil to brownish fine textured clay and then to gritty clay. The soil from the lower levels was very loose such that the profile was collapsing with minor disturbances, just as in Test Pit 5. A few stone artefacts were recovered, mainly quartz and dolerite flakes. There was not much recovered in this test pit in terms of faunal remains. Apart from *Achatina* shell fragments only bone fragments from zebra (*Equus burchelli*) were recovered.

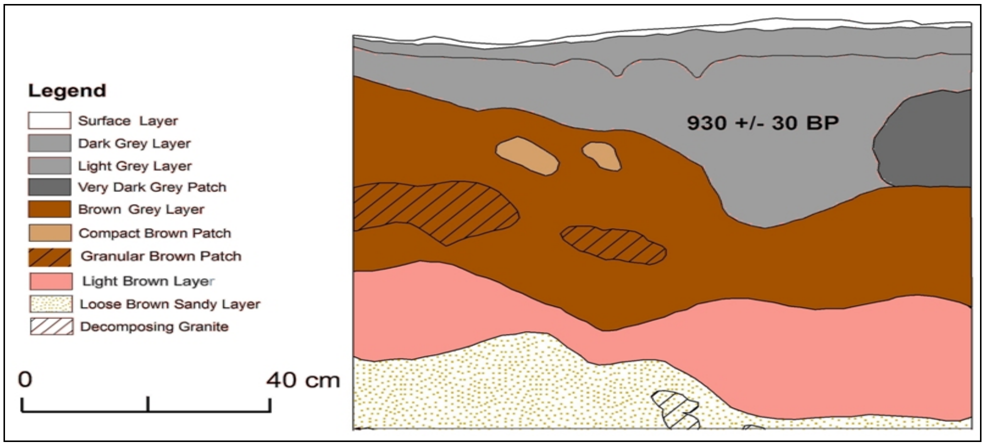


Fig. 5. 5 North profile of Test Pit 6

5.2.1.2 The finds

5.2.1.2.1 Stone artefacts

Stone artefacts constitute the bulk of the cultural material recovered at Gwenzi site. As these have been described in detail elsewhere (Mupira and Katsamudanga 2007; Soper 2005), I only summarise the key observations. The analysis of the stone artefacts showed that there were very limited formal tools from the site (Soper 2005). Of the formal tools, most were from quartz and a few from dolerite. The artefacts range from grinding stones, small points (1 bifacial) and bladelets to scrapers. The quantity of scrapers, especially small convex scrapers of less than 20 mm, increased with depth while backed bladelets decreased. In general, the stone artefacts can be described as microliths, a characteristic of the LSA. Soper (2005) finds similarity in terms of the proportion of backed bladelets and scrapers, between this LSA material and the Pfupi tradition which has been previously recovered at other rock shelters in eastern Zimbabwe (Martin 1938; Burrett 2005). A detailed analysis of the lithics showed that the only unique aspect with this assemblage is the presence of dolerite bifacial “axes” as these have not been reported anywhere else in eastern Zimbabwe (Soper 2005).

5.2.1.2.2 Pottery

There were a few potsherds on the surface and in the upper layers of the test pits. Some of these were graphite burnished with no other determinable decoration, except for 1 sherd with comb stamping. The few rim sherds found have rounded to square lips. The majority of the sherds are 5 to 8 mm thick. 90% of the sherds were recovered in the first 30 cm below surface. In general the ceramic assemblage is too small to relate it to that found at nearby sites such as Murahwa's Hill or Mutare Altar site. There is indication of the possible presence of EFC material shown by a single sherd with comb stamping. The decorated sherd is shown later in Fig. 5.17 together with three others recovered from Manjowe rock shelter. The rest of the sherds recovered were plain pieces which could be LFC material. There is no EFC date in all the levels from which the sherds were recovered for lack of charcoal samples from these provenances, but the lower calibration range of a charcoal sample taken from Test Pit 6 outside the shelter and at generally the same depth of about 25 cm below surface, is around the 11^{th} century (1055-1193 AD).

5.2.1.2.3 Beads

Beads are a significant component of material culture that has been recovered in both Stone Age and Farming Communities contexts throughout Zimbabwe. Ostrich egg shell beads are the most common beads in Stone Age contexts but at Gwenzi only one such bead was recovered in Layer 3 of TP2c. This bead is also the only evidence recovered for ostrich egg shells at the site.

5.2.1.2.4 Faunal remains

Several bones and bone fragments were recovered, particularly from Test Pits 2, 2a, 2b and 2c (also see Appendix C). The location of the faunal assemblage towards the outer edge of the shelter shows that this is a cultural behaviour. The faunal report suggests that these larger bones could be of non-domestic animals although they could not be identified by species (Manyanga

2006). It can be seen from the species list in Table 5.1 that this assemblage was produced by hunting and gathering communities since the remains show a wide range of small wild animals such as *Lepus saxatilis* and *Bov 1* species. In addition, most of the bones were crushed, suggesting hunter gatherer behaviour consistent with the use of stone tools to break the bones (Manyanga 2006, *pers comm*.).

Scientific name	**Common name**	**NISP**	**MNI**
Orycteropus afer	Antbear	4	2
Equus burchelli	Zebra	5	3
Bovidae 1 indet		11	7
Bovidae 2 indet		8	5
Bovidae 2 non domestic		1	1
Bovidae 3 indet		9	6
Manis temminckii	Pangolin	1	1
Thryonomys swinderianus	Cane rat	3	2
Geochelone pardalis pardalis	Tortoise	2	2
cf. Rattus sp.	Rodent	3	2
Lepus saxatilis	Hare	5	3
Aves (medium)	Bird	2	2
Aves (small)	Bird	3	2
Reptile	cf. Snake	11	5
Asphatharia	Fresh water muzzel	1	1
Achatina sp	Land snail	38	31

Table 5. 1 Faunal remains from Gwenzi

Numerous shell fragments of *Achatina* (land snail) were recovered but they show no deliberate modification. The process leading to their accumulation could not be determined although it is known that land snails can burrow through soft ground. However, no complete shells were recovered to show that the species were self introduced. No useful patterns could be discerned as the shells are distributed throughout the stratigraphy. In addition, the absence of deliberate modification on the shells limits what can be said about this evidence. The *Asphatharia* shell identified must have been brought into the shelter, probably from the Odzi river or the nearby stream, since this is a fresh water species.

5.2.3 Radio Carbon dates from Gwenzi

The charcoal yield at Gwenzi was so low such that only 4 samples were collected. The samples were collected from Test Pit 2 Layer 2, Test Pit 4 Layers 2 and 7, and Test Pit 6 Layer 2. As can be seen from Table 5.2, there is no date between 31 and 70 cm in all the test pits and below 80 cm in Test pit 4. This was due to lack of suitable material for radiocarbon dating, although stone tools were recovered from these layers. Although there are limited dates, and some spits were not dated at all, there is no discernible hiatus that separates the dated contexts. As indicated in Table 5. 3, the recovery of cultural material in the spits does not suggest any breaks in occupation.

Depth below surface (cm)	**TP2**	**TP4**	**TP6**
1-10			
11-20	685 +/-30 BP		
21-30		320 +/-70 BP	930 +/-30 BP
31-40			
41-50			
51-60			
61-70			
71-80		7655 +/-40	
81-90			
91-100			
101-110			
111-120			
121-130			

Table 5. 2 Radio Carbon dates from Gwenzi

5.2.4 Summary on excavation at Gwenzi

There are three major soil colours in the stratigraphy of the shelter. The top layer is grey sandy that turns brownish close to the base of the boulder. Along the drip line edge the surface soil is humic grey. Below the topsoil the next layer varies between light ashy grey to brownish colour. For Test Pit 2 and its extensions the colour is light to dark grey. The third colour regime is yellowish brown with a clayey texture. In some sections reddish granules appear as small patches with very limited horizontal spread. Test Pits 1 and 3 near the base of the boulder show fine lenses or lines that seem to indicate sequences of sand deposits from either runoff water in the mountain or from wind deposition. In terms of dates, the earliest radio carbon date obtained (GrA-26884: 7655+/-40 BP) is within the LSA. However, since some stone artefacts were recovered below the 80 cm associated with this date (Table 5. 3), the site therefore should have been occupied earlier than 7655 +/- BP.

Layer	**TP1**		**TP2**		**TP3**		**TP4**		**TP5**		**TP6**		**DATE (BP)**
	P	***S***	***P***	***S***	***P***	***S***	***P***	***S***	***P***	***S***	***P***	***S***	
0*			x	x				x					
1	x	x	x	x	x	x		x	x	x		x	
2			x	x		x		x	x	x	x	x	685+/-30 BP
3			x	x		x		x		x		x	930+/-30 BP
4			x	x				x		x		x	
5				x				x		x		x	
6								x				x	
7								x					
8								x					7655+/-40 BP
9								x					
10								x					
11								x					
12								x					
13								x					

*KEY: **P** = Potsherds, **S** = Stone Tools, 0* = Surface layer*

Table 5. 3 Artefact presence in the different test pits and layers at Gwenzi

The *Achatina* shell evidence is found from the top layers that have EFC material down to the basal levels of the test pits, but its occurrence in the stratigraphy is not easily explainable. The fact that much of this evidence is found in the test pits close to the outer edge of the shelter suggests natural intrusion. Test Pits 2, 2A-C had an ashy content which might have attracted the land snails. Twenty nine potsherds recovered in the upper levels of the site had graphite burnishing but with no other obvious decoration, except for one sherd with oblique comb stamping. There were a few rim sherds but it was not possible to relate this material to any of the known ceramic traditions in eastern Zimbabwe. Quartz and dolerite stone artefacts and flakes were found mainly in the lower levels. Also recovered were shell and bone fragments, a lower grinding stone, a hammer stone, and a shell bead in Test Pit 2C.

5.3 Manjowe Rock Shelters

The Manjowe rock shelters are located on a range of mountains about 51km from Mutare city (Fig. 5.1). The physiographic setting of the Manjowe shelters is similar to that of Gwenzi, being granite hilly area with savannah woodland dominated by *Brachystegia* tree species. This area forms the southern limits of the granite belt of the eastern highlands of Zimbabwe. There are however, a few outcrops of quartz rock which was exploited for tool making as seen from the surface and excavated evidence. To the south there is a seasonal river, while to the west there is a perennial trickle of water in the vlei below the mountains. Through taboos and other social controls, the community of Zimunya had managed to conserve much of the woodland in this area. There is general reverence of the mountains as they are considered abodes of ancestral spirits (Pwiti *et al* 2006). However, continued pressure for agricultural land has seen part of this forest being cleared for farming. An immediate impact of the resettlement in the area has been the drying up of the small stream which when first observed in 2002 had a trickle of water during the dry season.

5.3.1 Manjowe main site

This site consists of a shelter that is below a single large painted boulder (Plate 5. 4). The paintings were executed on the steeply sloping face, up to a height of 4 m above the shelter floor (Plates 5. 4 & 5). Large animals such as elephants and rhino, antelopes, human figures, and birds make up the identifiable imagery in the art. On the top left side of the panel there are seven equids painted in dark red. There are also some *Bovids* which seem to be either buffalo (*Syncerus caffer*) or cattle (*Bos Taurus*), that are now fading from dark red to yellowish brown. Below this is a line of human figures running to the right. Further below, there is a rhino and three walking human figures in polychrome of red and white. The figures have out stretched bellies, suggestive of pregnant women. Immediately to the right there are 17 ostriches, with legs that are awkwardly at the posterior of the body. In the centre and to the far right of the panel are small and large elephants, as well as human and antelope figures. Some of the antelopes are bending forward as if lying down, while some of the humans have bows and arrows.

The shelter (Plate 5. 4) is about 10 m wide with a roof arching upwards to a height of about 7 m. Much of the shelter ground surface is bedrock and only on the edge of the bedrock on the slope-ward side is some soil deposit. Stone artefacts, especially dolerite cores, were seen several meters around and down slope of the two Manjowe shelters. In the shelters more stone tools and flakes, including cleavers, were observed. There were also scatters of potsherds, and what appeared like a hearth or floor. To the east of Manjowe Main Site a small concentration of large blocks of pole-impressed *dhaka* was observed. No other visible evidence of a farming community settlement was discovered.

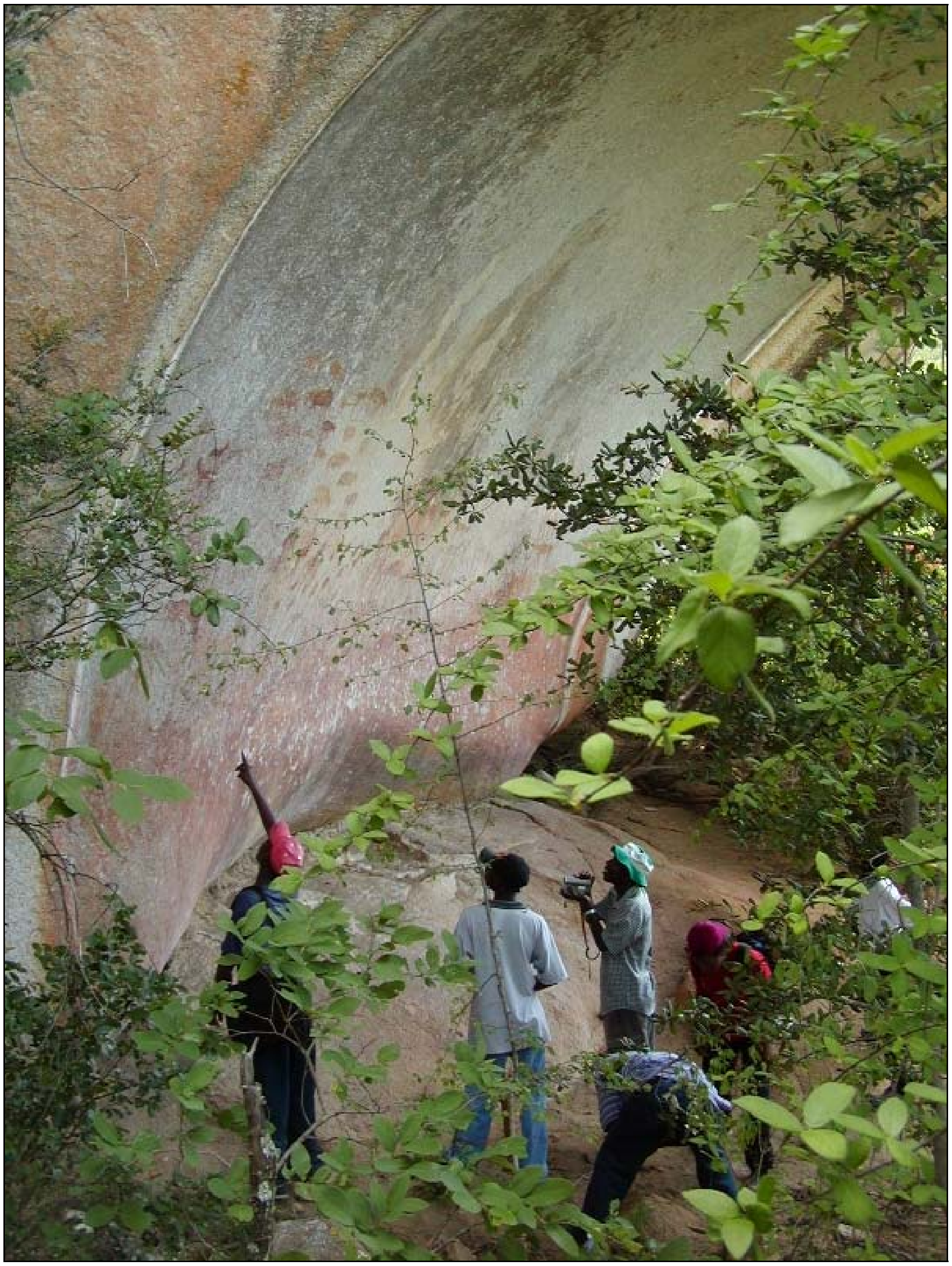


Plate 5. 4 Manjowe main site

Plate 5. 5 The rock art panel at Manjowe (Main site)

5.3.1.1 Stratigraphy

As at Gwenzi site, the siting of the test pits was preceded by augering to determine the nature and depth of the stratigraphy, and also to get an indication of sub-surface material culture deposits. The cores however did not yield much evidence of material culture, although they showed a significant depth of the stratigraphy around the exposed rock in the shelter. Initially, three 1 x 1m test pits were opened up. Later, Test Pit 2 was extended by $3m^2$ and three more excavation units were opened (Test Pits 4 and 6, and Trench 5) in and outside the shelter (Fig. 5.6).

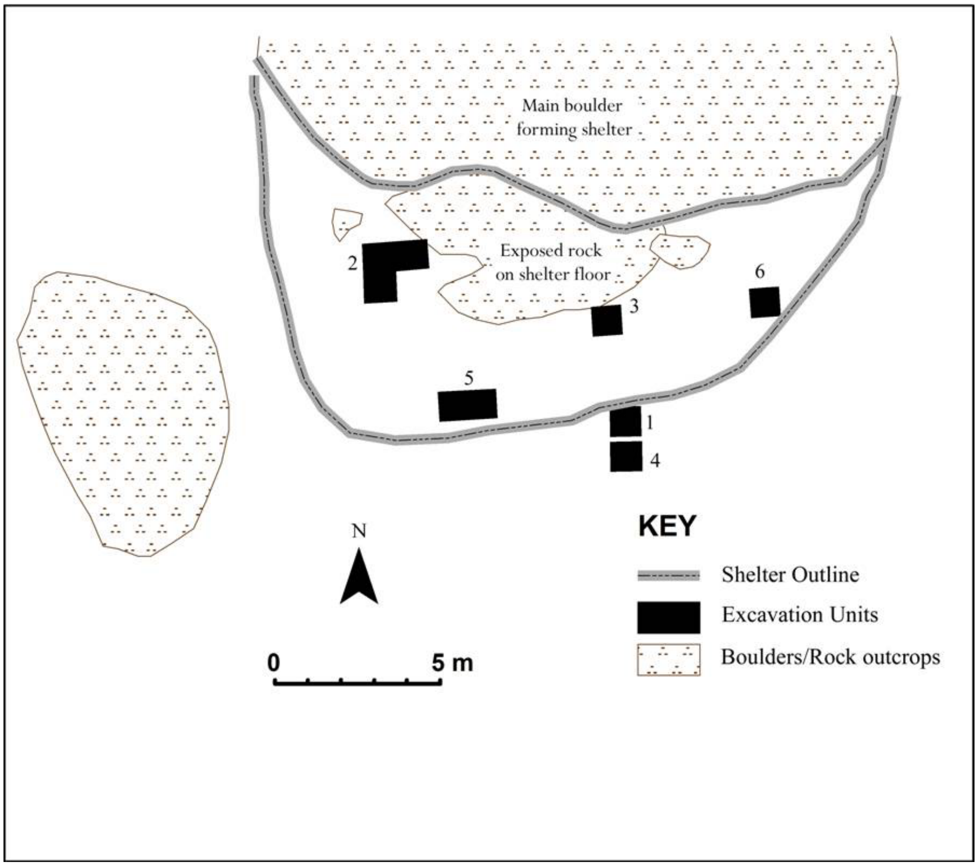


Fig. 5. 6 Site plan of Manjowe main site

5.3.1.1.1 Test Pit 1

The finds recovered from this test pit included quartz microliths and miscellaneous flakes, bone fragments, snail shells, potsherds and pieces of red ochre. The microlithic stone tools recorded included some points, blades, bladelets, scrapers and backed flakes. The faunal remains consist of phalanges, astraguli, shafts, a tooth, scapula and skull fragment belonging to different types and sizes of animals. Potsherds were recovered mainly from the top three layers, including one with punctate decoration that was recovered from Layer 2. Several pieces of red ochre were recovered from various levels of the test pit. Excavation was stopped at 80 cm after going through a sterile layer of decomposing granite for about 20 cm.

5.3.1.1.2 Trench 2

This trench was located at the western end of the shelter. Initially this was 1x1m but was later extended by 2 m² to form an L-shaped trench. Stone tools, flakes, bone fragments, snail shells, red ochre pigments and some potsherds were recovered. The stone tools were similar to those retrieved from Test Pit 1 but in this trench there were more of dolerite. Several charcoal samples were collected from this trench. The excavation of this trench was stopped at 70 cm below surface after reaching a layer of decomposing granite (Fig. 5.7).

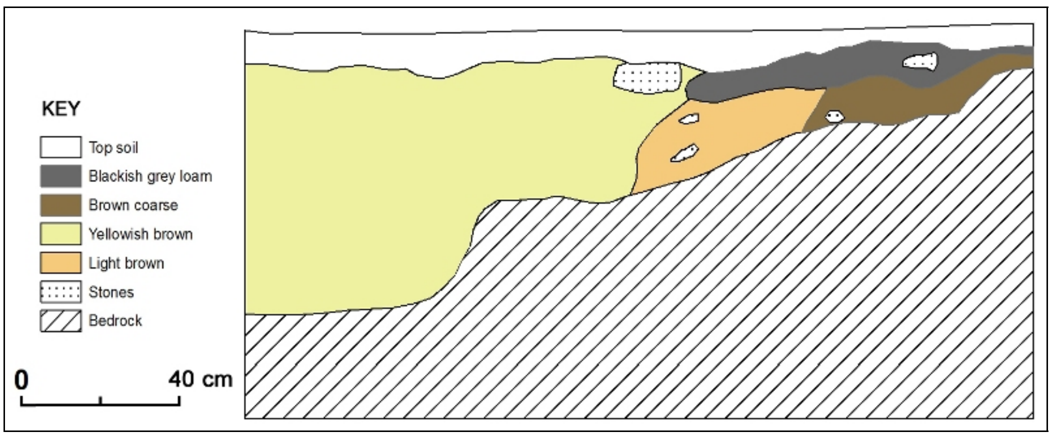


Fig. 5. 7 South section drawing of Trench 2

5.3.1.1.3 Test Pit 3

This was located near the centre of the shelter on the edge of the rock outcrop to investigate a small ashy midden. The pit had a very shallow stratigraphy, going down to 25 cm. Most of the recovered bones were anatomically identifiable to species and skeletal parts. Some were crushed, others were burnt. It was observed that there was a prevalence of bones from small rodents and birds.

5.3.1.1.4 Test Pit 4

Test pit 4 was opened up adjacent to Test Pit 1 but outside the shelter. Stone artefacts and pieces of red ochre pigments were recovered.

5.3.1.1.5 Trench 5

Trench 5 was the richest excavation unit at the site, yielding pottery, a copper object, bones of small and large animals, animal teeth, snail shells, and stone tools and flakes. The pottery and the copper object were recovered in the top three layers down to a depth of 30cm while bones and stone objects were found throughout the sequence. One of the sherds was decorated with a single line incision and triangular punctates on either side of the incised line (Fig. 5.14).

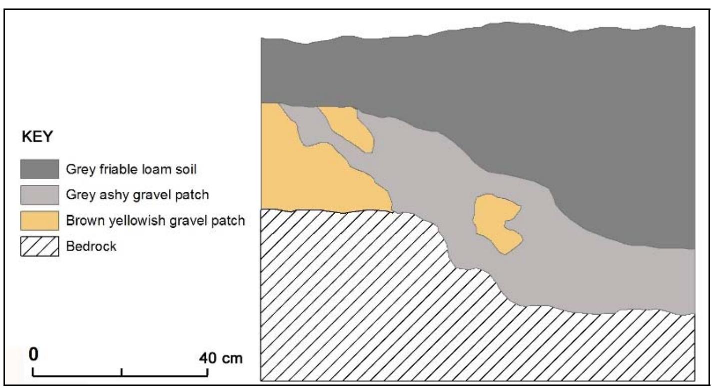


Fig. 5. 8 East profile of Trench 5

5.3.1.1.6 Test Pit 6

This test pit was sunk on the eastern edge of the shelter. A buried individual, who appears to be a child, was discovered at about 40 cm below the ground in this test pit. The skeleton was badly decayed and friable. The body was in a matrix of compacted soil. The local village headman who took part in the excavation at Manjowe could not allow further exposure of the burial. As a result there was limited recording of the buried individual. The decayed and friable status of the skeleton suggests that the individual was a child. Several charcoal samples were collected in the vicinity of the skeleton. A small blue glass bead was also recovered near the surface.

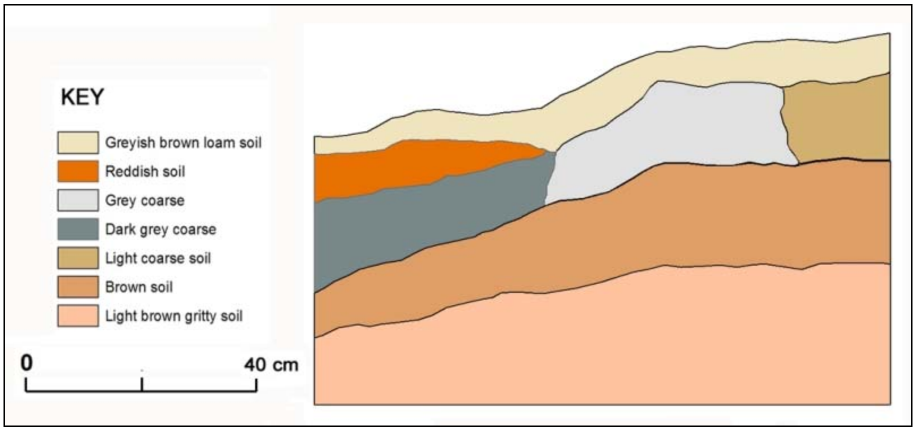


Fig. 5. 9 West section of Test Pit 6

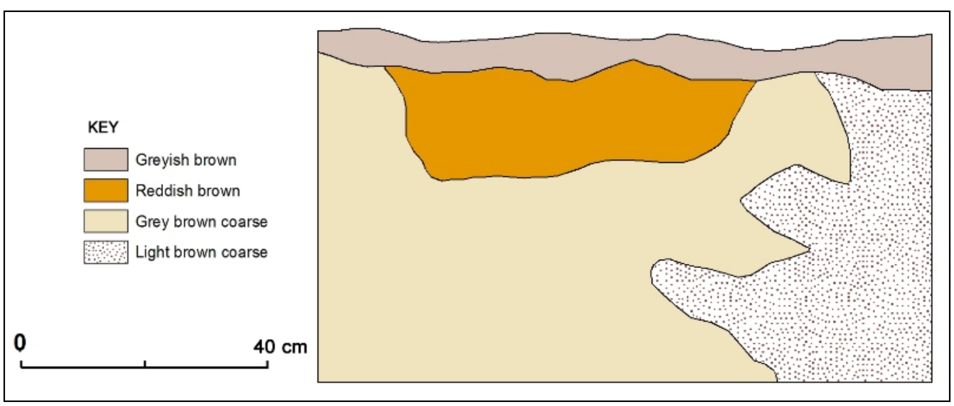


Fig. 5. 10 North section of Test Pit 6

5.3.1.2 The finds

5.3.1.2.1 Stone artefacts

The formal stone tools that were recovered at Manjowe belong to the LSA (Soper 2005). Although ESA and MSA artefacts had been noted on the surface, none were recorded from the excavations. The stone artefacts from the excavation range from cores, retouched bladelets and scrapers. Some of the cores were flaked, probably to produce bladelets. As at Gwenzi, two bifacial worked "handaxes" were also noted (Soper 2005). Most of the tools were produced from quartz, although some were manufactured from dolerite.

5.3.1.2.2 Pottery

A total of 149 sherds were recovered from Manjowe main site. 67 of the sherds have a thickness of less than 6 mm. These sherds are significant because their thickness has led to suggestions that there is Bambata tradition in eastern Zimbabwe. There is however, no strong basis to argue for the presence of Bambata ware because the potsherds lack other diagnostic features of this tradition such as decorations. In terms of decoration, only 3 sherds were decorated, 2 with stabs or punctuates and one with comb stamping. Out of the 149 sherds 12 had graphite burnishing, with no other discernible decoration.

5.3.1.2.3 Faunal remains

The faunal remains show that there is a significant proportion of *bovidae* and *Lepus saxatilis* species in the assemblage (Table 5.4). Some of the dental fragments identified in the assemblage could be of *Bos Taurus* (cattle). There is no trend however, in terms of stratigraphic representation. The skeletal part representation at Manjowe MS shows that there are many lower limb bones especially phalanges and teeth. Over 90% of the bones were charred. It could not be demonstrated if this was a result of roasting or they were charred after discard. In terms of bone surface modification, only two phalange specimens of bov 3 sized animal species had chopmarks. The bulk of the remainder were crushed with a few specimens that had gnaw marks. The human tooth fragment recovered in TP 6 was identified to be that of an adult. Therefore it cannot be associated with the discovered buried child.

Scientific name	**Common name**	**NISP**	**MNI**
Primate cf. Homo sapiens sapiens	Human	1	1
Equus burchelli	Zebra	4	2
Heterohyrax brucei	Hyrax	3	2
Bovidae 3 cf. Bos Taurus	*cf.* Cattle	2	1
Bovidae 1 indet		5	4
Bovidae 2 indet		11	6
Bovidae 3 indet		11	7
Bovidae 3 non domestic		2	2
Sylvicapra grimmia	Common duiker	2	2
Thryonomys swinderianus	Cane rat	1	1
cf. Rattus rattus	Rodent	17	4
Geochelone pardalis	Tortoise	7	3
Lepus saxatilis	Hare	10	4

Table 5. 4 Faunal remains from Manjowe main site

5.3.1.2.4 Other types of material culture

Two glass beads were recovered; one was yellow while the other was blue. There are also pieces of red ochre that were recovered in some of the test pits 1 and 4.

5.3.1.3 Radio Carbon dates from Manjowe Main Site

Table 5.5 below shows the dates that were processed from seven charcoal samples collected from Manjowe Main site. The samples were collected from Test Pit 1 Layer 1, Test Pit 2 Layers 5, 6 and 7, Test Pit 5 Layers 5 and 6, and Test Pit 6 Layer 5. There were no charcoal samples from layers 1-4 and layers below 70 cm in all test pits. An analysis of the dates shows that the 4955 +/-35 BP and 375 +/-30 BP dates in Test Pit 5A show an anomalous relationship between themselves and with other dates in similar layers (on the basis of depth) in the other test pits. The two dates in Test Pit 5A and the other one in Test Pit 6 are products of AMS dating. This shows that the anomaly is not a problem of the different dating techniques. It might be that there was inaccurate recording of the provenance of the charcoal samples as there was no noticeable disturbance of the stratigraphy.

Depth (cm)	**TP 2**	**TP 2A**	**TP 2B**	**TP 5A**	**TP 6**
1-10					
11-20			900 +/- 50 BP		
21-30					
31-40					
41-50		6270 +/- 50 BP		375 +/-30 BP	5590 +/-35 BP
51-60				4955 +/-35 BP	
61-70	6700 +/-80 BP				
71-80					
81-90					
91-100					

Table 5. 5 Radiocarbon dates from Manjowe main site

5.4 Manjowe 1 shelter

Manjowe 1 shelter is at the foot of the same mountain of Manjowe, 100 m south of the Manjowe Main site. The shelter consists of a sloping overhang on an enormous boulder. The shelter has one small panel of unclear antelope on a light stripe of rock. The ground surface in the shelter has an ashy soil deposit. Worked stone artefacts, some of them MSA, were scattered on the surface. Parts of the shelter floor were disturbed by animals. A human skull was found on the surface on the western edge of the shelter.

5.4.1 The stratigraphy

One test pit and one trench were sunk in the centre of the shelter. The cultural layers gradually changed from the ashy fine dust visible on the surface to loose grey loam in layer 2, brown sandy in layer 3, and eventually to light brown in layers 4 and 5. The texture also changed from dusty at the surface to granular in layer 5.

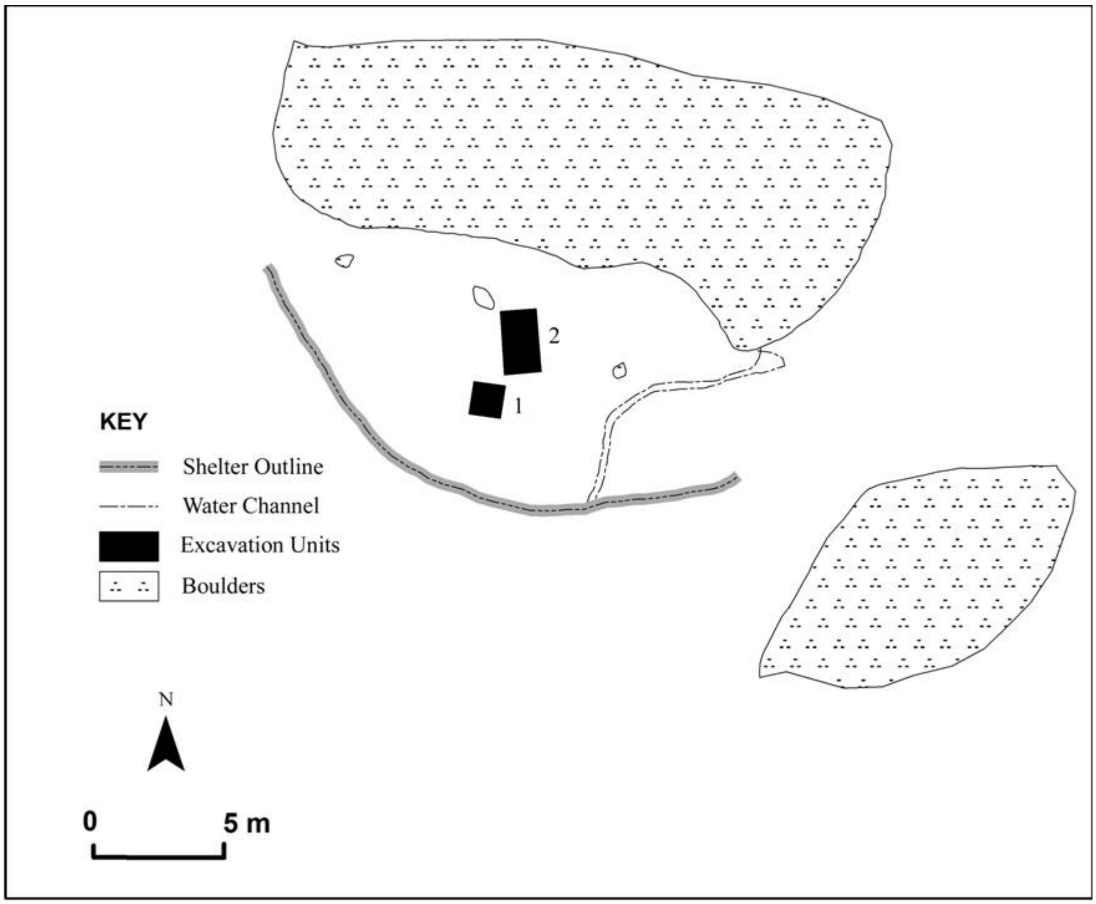


Fig. 5. 11 Manjowe 1 Site Plan

5.4.1.1 Test Pit 1

Test Pit 1 was excavated to a depth of 60 cm. In terms of faunal remains, several fragments of *Lepus saxatilis* were recovered from layers 1, 2 and 6. A primate molar tooth, probably related to the skull that was found on the surface, was recovered in layer 2. *Bovidae* species ranged from *Bov* 1 to *Bov* 3. Fragments of tortoise (*Geochelone pardalis*), zebra (*Equus burchelli*), and rodents (*Rattus sp*) were also recovered. Other finds from this test pit include potsherds that were recovered in the upper levels of the test pit.

5.4.1.2 Trench 2

Three ostrich egg shell beads were recovered from layer 7. Animal bone remains, snail shell fragments, flakes and stone tools were also present. The identified faunal remains include zebra (*Equus burchelli*), hare (*Lagomorpha sp., cf. Lepus saxatilis*), tortoise (*Geochelone pardalis*), thick tailed bush baby (*Otolemur crassicaudatus*), snake (cf. python) vertebrae and rodents (*Rattus sp*). There are also some indeterminate *bovidae* bones.

5.4.2 The finds

5.4.2.1 Stone artefacts

There were 880 stone artefacts that were recovered in this shelter, 30 of which were retouched tools (Soper 2005). Of the retouched artefacts, 12 were small convex scrapers, 5 large convex scrapers, 4 irregular scrapers, 7 backed bladelets, 1 segment and 1 bifacial “axe” (Soper 2005). The rest were chips and chunks from the manufacturing process. There are no definitive trends except that quartz artefacts dominate the assemblage, although there is also a significant percentage of dolerite artefacts. However, it was still small to make meaningful impact on the general LSA dominance on the assemblage.

5.4.2.2 Pottery

Only 5 potsherds were recovered from this shelter. 1 sherd recovered in Trench 1 layer 2 was 10 mm thick with graphite burnishing. The other 4 were between 5 and 6 mm with no decorations. The nature of the pottery remains does not allow for comparison with known pottery traditions in Zimbabwe. Although the thin sherds can be related to Bambata, but thinness by itself has been considered not a significant variable (Huffman 2005). In addition, the sample is too small a quantity to be compared or contrasted with other ceramic traditions.

5.4.2.3 Faunal remains

The MNI counts of from the faunal remains from Manjowe 1 shelter (Table 5.6) show a significant proportion of *bov* 1 and 2 sized species in the assemblage, followed by the hare (*Lepus saxatilis*) and tortoise (*Geochelone pardalis*). In common with the other shelters, most of the remains were charred. Most of the *bov* 3 sized skeletal specimens were recovered 50 cm below surface. Other species show no clear distribution trends in the stratigraphy. Compared to Gwenzi and Manjowe main site, there is a significant range of animal species represented in this shelter despite the fact that only two units were excavated. In addition, the yield of faunal remains goes deeper that most of the excavated units at Gwenzi and Manjowe main site. It could not be established if the human tooth identified was from the individual whose skull was found lying on the surface in the shelter. The presence of the *Otolemur crassicaudatus* (thick tailed bush baby) might be of interest as it shows either the exploitation of the rainforests of Tsetsera mountains or that the vegetation around the Manjowe shelters was densely forested at the time. The *Otolemur crassicaudatus* is a species which is generally found in central eastern Zimbabwe in forests or plantations (Kenmuir and Williams 1975).

Scientific name	Common name	NISP	MNI
Primate cf. Homo sapiens sapiens	Human	1	1
Otolemur crassicaudatus	Thick tailed bushbaby	1	1
Equus burchelli	Zebra	5	4
Bovidae 1 indet		9	6
Bovidae 2 indet		8	7
Bovidae 2 non domestic		2	1
Bovidae 3 indet		6	4
cf. Rattus rattus	Rodent	13	4
Lepus saxatilis	Hare	8	5
Aves	Bird (large) chicken size	2	2
Geochelone pardalis	Tortoise	11	5
Reptile cf. snake	cf. Snake	4	2

Table 5. 6 Faunal remains from Manjowe 1 site

5.4.2.4 Radio carbon dates from Manjowe 1 shelter

Only three charcoal samples were collected for radiocarbon dating (Table 5. 7). The dates from Trench 2 have an anomalous sequence. It is most probable that the stratigraphy in the centre of the shelter could have been disturbed. It was observed prior to excavation that some parts of the shelter were disturbed although care was taken to ensure that the test pit and the trench were sunk at portions that indicated no disturbance. Since only one charcoal sample was collected from TP1, it is not possible to tell if this 6950 +/- BP date (GrA-26837) is accurate or not too. However, with reference to depth below surface, the date is in general sequential agreement with the dates from Manjowe Main site (Pta-9308 and Pta-9307) and the other one from Gwenzi (GrA26884). At Manjowe main site, the AMS dates were younger than those obtained using the conventional method. At Manjowe 1, the AMS is older than the ones from the conventional means. As suggested for Manjowe main site, the problem does not lie with the dating techniques, but either the recording of the provenience of the charcoal samples or that the stratigraphy was disturbed in such a way that it was not possible to detect it.

Depth below surface (cm)	TP 1	Trench 2
1-10		
11-20		
21-30		
31-40		
41-50		5100 +/- 60 BP
51-60		
61-70	6950 +/- 40 BP	4210 +/- 110 BP
71-80		

Table 5. 7 *Radio Carbon dates from Manjowe 1 shelter*

5.5. Murahwa's Hill site

Murahwa's hill is a granite kopje that is located about 3 km North West of the city of Mutare. At present the hill is under the custodianship of the National Trust because it is a nature conservancy specialising in bird watching. The site however is historically important because it has archaeological remains of both the Stone Age and farming communities. This material is found from the top of the hill down to the foot slopes. Murahwa's hill site was initially excavated in the 1960s (Bernhard 1968), the excavation focussing on the farming community remains that were discovered at the southern foot slopes. The excavation in August 2004 by the Archaeology Unit of the University of Zimbabwe focussed on the same site to enable detailed investigation of the culture history of the site, especially in the context of Farming Communities. Although there are rock paintings and some stone tools at one of the shelters at the site, the excavated part of the site was essentially an EFC settlement. This site was excavated to recover material culture, particularly ceramics, which could be used to reconstruct the cultural sequence of Farming Communities for this part of the eastern highlands.

The excavation in August 2004 was conducted mainly in the context of the overall ALM archaeology project, but was also relevant for this research. By that time the archaeological surveys in the area south of Mutare city had not yielded Farming Communities sites suitable for excavations. Murahwa's Hill was therefore seen as the nearest suitable site to excavate to investigate the prehistoric farming communities of this area. The excavation was directed by Mupira and the analysis of the recovered material was conducted by Musindo, Mupira and Shenjere (Musindo 2005; Shenjere 2006 and Mupira 2007) for the ALM project. Together with Bernhard's report of the 1960s excavations at the site which is also available from the National Museums and Monuments of Zimbabwe, I found these excavations useful in the discussion of the culture sequence of the farming communities and in comparing with the evidence from the surveys conducted further south. Since the results of the recent excavations have been published elsewhere (Mupira 2007), I therefore present only a summary of the evidence.

5.5.1 Pottery

The recent excavations recovered less pottery when compared with what Bernhard recovered at the same site in the 1960s. Of the 416 rim sherds recovered in 2004 only 149 could be identified to vessel type (Musindo 2005). The analysis of the sherds by Musindo (2005) examined various aspects of vessel attributes such as profile, decoration techniques and motifs, decoration placement and metric attributes. From that analysis it was observed that the assemblage had 217 sherds that were decorated, with styles consisting mainly of composite bands of incisions, comp stamping and band and panel motifs.

Trench 1 showed the clearest stratigraphic trends indicating at least two cultural components where necked pots with thickened rims and oblique comb stamping at the lower levels gave way to band and panel necked pots with simple lips and constricted bowls in the middle and upper levels (Musindo 2005). Trench 4 had a higher prevalence of cross hatched triangular motifs in the top levels. Other trenches were fairly homogeneous, with pottery that is dominated by composite band and panel motifs.

5.5.1.1 Ziwa pottery

Further examination of the ceramics from Murahwa's Hill by Mupira (2007) confirmed Musindo's (2005) earlier observation that at least three pottery traditions can be identified at the site. The lower layers in Trench 1 produced pottery with core attributes of EFC ceramics of the Ziwa culture (Fig. 5. 12 and Plate 5.6). Most of the sherds are very fragmented but core features such as thickened rims with comb stamping (horizontal, vertical or oblique) or a combination of comb stamping and incised lines are evident. In all, 20 comb stamped sherds were recovered in Trench 1.

Although Ziwa pottery is the earliest at Murahwa's hill and possibly in the whole of the eastern highlands of Zimbabwe, there are some sherds that have Bambata affinities, especially in terms of vessel thickness. As I have presented above, similar thin sherds of less than 6 mm, probably representing the Bambata tradition, were recovered from the rock shelters of Gwenzi and Manjowe. There is need for further research on this aspect, as it may change the current opinion regarding the distribution of Bambata ware in southern Africa.

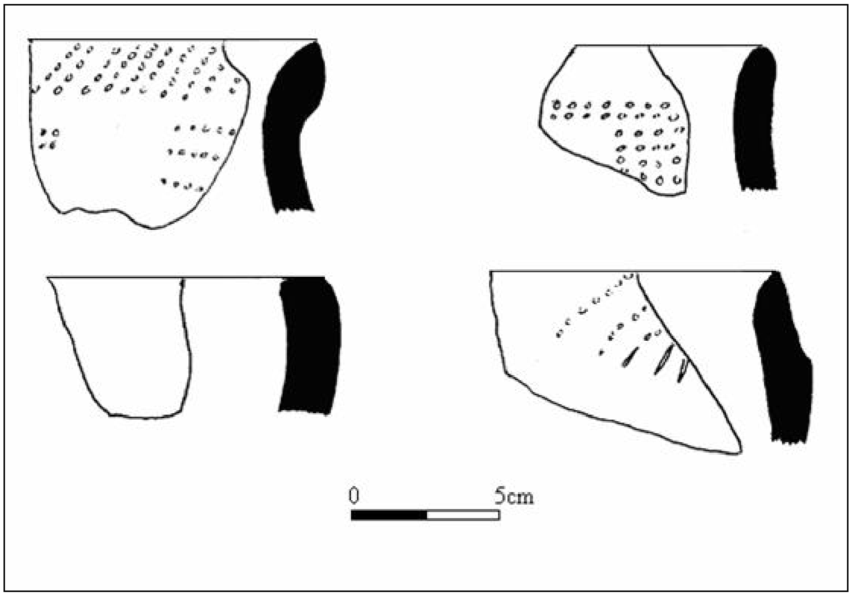


Fig. 5. 12 Ziwa pottery from Trench 1 (After Musindo 2005)

Plate 5. 6 Ziwa pottery recovered by Bernhard in the 1960s

5.5.1.2 Khami pottery

The other distinct pottery tradition at Murahwa's Hill is that of the Khami phase of the Zimbabwe tradition (Plate 5. 7). The pottery is found above the Ziwa tradition in Trench 1 with the interface level between them (layer 5) having very few finds. The layer is also compact, suggesting a long time lag between the two traditions. Bernhard (1968) observed similar interfaces in excavations in Trench H layer 3 and Trench S layer 3. Both Musindo (2005) and Mupira (2007) seem to agree that this suggests that there was no contact between the EFC and LFC communities as the two occupation phases appear to be separated by a sterile layer. This raises questions regarding the fate of the EFC in the area.

Khami pottery consists mainly of spherical, constricted and tall necked pots with polychrome decoration generally described as band and panel. The extensive use of graphite burnishing is another characteristic feature of Khami ware (Chirikure *et al.* 2002).

Plate 5. 7 *Khami pottery from Bernhard's excavations*

5.5.1.3 Umtali Cordoned Ware (UCW)

In 1968 Bernhard reported the existence of another type of pottery that he described as related to the Khami phase. This pottery, which he named the Umtali Cordoned Ware (UCW) and the Ribbed Ware, was not well represented in the recent excavations; only one sherd similar to UCW and three of the Ribbed type were recovered (Mupira 2007). The UCW was described as consisting of a thin bodied well fired and grit free pottery with cordons that were moulded on the wet pot and decorated with either herringbone knife incisions or stylus points (Bernhard

1968). The Ribbed ware was described as rough and thick bodied with a coarse gritty temper. It cannot be said with certainty that this ware is associated with Khami, although there are reports that such pottery was found in phase 4 at Great Zimbabwe (Pikirayi 1993). It appears this was Bernhard's basis for relating it to the Khami phase. Plate 5.8 shows the sherds that Bernhard named UCW and Ribbed ware.

Plate 5. 8 Cordoned and ribbed ware recovered from Murahwa's Hill in the 1960s

5.5.1.4 Murahwa/Refuge period pottery

The fourth group of ceramics consists largely of undecorated, poorly fired sherds similar to modern Manyika pottery and some which have, in the past, been attributed to the Refuge period. The few decorated samples consist of stab and drag and cross-hatching motifs and a large number of black undecorated vessels. At Murahwa's hill these ceramics have been associated with the Manyika occupation of the 19th century (Bernhard 1968). This association is corroborated by oral traditions that confirm the occupation of the site during historical times by the Murahwa people, who are regarded as Manyika (Beach 1980; Bernhard 1968). According to Mupira (2007) there appears to have been contact between the Murahwa people and the makers of the band and panel ware as there is no stratigraphic evidence separating the two groups. Material remains of the two occupations were mixed in the top two layers in Trenches 4 and 5, but generally Murahwa pottery is found on the surface.

5.5.2 Beads

Murahwa's hill produced a variety of beads which include glass, shell, copper and brass beads. Mupira reports that 686 glass beads were retrieved and the dominant colours included royal blue/dark blue and Indian red, light blue and white. The beads are generally the small (2-4 mm) and medium sized (4-6 mm) cylinders and oblates (Mupira 2007). However, no glass beads were recovered in the contexts where Ziwa material was recovered. The glass beads associated with the Khami type or band and panel pottery are generally identical to trade beads of the 16th and 17th centuries found at some Zimbabwe tradition sites.

Some shell beads from land snail (*Achatina*) and ostrich egg shell were also recovered at the site. Some cowrie shells (*Cypraeidae*) were recovered in association with the band and panel ware in Bernhard's excavations (Bernhard 1968). Cowrie shells are generally thought to have been used as a form of currency in prehistoric trade systems, but they were also used for personal adornment (Bvocho 2005). Other beads were of copper, recovered from the Khami phase levels at the site. For a fuller description of the beads and other finds from Murahwa's Hill the reader is referred to Mupira (2007).

The importance of the beads is in their potential to enlighten us on the foreign trade between the Khami phase people and other later communities at the site, and the Indian Ocean coast. A brass bead that was recovered from Test Pit 2 layer 2 in the recent excavations and a brass bangle recovered in the earlier excavations by Bernhard indicates the existence of such trade since brass manufacturing is not known in the prehistory of Zimbabwe (Thondhlana 2005).

5.5.3 Faunal remains

The faunal analysis by Shenjere (2006) shows the presence of a variety of animals. Table 5.8 below is a summary of the animal species identified at Murahwa's Hill. Domestic cattle (*Bos Taurus*) are the most abundant, although there is also a significant representation of indeterminate bovids (Table 5. 8 and Fig. 5.13). Apart from remains of *Sylvicapra grimmia* and fish, no other animal bones were found in the levels that had Ziwa material. Although all age groups are represented, it appears that the majority of the cattle represented are mature animals, suggesting a management practice designed to allow the herd to grow. The suggestion of the probable presence of dwarf cattle at Murahwa's hill is interesting as it makes the research area part of a whole cultural landscape from the Nyanga highlands where similar evidence has been found (Shenjere 2006, Soper 2002, 2006). However, this possibility remains tentative due to the absence of other diagnostic skeletal parts.

Species name	Common name	NISP	MNI
Achatina	Land mollusc	16	11
Asphatharia	Fresh water muzzel		
Aepyceros melampus	Impala	1	1
Aves (small and medium)	Birds	21	9
Bos taurus	Cattle	135	26
Bov 1 indet.		14	7
Bov 2 domestic		2	2
Bov 2 indet.		24	13
Bov 3 domestic		1	1
Bov 3 indet.		155	33
Bov 4 indet		1	1
Canis sp. (C. adustus or C. mesomelas)	Jackal	2	2
Capra hircus	Goat	1	1
Carnivore	?	4	2
cf. Bos taurus	cf. Cattle?	11	8
cf. Capra hircus	cf. Goat?	5	4
cf. Lepus saxatilis	cf. Hare?	1	1
cf. Ovis aries	cf. Sheep?	2	2
cf. Potamochoerus porcus	cf. Bush pig?	1	1
cf. Sylvicapra grimmia	cf. Common duiker?	3	3
Cf. Tragelaphus strepsiceros	cf. Kudu?	1	1
Cypraeidae	Cowrie shells	2	2
Felis caracal	African Linx	1	1
Osteinchthyes	Fish	1	1
Gennetta	Genet	1	1
Lagormoph sp.	Hare	2	2
Lepus saxatilis	Hare	7	6
Ovis aries	Sheep	8	6
Ovis/Capra	Sheep/Goat	1	1
Potamochoerus porcus	Bush pig	3	3
Procavia capensis	Dassie	11	9
Redunca arundinum	Reedbuck	6	4
Reptile	Snake?	2	2
Rodent (large)	Cane rat	4	4
Rodent (medium)	Rat	23	8
Rodent (small)	Rat	19	6
Struthio camelus	Ostrich	1	1
Suid cf. Potamochoerus porcus	Bush pig	1	1
Sylvicapra grimmia	Common duiker	40	16
Taurotragus oryx	Eland	2	1
Thryonomys swinderanus	Greater cane rat	4	2
Tragelaphus strepsiceros	Kudu	2	2
Viverridae	Lizards	10	5

Table 5. 8 Faunal species represented at Murahwa's Hill (After Shenjere 2006).

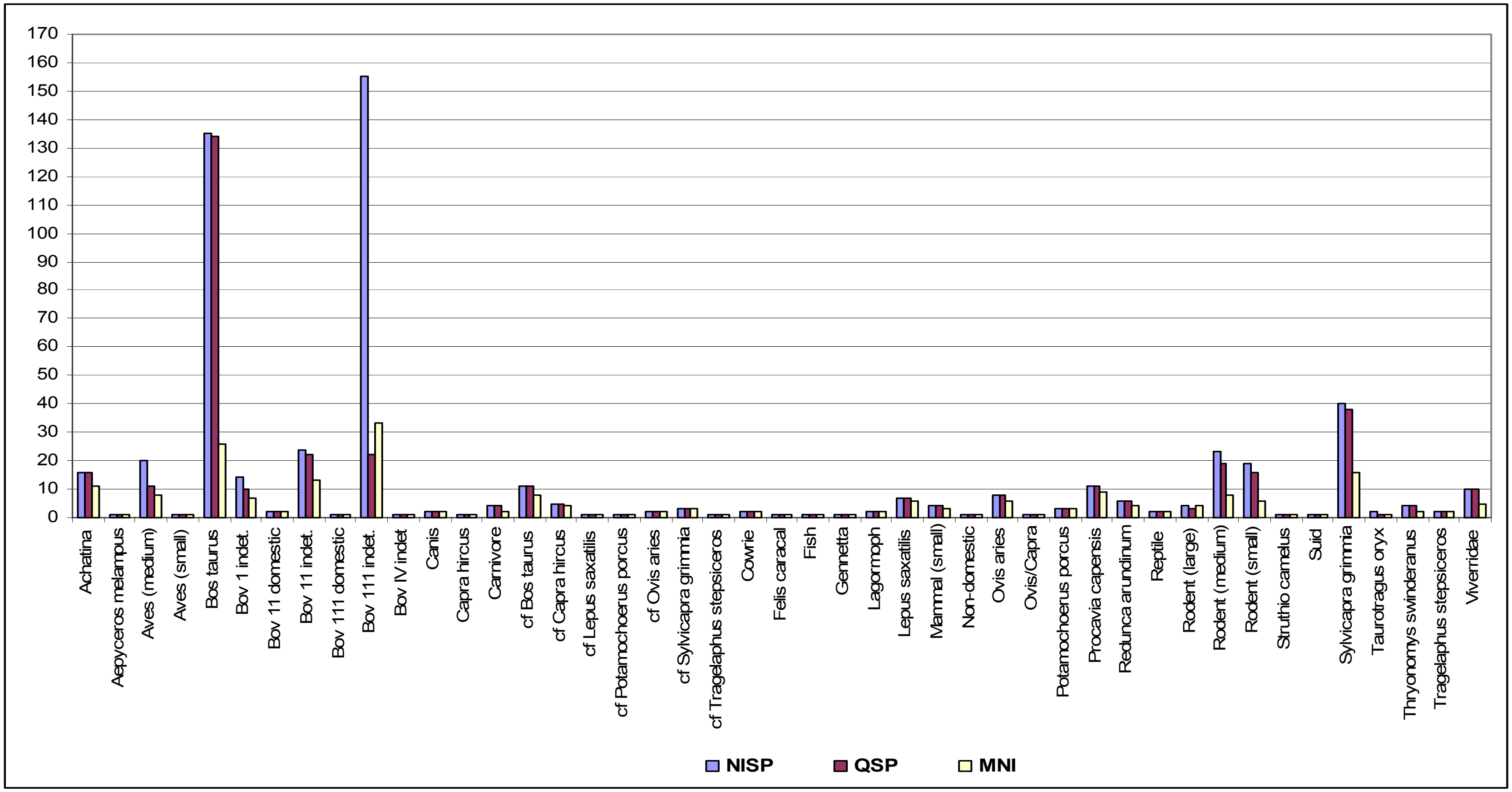


Fig. 5. 13 Species representation at Murahwa's Hill

As Table 5. 8 and Fig. 5.13 show, the assemblage has a wide range of wild animal species including some that are not commonly eaten such as the civets/genets (*Viverridae/genetta sp),* lizards (*Varanus*) and bushbaby (*Otolemur crassicaudatus*) species. There is evidence of bone working in the form of carved concentric grooves on some metapodial bones. A cache of 34 worked and unworked metapodial bones was discovered in two pits at the basal levels of Trench 1. The bones have been identified as those of common duiker (*Sylvicapra grimmia*) (Shenjere 2006 *pers. comm*.). The cache shows deliberate preparation of the bones, probably connected to ritual activities.

5.5.4 Other finds

Figurines have been recovered in numerous EFC sites in Zimbabwe. In eastern Zimbabwe, the most notable are the 136 figurines recovered at Mutare Altar site (Matenga 1993). Murahwa's hill is only 5 km from Mutare Altar site but only a single clay figurine with a V-shaped groove on one end was recovered from layer 4 of Trench 3 at the former site. Other notable finds include spear and arrow heads, wound copper and iron wire fragments and a flat rectangular iron copper bar 15 cm long and 3 cm wide.

5.6 A reappraisal of the culture sequence of eastern Zimbabwe

5.6.1 The Stone Age

The overall analysis of the lithic material shows that quartz was the dominant raw material for the manufacture of tools, representing 96% of the artefacts at Gwenzi and 91% at Manjowe and 81% at Manjowe 1. More non-quartz artefacts, especially of dolerite, occur at Manjowe 1. Although surface evidence from the shelters showed the presence of MSA tools, the stone artefacts recovered from the excavations are mainly LSA material (Figs 5.14, 5.15 and 5.16). A few large pieces of dolerite flakes and partially flaked pieces which Soper (2005) termed hand "axes" (for lack of a better term to describe them) (Fig. 5.16 (8 & 11)) were recovered at both Gwenzi and the Manjowe shelters but are not adequate enough to be characterized as MSA or ESA.

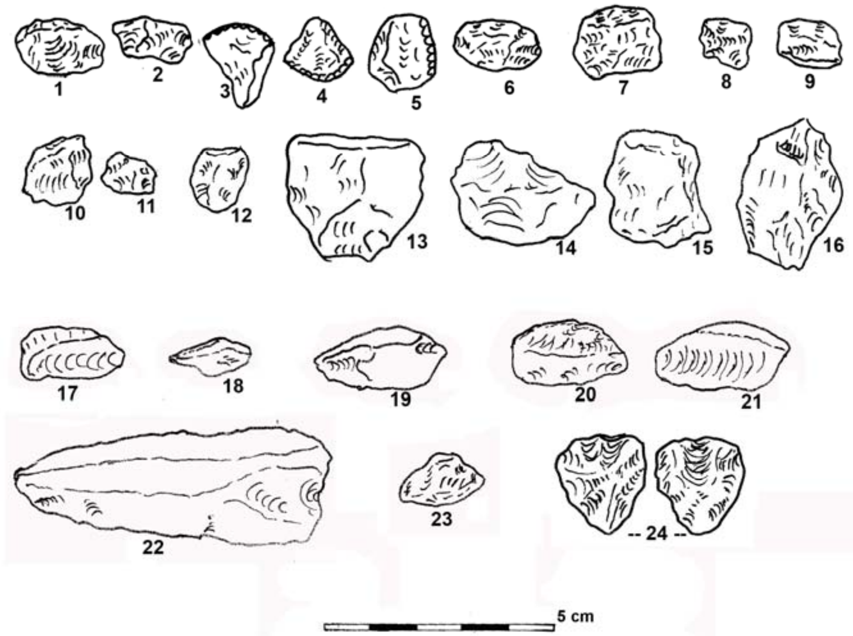


Fig. 5. 14. Stone artefacts recovered from Gwenzi

1-12 small convex scrapers, 13-15 large convex scrapers, 16 core artefact, 17-21 bladelets, 22 blade, 23 segment, 24 bifacial point

The assemblages are dominated by small convex scrapers which form 63% of retouched artefacts at Gwenzi, 47% at Manjowe and 40% at Manjowe 1. Of significance also are bladelets which form 14% of flakes at Gwenzi, 17% at Manjowe and 26% at Manjowe 1. Although only a few backed bladelets are illustrated, they account for 15% of retouched tools, 6% at Manjowe and 3% at Manjowe 1 (Soper 2005). There is a large quantity of flakes and chunks recovered from the rock shelters which seems to suggest that these localities were also used as manufacturing sites in addition to being settlement sites. Soper (2005) thinks that the excavated assemblages represent the *Pfupi* tradition that is known in eastern Zimbabwe. In particular, the Zimunya assemblage is comparable to the material from Mutemwa where scrapers are more numerous than backed pieces.

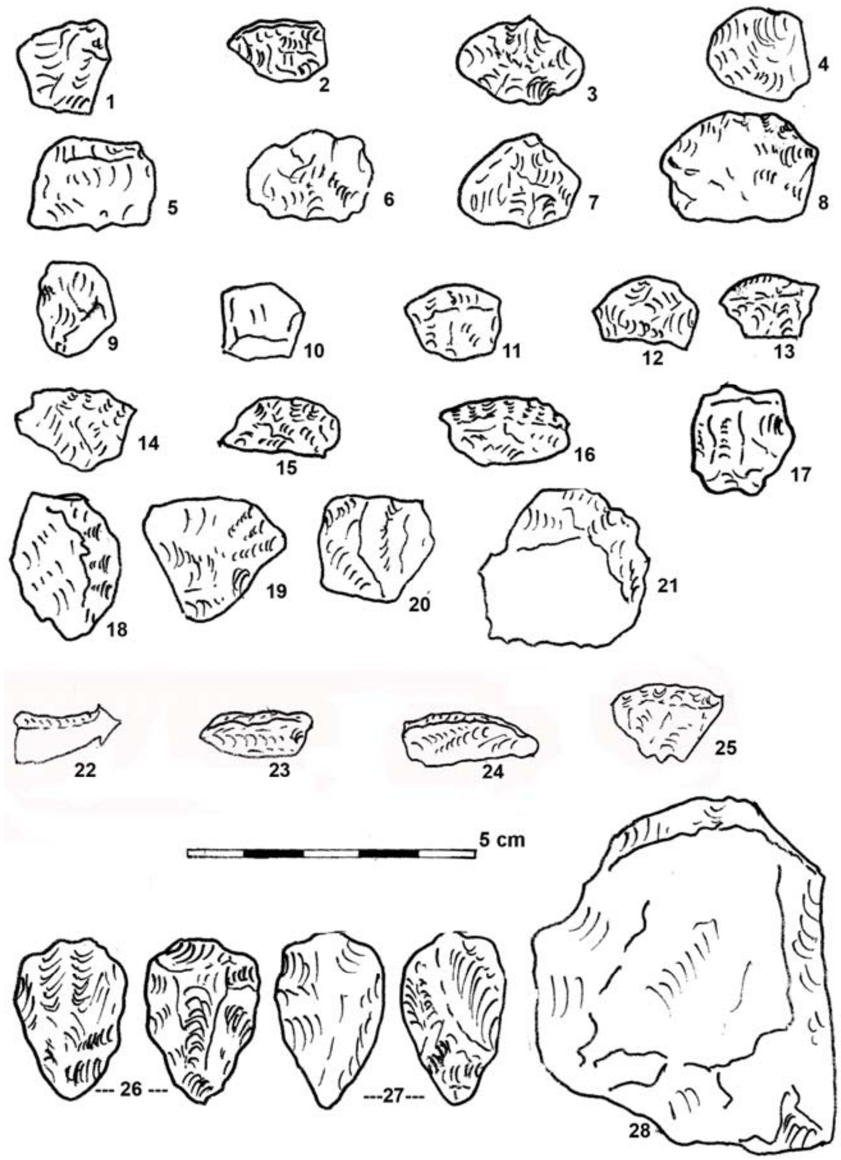


Fig. 5. 15 Stone artefacts from Manjowe shelters

1-7 and 9-20 - small convex scrapers, 21 - large convex scraper, 22-24 - bladelets, 25 - segment, 26-27 - bifacial points, 28 – core scraper

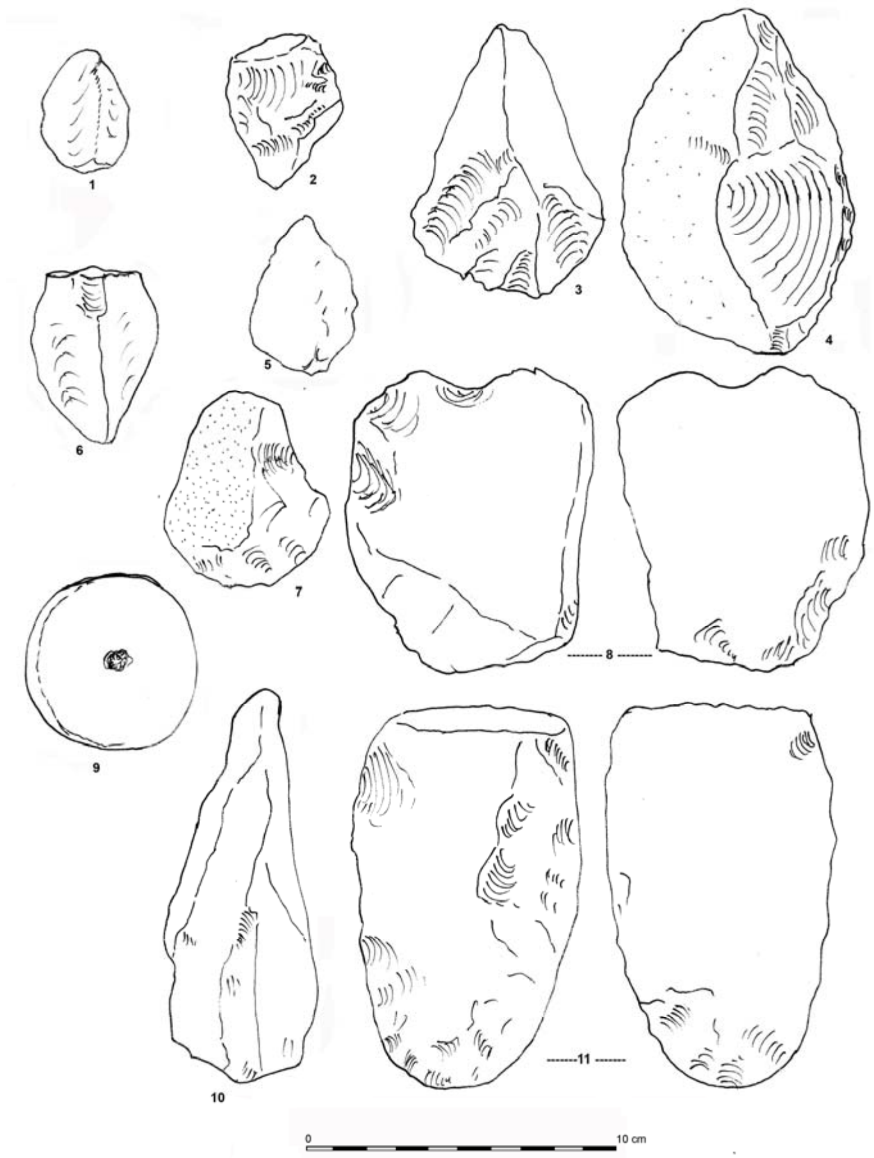


Fig. 5. 16. *Miscellaneous dolerite artefacts from Gwenzi and Manjowe shelters*

1-large flake from Gwenzi, 2-7 and 10 - flakes from Manjowe, 8 and 11 - "hand axes" from Manjowe, 9 - Rubber? with flat sides and notched at the centre

The general characteristics of the lithic material do not differ much from what has been recovered in other shelters in eastern Zimbabwe, such as Gosho and Nyazongo (Burrett 2005, Martin 1938), except for the few dolerite bifacial hand "axes" which have not been reported elsewhere in this part of the country (Soper 2005). Although there is no clear pattern in the stone artefacts at Manjowe, at Gwenzi the quantity of backed bladelets decreases while small convex scrapers increase with depth. In addition, there is a significant proportion of large convex scrapers at Manjowe main site and Manjowe 1 than there are at Gwenzi.

5.6.2 Farming Communities

The evidence for farming communities in central eastern Manyikaland dates back to the EFC Ziwa culture at Murahwa (Bernhard 1964, 1968). There is also evidence of the presence of people of the Zimbabwe and Khami culture at Altar and Murahwa sites respectively, the only farming community sites excavated in southern Manyikaland prior to the year 2000. The ceramics from Murahwa give a clear occupation chronology for the central eastern highlands.

Out of the 315 sherds collected from the rock shelters, only four sherds are decorated, the rest are not diagnostic (Soper 2005). Although three of the four decorated sherds (Fig. 17) have affinities with EFC ceramics, it is difficult to relate them to any tradition with certainty. The analysis of sherd thickness of these ceramics shows that the bulk of the sherds have thickness that ranges between 5 and 8 mm (Fig. 5.18). The evidence of the Ziwa tradition at Murahwa's Hill appears to be on its southern limits as there is clear evidence of its existence further south of the site. The few isolated finds of the culture simply offer the possibility of EFC communities in the research area but it is not adequately represented.

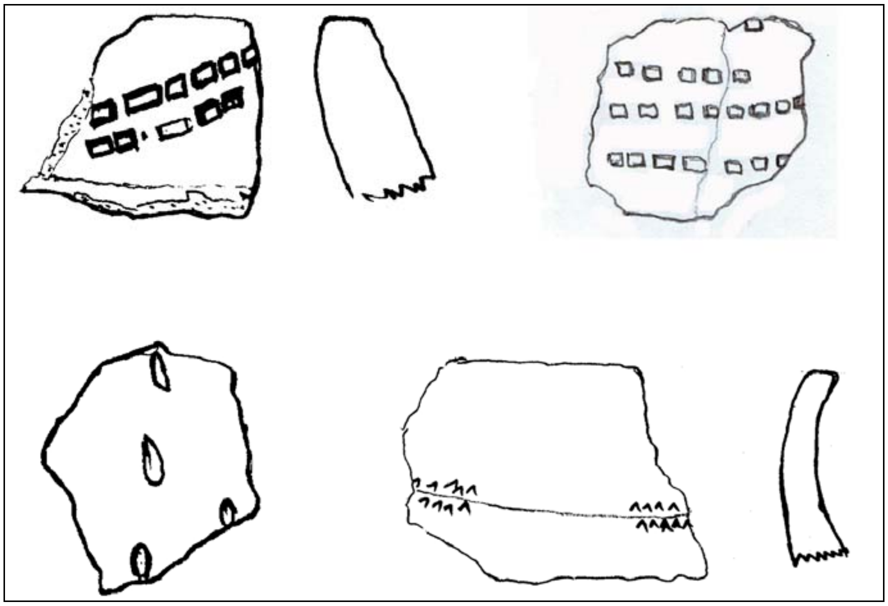


Fig. 5. 17 Potsherds recovered from Gwenzi and Manjowe main site

Top left – Comb-stamped sherd from Gwenzi, the remaining three are from Manjowe

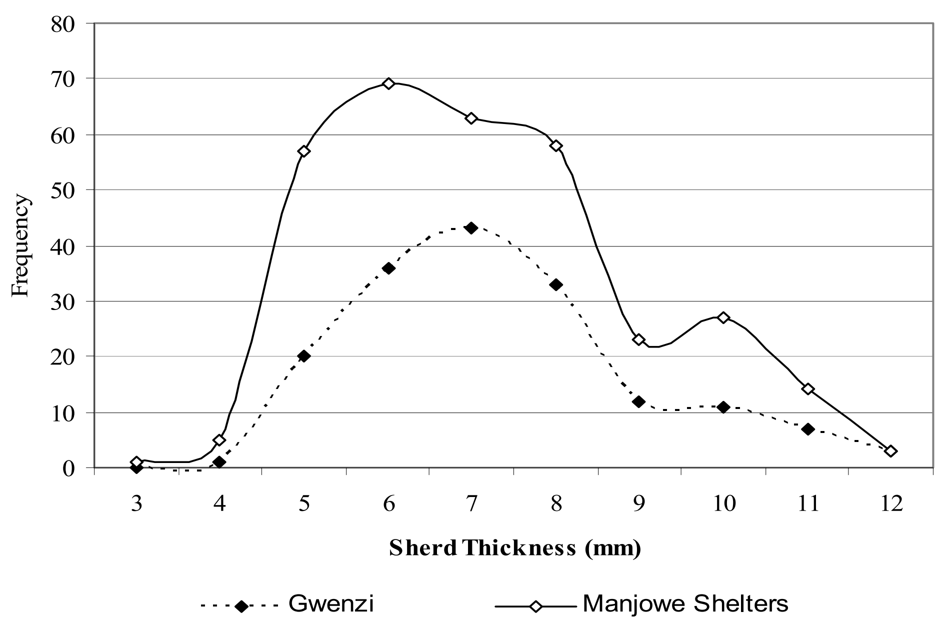


Fig. 5. 18 Comparison of sherd thickness between Gwenzi shelter and the Manjowe shelters

The dating of the EFC raises a number of questions. For example, given the co-occurrence of pottery and stone tools in the shelters at Gwenzi and Manjowe, it is possible that there was coexistence of Stone Age communities and farming communities. Such an hypothesis has been proposed for ceramics belonging to the Bambata assemblage (Huffman 2005). However, the difference with the Zimunya assemblages from the excavated rock shelters is that the layers with these ceramics have dates ranging from the 12th to 14th centuries. A similar trend was observed in Malilangwe further south of Zimunya, where there is a late survival of hunter gatherers into the second millennium AD (Thorp 2005). It is on the basis of these dates and the absence of other characteristic features, such as elaborate decorations, that these ceramics cannot be entirely classified as Bambata ware. It is surprising however, that given this late indication of the hunter gatherers, there are no oral accounts of them having been seen in eastern Zimbabwe. This has generated concerns on whether the farming communities could have manufactured the stone artefacts. In terms of proportions, there are more stone artefacts than there are potsherds in the contexts in which these are associated. This disqualifies the farming communities as manufacturers of the stone artefacts.

Away from the rock shelters, ceramic material from Murahwa's Hill presents a fairly clear sequence for the site. Apart from the possibility of the presence of Bambata ceramics in the lower levels in the stratigraphy, the sequence is clear thereafter. A charcoal sample collected at 92 cm below surface in Trench 1 and in a level in which material of the Ziwa culture was recovered was dated to 1180 +/-45 BP. The date is within the same time range as others from such sites as the Place of Offering at Ziwa and Cave of Offerings at Nyahokwe in the north eastern highlands of Zimbabwe (Summers 1958; Bernhard 1964). The end of the Ziwa culture could not be documented because of the absence of charcoal samples in some of the levels.

This shortcoming makes it difficult to evaluate the reliability of the EFC sherds recovered from Gwenzi and Manjowe rock shelters.

For the later farming communities, the earliest date is around 505 +/-35 BP, associated with the Khami phase at the site and at the type site in western Zimbabwe. This date is closely related to the 465 +/-35 BP date obtained in Trench 4 layer 4. These early dates for Khami type pottery in eastern Zimbabwe have far reaching implications for the previous interpretations which have associated the band and panel ceramics at Murahwa's hill with the Rozvi of the Changamire empire. The Rozvi belong to a much later date than the dates obtained at Murahwa's hill. Historical sources place the origins of the Rozvi dynasty in the late seventeenth century (Beach 1980; Pikirayi 2001b) and therefore cannot be associated with the pottery at Murahwa's hill.

The sequence is followed by the Murahwa/Manyika pottery which can be described as mainly undecorated and belonging to the Refuge period. However, where there are decorations they are mainly stab-and-drag and cross hatches. This material is thought to be associated with the Manyika people of the Murahwa family who can be traced into the historical period. The Khami phase and Murahwa material culture are mixed in some of the trenches, suggesting no hiatus of the two cultures. This raises questions concerning the succession of Khami and Murahwa people at the site. The analysed ceramics are not clear if the contexts with both cultures imply a gradual transition of ceramic manufacturing and decoration techniques from Khami to Murahwa that can be associated with the coming in of a new group of people. If the change cannot be associated with the coming in the area of a group of different people, then it would be imply that the change was a result of the strife that was associated with the arrival of the Portuguese or with the Refuge period.

5.7 Conclusion

The excavations generally confirmed the sequence that had been established from survey data except the absence of MSA material in the excavated contexts. Survey data revealed the presence of this material on the surface in and around some rock shelters. The occurrence of LSA Pfupi material is in line with what is known in eastern Zimbabwe. Only the presence of the bifacial hand “axes” at Gwenzi and Manjowe seem to be uncharacteristic of this tradition.

For the farming communities the traditions identified from the excavated contexts do not contradict what had been recorded during the surveys except on one aspect. There is no doubt about the presence of the Zimbabwe tradition and the 19th century Manyika pottery in the excavations and the surveys. However, it is not clear whether Murahwa/Manyika pottery should be regarded as representing the Nyanga culture which is known in the research area by the presence of pit structures in the Vumba mountains. The ceramic sequence at Murahwa does not show if it is the Khami phase which lasted longer or that the Manyika have been occupying the hill since the 15th/16th century.

A general review of the literature makes the Nyanga tradition appear to be the culture of a specific geographic area with a broad range of ceramic styles within it. Ceramically, there are a series of changing styles in the Nyanga tradition itself (Soper 2006; Manyanga 1995). There is nothing that can be clearly stated as distinguishing ceramics for the Nyanga culture. Thus the Nyanga culture seems to represent an extensive cultural complex with a unique stone building tradition of pit structures and terraces with a significant time depth beginning in the 15th /16th century (Soper 2002). On the basis of Soper’s (2002) ceramic illustrations, the cordoned and ribbed ware fits within the Nyanga tradition, although there are no associated terraces at the site. The identity of the Nyanga culture is important because it may facilitate the seriation of the pit structures in Vumba on the light of the ceramics from Murahwa's hill and around the research area.

The final settlement phase at Murahwa's hill is attributed to the Murahwa people of Manyika. These people are not known for any terracing. The late 19th century Chief Mutasa claimed that terracing was known north of his territory (Leversen 1893). From that perspective we can assume that the Murahwa people did not practice agricultural terracing. We are then left with questions regarding the identity of the builders of the pit structures in the Vumba mountains.

CHAPTER 6

Settlement pattern analysis in Zimunya

"The physical environment certainly accounts for a proportion of the variance in location;-the nature of landform, water availability, soils, plant and animal communities, the availability of natural resources. Another proportion is accounted for by features of the social environment- the distribution of other settlements, road networks, ceremonial and economic centres, and the like. The remaining variance is unaccounted for or unexplained and derives from idiosyncrasies that characterize so much of human behavior" (Kvamme 1997, pp.3-4).

6.1 Introduction

This chapter is a discussion of the dynamic relationship between archaeological cultures and the natural environment in which they are located. I investigate settlement patterning for each cultural period represented in the archaeological record and assess any changes in the distributions when one period is compared with the next. The archaeological evidence comes from the survey data and the excavations. Although the focus is on the settlement site, I also use the other archaeological occurrences to demonstrate the use of the landscape. The reliability of using current environmental parameters as a starting point in investigating prehistoric developments in the research area is assessed. The idea is based on the need to observe any consistencies, deviations or anomalous relationships between the archaeological sites and the environment.

6.2 Analytical techniques

The most important unit of analysis being dealt with in the research is a "point" of archaeological interest, that is, the site. Thus most of the analytical techniques would use approaches or methods applicable to the analysis of archaeological sites as "points" on the landscape. The properties of the sites are later quantified to characterize aggregates or clusters of sites. These analytical techniques include measuring the strength of the association between the sites and their physical surroundings, so as to enable confirmation or rejection of the presence or absence of spatial patterning. The techniques would also help in defining the nature of the spatial patterns where they exist.

Using the ArcGIS Arcview 9.1 software and elevation data for Zimunya, I modelled the landscape in 3 dimensions to create a perspective of the area. The significance of this process was to help situate the settlement sites in their proper topographic context. Three dimensional views (3Ds) "take the viewer back on to the landscape", making it easier to interpret some spatial phenomena that relate to the topographic morphology of the landscape. As Aldenderfer (1996) points out, there are instances when visual assessment of phenomena is more informative than other approaches. 3Ds are therefore good to think with as they vividly show highlights in the spatial data. However, this does not imply doing away with other non-visual analytical techniques such as statistical approaches of gaining confidence in the observed patterns. Despite the criticisms levelled against the use of statistical approaches (Thomas 1978; also see Chapter 2), they still remain useful in archaeology, and do well when integrated with GIS software (Anselin and Getis 1992; Lloyd and Atkinson 2004).

For the Zimunya data, I grouped the spatial analytical techniques into overlays, cross tabulations, distance measures and surface analyses. Some statistical techniques were applied but the results are less reliable because the data proved not sufficiently suited for those techniques. Further processing required crossing over from ArcGIS software to other analytical programs, such as the WinIDAMS and Excel programs. These techniques make the description of data relatively complete, and consequently allow several questions to be asked of the data.

6.2.1 Overlays

Overlays form the foundation for many higher level analyses in spatial studies. By overlaying different data sets such as point data (e.g. archaeological sites or artefacts) over polygonal (e.g. soil types) or linear features (e.g. rivers) it might be possible to see some tendency in the data sets. One may observe, for example, agglomerations of sites related to some phenomena in the underlying dataset. Further manipulations such as intersecting, merging, clipping or extracting attributes from one layer to another can be done through the analysis tools in the Spatial Analyst modules of the GIS software. The range of possible manipulations depends on the data structures (vector or raster), the software capabilities and the analyses intended. The analyses can result in visual maps, graphs or numerical figures that are derived from logical data combinations. Attribute values from two or more data layers can be combined to produce new data classifications on the basis of defined criteria.

The possibility of extracting attributes from one layer and assigning them to another makes it possible to update the attributes of the layers. In the case of Zimunya I needed to update the attributes of the archaeological sites with environmental data so as to be able to work with the environmental data as attributes of the archaeological sites. The tabular data was then analysed statistically to check for the significance of some of the visible patterns. Statistical analyses also enable the investigation of both visible and non-visible relationships. It has been argued that sometimes the eyes see patterns where none exist (Hodder and Orton 1976; Wheatley and Gillings 2002), hence the application of statistical techniques to confirm or reject some of the visual patterns.

6.2.2 Distance analyses

One of the most important variables in spatial relationships is distance. Since archaeological sites are inherently spatial (Lloyd and Atkinson 2004), it means their location or position can be determined. Consequently the distance between sites in the same layer or in different layers can be computed. The proximity of archaeological sites to other sites or features can be meaningful because this could imply underlying control or influence in the utilisation of space and resources. Thus distance is important in measuring spatial cohesion of the sites as a result of environmental, social, economic or political considerations. Settlements can be located close to or away from other settlements, cultural features and aspects of the physical environment. In archaeology, some distance based analyses, such as buffering, reflect the traditional application of some concepts derived from established models about prehistoric human behaviour on settlement location and resource exploitation. For example, hunter-gatherers and farming communities have been described as having exploitation territories of radii of 10km and 5km respectively (Chisholm 1962; Higgs 1972; Lee 1969, 1976; Vita-Finzi 1972). Later, time based distance models that factored in topographic variations on the landscape (Bailey and Davidson 1983) were considered more appropriate to understand the exploitation of territories.

Distance measurements can also be used exploratively to establish some limit of spatial behaviour or activity observed in the archaeological data, such as the clustering of sites around or along a feature which could be a water hole, river or any other variable. Using the explorative data analysis techniques, the data can be allowed to speak for themselves. However, there will still be underlying assumptions regarding human behaviour, although the buffer ranges of the behaviour being investigated may not be obvious.

In this research I use distance based analyses to investigate the distance between sites and the nearest water source. This investigation, also known as proximity analysis, functions with the overlay methods to calculate the distances between features in different themes. The mean distance between sites or features gives an indication of the level of clustering or the influence of particular features to the distribution pattern. The theoretical assumption in this analysis is that of least effort whereby prehistoric settlements should ideally have been located in such a way that there was minimal energy expenditure to important resources. Deviations from this principle would imply the influence of social or political factors on the one hand, and the existence of different climatic conditions on the other.

The allocation of space to sites to investigate aspects of territoriality is also another technique that is based on the analysis of distance between sites. This technique involves the use of Thiessen polygons to allocate space to particular sites basing on principles of equidistant sharing of the territory. The technique divides space on the basis of equal distance between features or sites of a similar rank. This is a concept that is borrowed from Geography (see Haggett *et al.* 1977) but which has seen wide application in archaeology, especially where there is hierarchical data. In this study, I use this technique to determine the size of clusters of rock art sites in the research area and the extent of their possible territory. The rock art sites were amenable to this technique because they could be ranked according to the size of the shelter in terms of floor space, and indications from material culture. Despite the contemporaneity problem, topographic variations and uneven distribution of natural resources that limit the deductions that can be made from this analysis, the technique gives an estimation of the possible territorial divisions of the landscape (Haggett *et al.* 1977; Schacht 1984).

6.2.3 Surface analyses

Surfaces are raster versions of both discrete and continuous data, and are meant to take advantage of the analytical advantages in such data structures. Some of the techniques presented above can also be performed with surfaces. In archaeology, surface analysis has been used to investigate the significance of movement of people in resource procurement and perception of the landscape relative to the location of settlements (Wheatley and Gillings 2000; Conolly and Lake 2006). Regarding movement, surfaces from elevation data have been used to investigate the effort or energy required to access resources in a territory or landscape (Conolly and Lake 2006). It is known that topographic variations can impede or facilitate resource exploitation depending on the direction of movement of the resource procurer. Elevation data from digitised topographic maps or DTMs (or DEMs) is manipulated together with layers of resource distribution using mathematical models or formulae of energy expenditure in negotiating the landscape to reach the resource. This creates a new surface (generally referred to as cost surface) showing the energy or cost of negotiating particular areas. Such analyses have been used in predictive models to predict routes of movement or suitable areas for some activity using least cost or least effort principles. Surfaces derived from elevation data can also be used to identify suitable areas for farming by analysing slope and aspect properties of the landscape.

Surfaces have also been important in analyses where visibility is thought to have been important, to create viewsheds and Lines of Sight (LOS). Defensive settlement analysis has been the obvious candidate for such approaches, although visibility can be important for other reasons such as hunting, symbolic representations and other aspects of territoriality (Ramqvist 2003; Wheatley and Gillings 2000). In Zimunya, there are a few hilltop settlements where visibility could have been significant in viewing the landscape around. Two of these sites (Murahwa's Hill and Vumba Castle Beacon Hill) have rough walls that can be regarded as associated with defensive strategies during the late farming period. Two other sites, Chinyamutupwi and Chisamba, have no stone walls but their locations command a wide view over the landscape below them. However, there are also Stone Age sites such as Chiuya I, Guta raJehova, Gwenzi 2, Manjowe Main site, Museta and Ngoya, which have similar locations that have visibility advantages on the landscape below them.

6.2.4 Statistical analyses

The interest in spatial statistics was to assess the significance of the visible relationships in the spatial distribution of archaeological sites and environment factors. The search for relationships was also investigated by cross-tabulating attributes of the archaeological sites with environmental data. Cross tabulations compare two or more attributes in a table in search for relationships, which are basically the frequencies detected for the association of the values in the variables. I also used spatial auto-correlation and average nearest neighbour statistics to assess the dispersion or clustering of particular sites across the landscape.

In order to investigate the possibility of a relationship two hypotheses have to be made; one assuming that there is a relationship in the variables, the other assuming there is no relationship. A hypothetical data set can be created with which to compare the real data set. When the statistical results show that the hypothetical data set looks similar to the real data, this is regarded as meaning that there is no relationship in the observed data. This is because the similarity suggests that a similar pattern in the real dataset can be achieved with any other random dataset (Shennan 1997; Drennan 1996; Conolly and Lake 2006). Where the real dataset is different from the hypothetical one then this would indicate the possibility of structure or relationship in the observed data. There are several techniques to determine these associations depending on the structure of the data. As my data are essentially categorical, I chose to test the sites for the goodness of fit (chi-square test) and for clustering or dispersion through spatial autocorrelation and average nearest neighbour analysis. Due to the limitations that sometimes constrain the effectiveness of the Chi-square, other statistical approaches such as the Phi-coefficient, Cramer's V and the Lambda coefficients that measure the strength of the correlationship between variables were employed where necessary. These statistics are discussed below.

6.2.4.1. Chi-squared Test (χ^2)

This statistic is used to measure the significance or strength of a relationship where variables show association. For example, where soils and rainfall are considered as possible variables influencing settlement location, one may want to know if there is a significant relationship between the two variables with respect to settlement patterning. In this example, sites might occur in a particular rainfall regime with a particular soil type. In the chi-square test, there are two assumptions as mentioned above: i.e. there is no relationship (H0) or that there is (H1). If the calculated χ^2 value is smaller than the critical χ^2 values from statistical tables at the specified level of confidence (usually 95%) and relevant degrees of freedom, this would mean that there is no significance in the pattern of the observed data, and the reverse being true where the calculated value is larger than that in the statistical tables (Shennan 1997).

The χ^2 statistic had the potential to highlight the significance of related variables. Since it is usually a bivariate statistic, this meant several variable combinations had to be tested separately for their significance. However, the χ^2 does not indicate exactly how strong the relationship is (Shennan 1997). I have realised from the analysis, as will be shown below that the χ^2 does not show which subtype(s) of the environmental variables in the contingency tables have more influence in the goodness-of-fit (χ^2) value. This statistic is also liable to sample size effect where the larger the sample size the more likely it is that the relationship will be significant (Conolly and Lake 2006). Thus, as Shennan (1997) argues, simply carrying out the chi-square test is not enough, there has to be a way of distinguishing statistical significance from substantive significance.

6.2.4.2. Phi, Cramer's V and Lambda coefficients

These statistics are used to measure the strength of the association between variables. They are used mainly for nominal against nominal data. They go beyond the Chi-square statistic by being able to measure the strength of the association implied by the Chi-square statistic. These statistics have different requirements such that their use was always subject to the relevant conditions being met. For example, while the Phi-coefficient is a bivariate statistic, it is mostly effective with dichotomous data (that is 2x2 contingency tables) where its values are measured between 0 and 1 For tables with more than two rows or two columns the Phi-result is regarded less useful because its range becomes open-ended (Drennan 1996). The Cramer's V statistic is relevant for tables with more than two rows or columns in the contingency tables but its limitation is that it utilizes the Chi-square. The Lambda is another useful statistic/coefficient for measuring the strength of a relationship. The result is either symmetrical or asymmetrical depending on whether or not there is specification of a dependent variable. Where a dependent variable is specified, the resultant asymmetric value is used and the symmetrical one is employed when no dependent variable has been specified. The Lambda coefficient ranges from 0 to 1 with values closer to 1 indicating a stronger relationship.

The WinIDAMS program calculates on the fly other coefficients such as the Contingency coefficient which, like Cramer's V coefficient, is used to describe the strength of association of nominal variables. Fisher's exact test is also another probability test which is considered as an extremely useful non-parametric technique for analysing discrete data (either nominal or ordinal) from two independent samples. However, it is only useful with dichotomous data such that it could not be used with the data from Zimunya. Other bivariate statistic used to measure the association of variables include the Kendall's τ (tau) (which comes with three values, Tau a, b and c), the Goodman-Kruskal γ (or Gamma*)* and Somer's D. These last three statistics are used to measure the association of ordinal variables. They are generated automatically in WinIDAMS because the program uses coded numeric values for the variables. It is the duty of the researcher therefore to know whether the codes relate to ranked codes or not. For this research, and in addition to the Chi-square, I consider the Cramer's V, Lambda and contingency coefficients as the more relevant statistics to cross relate environmental variables and the archaeological sites. The two most important aspects to remember about these techniques are; (i) to ensure that they are used on suitable data and (ii), that significant values are those that are closer to -1 or +1.

6.2.4.3. Cluster analysis:

6.2.4.3.1. Spatial autocorrelation

Spatial autocorrelation measures similarity in the spatial distribution of features using both feature locations and feature values simultaneously. Using the ArcGIS software, and given a set of features with an associated attribute, this analysis evaluates whether the pattern expressed in the distribution of the attribute values is clustered, dispersed, or random. A Moran's Index value near +1.0 indicates clustering while an index value near -1.0 indicates dispersion. A *z* score is also calculated to assess whether or not the observed clustering or dispersion is statistically significant.

6.2.4.3.2 Average Nearest Neighbour

The Average Nearest Neighbour statistic calculates the proximity to each other of sites of a similar rank. This is another way of calculating clustering or dispersion of sites of a similar rank. The technique, like the spatial autocorrelation tool, also calculates a z-score to measure the significance of the calculated Average Nearest Neighbour statistic. If the Z score is less than 1, the data shows tendency towards clustering and the reverse is also true.

6.3 Data resolution and classification

The substantive significance of the analyses depends on the resolution and appropriateness of the spatial data in use. The resolution of published environmental data cannot be improved much except by getting new data. The environmental data that was used here was obtained from published maps, some in the order of 1: 1 000 000 scale and others 1:50 000. I derived some data such as elevation, aspect and slope from a 2002 DTM downloaded from the internet at http://glcfapp.umiacs.umd.edu. The DTM is a raster dataset with a resolution of 90 m, and thus is fairly useful for this analysis. The DTM had a close fit with the drainage network that I derived from 1: 50 000 scale topographic maps of the area. I used the land cover image downloaded from the same link for visual enhancement. Rainfall data were digitised in vector format from a 1988 mean annual rainfall map for Zimbabwe, with a scale of 1: 2 500 000. Since prehistoric communities did not have rain gauges to check rainfall amounts, their assessment of rainfall distribution was relative, and probably could approximate the resolution of the scale used here. The soil layer used in the analysis is an FAO dataset produced at a scale of 1: 5 000 000 in vector format. The layer of geology has a resolution scale of 1:100 000, produced from a 1957 geological survey map of the research area by Watson (1964). The significance of these variables to hunter gatherers and farming communities has been discussed in Chapter 3.

From the data presented in Chapter 4 we now know the nature of the archaeological evidence that was discovered in Zimunya. These sites were classified according to cultural periods and by cultural phases and traditions where possible (see Chapter 3). Using the criterion set out in Chapter 3 section 3.3, I determined that out of 86 Stone Age sites, only 13 shelters could have been used for habitation. From the 130 sites of the farming communities, only 26 could be firmly identified by traditions. The rest were simply classified as LFC sites.

For the Stone Age sites, the frequency tables used in the calculation of the statistics are based on all the painted rock shelters. However, much of the discussion focuses for the 13 large sites for reason that these are the same sites with ESA, MSA and LSA stone artefacts and elaborate paintings which suggests they were habitation areas as already mentioned. For the farming communities, only the 29 sites clearly identified by tradition are used in the tables. Of these, there are 10 EFC (all Ziwa) and 19 LFC (4 Zimbabwe phase, 10 Khami phase and 5 Nyanga tradition) sites. Most of the other sites whose traditions could not be firmly identified from the ceramic evidence were presumed to be LFC sites of the Refuge period (18^{th}–19^{th} centuries) on the basis of their topographic location and the nature of other material remains such as roughly constructed enclosures.

It is observed however, that the EFC communities did not decorate their entire range of ceramics. This makes it difficult to conclusively state that all sites with undecorated sherds are entirely LFC. In addition, generally the proportion of decorated surface area on any decorated vessel is smaller than the undecorated proportion such that the recovery of the sherds could also be in the same proportion, all things being equal. Researchers have often alluded to differences in vessel thickness as a distinguishing variable between vessels of the two periods (Phillipson 2005), but without other corroborative evidence we can not say that sites without decorated sherds are entirely LFC, let alone Refuge.

6.4 Settlement patterns in Zimunya

To investigate the distribution of settlement sites in relation to the physical environment of Zimunya, I first updated the site database with environmental attributes. I used the spatial join tool to extract the environmental attributes from the 6 themes of environmental data and assigning them to the attribute table of the archaeological sites. The primary layers of environment data are soils, rainfall, vegetation, geology, hydrology (rivers) and elevation. Using the ArcGIS package I derived slope and aspect surfaces from the elevation data and exported the values at each settlement to the site attribute table. In addition, I derived viewshed layers from some key sites of farming communities to assess the significance of visibility at those locations. These sites are Murahwa's Hill, Vumba Castle Beacon, Chinyamutupwi and Tsetsera. Except for the Zimbabwe type enclosure on Tsetsera mountain, the others are of the Refuge tradition.

The sites are analysed chronologically starting with the Stone Age. For clarity, I found it necessary to chronologically discuss the distribution pattern of each cultural period relative to the environmental aspects chosen before moving to the next category. Where possible some site categories were combined in the distribution maps to compare the different relationships in the various cultural categories. This enabled assessment of changes in location patterns between different periods.

6.4.1 The Stone Age sites

Ethnographic and archaeological studies in southern Africa have shown that hunter-gatherers largely live a mobile life (Lee 1976; Lindholm 2006; Yellen 1976; Yellen and Harpending 1972). In that context and from a very restricted sense, the concept of settlement as relating to fixed location of habitation may be difficult to apply. However, the need for protection from various discomforting elements, natural or otherwise, meant shelters had to be constructed. Rock shelters and caves offered a ready alternative to constructing shelters. The conscious construction of shelters and the labour involved would have ensured that some time is spent at these places. In spite of the short temporary dimension, such places would qualify to be labelled settlements. In Zimunya, the absence of open air sites makes it appropriate to use the rock shelters as the preferred settlement places. Many excavated rock shelters in the country have shown evidence of repeated occupation, thus allowing archaeologists to identify them as settlements. Some shelters in north eastern Zimbabwe have deposits of cultural material that have a depth of more than a meter, demonstrating the repeated occupation of these sites (Larsson 1996, 2000).

For hunter gatherer communities the important variables influencing settlement decisions are those that affect the availability of food resources and raw materials for the manufacture of tools. Water plays a significant role among these communities, either as rain or flowing from springs or in rivers. Ethnographic evidence has shown that the availability of water has a significant influence on the mobility patterns and the duration of the occupation of particular areas by the Kalahari !Kung hunter gatherers (Lee 1976; Yellen 1976; Yellen and Lee 1976). Although modern perceptions of hunter-gatherers give the impression that these were very mobile people who responded to the availability of subsistence resources, both faunal and floral, mobility could have been minimal where subsistence could be afforded in the same area for a considerable part of the year. Further movement was minimized by storing food, as discovered in the Matopo Hills in Zimbabwe (Walker 1995).

The determination of climatic conditions that prevailed during particular cultural periods helps in understanding the temporal dimension of mobility amongst hunter gatherer people. Much of the stone tool evidence in Zimunya is in painted rock shelters. Thus, analysing the spatial distribution of painted rock shelters helps us understand some aspects of the use of the rock shelters for habitation by the Stone Age communities. Walker (1995) found that in the Matopo Hills, there was a close association between the length of stay in a shelter and the amount of art in it. This is one of the reasons why the large painted shelters in Zimunya were considered to be settlement places.

6.4.1.1. The Early Stone Age

There is limited evidence for the ESA in the research area, occurring only at four sites. This evidence occurs in the same shelters in association with MSA and LSA material. The absence of ESA material culture in the open landscape could be a function of limited visibility of these sites during surveys. Since this material was not recovered in the excavations, it is difficult to estimate its age and relate it to reconstructed climate models of southern Africa. Its association with MSA material makes it difficult to confine it strictly to the ESA. Thus the designation of this material as ESA is based only on its characteristic affinities.

Despite the problems noted above, an assessment of the relationship of the distribution of this material with the topography and geomorphology of the area can be made. It can be noted in Figs. 6.1-6.3 that all the ESA sites occur in similar environmental settings. They are located in shelters that are on the plains and on the foot slopes of mountains. These sites include Chiuya, Manjowe, Manyoreke and Muranda where large cleavers were discovered. Archaeological surveys in the higher altitudes did not yield any ESA material. It is not clear if the confinement of the sites to the mountain foot slopes is substantively significant.

The chi-square values for the association between soils types and rainfall on one hand, and the ESA sites on the other (Tables 6. 1 and 2), do not suggest significant relationships between the sites and these variables. This can be expected for soils as hunter gatherers do not have a direct relationship with soils. However, we know from ethnographic evidence in the sub-region that water has significant influence in the settlement and mobility of hunting and gathering communities. As such, rainfall and where its other form (water) was available should have been important for the Zimunya hunter gatherers. The lack of association in this dataset suggests that probably the distribution pattern of rainfall in the past was not as it is at present. However the effect of the low values in the frequency cells can not be ignored. Although the reliability of the Chi-square can be improved by reclassifying the categories to reduce the incidence of low values in the range of expected observations; this is not the best approach with the soil variable, in addition, it did not result in a different conclusion when it was tried with the rainfall variable.

Soil Type	**Area%**	**Observed Sites**	**Expected Sites**	**Chi-square**
Rhodic Ferralsols	35	1	1.4	χ^2 *Cal* = 0.448
Lithosols	19	0	0.76	
Ferric Luvisols	46	3	1.84	2 df @ 0.05 = 5.99
Total	**100**	**4**	**4**	

Table 6. 1. Contingency table for the correlation of ESA sites and soil types

Rainfall (mm)	**Area%**	**Observed Sites**	**Expected Sites**	**Chi-square**
600-700	15.5	0	0.62	χ^2 *Cal = 0.000196*
700-800	31.7	0	1.268	
800-900	13.2	4	0.528	
900-1000	17	0	0.68	6 df @ 0.05 = 12.59
1000-1200	17.1	0	0.684	
1200-1400	3.1	0	0.124	
1400-2000	2.2	0	0.088	
Total	**99.80%**	**4**	**3.992**	

Table 6. 2. *Contingency table for the correlation of ESA sites and mean annual rainfall*

These χ^2 values are however different from the calculations worked out for all the Stone Age sites using the WinIDAMS program. The relationship between all the Stone Age sites and soils was observed to be not significant (Fig. 6. 1). The χ^2 value from statistical tables at 4 degrees of freedom and at 95% confidence level is 9.488. This is higher than the calculated χ^2 value of 0.34 showing that there is no significance. The other statistics also show a weak level of association.

	Rhodic Ferralsols	Lithosols	Ferric Luvisols	Total
ESA Freq	1	0	3	4
MSA Freq	1	0	4	5
LSA Freq	14	1	71	86
Total Freq	16	1	78	95

```
1. Chi-squared statistic
Degrees of freedom : 4
Chi-Square         : 0.34
Adjusted N         : 95

2. Measures of association based on Chi-Square for nominal variables
(Does not require any ordering of the row and col categories)

Phi coefficient         : 0.06
Contingency Coefficient : 0.06
Cramer's V              : 0.04

3. Measures of Association for Ordinal Variables
3.1 Measures Based on Concordant and Discordant pairs

Kendall's Tau-b : 0.04
Stuart's  Tau-c : 0.01
Gamma           : 0.16
Sormer's D Asymmetric - Col Var dep : 0.05
Sormer's D Asymmetric - Row Var dep : 0.03
Sormer's D Symmetric   : 0.04

3.2 Measures Based on Proportional Reduction in Error

Lambda Asymmetric - Row Var dep : 0.00
Lambda Asymmetric - Col Var dep : 0.00
Lambda Symmetric                : 0.00
```

Fig. 6. 1. Statistical analysis for the association of all Stone Age sites and soil type

There is some degree of statistical significance in the relationship between all the Stone Age sites and mean annual rainfall. At 95% confidence level and 8 degrees of freedom, the tabulated value of χ^2 is 15.507. This value is smaller than the calculated χ^2 of 16.05 (Fig. 6. 2) which means that there is some significance in the distribution of the Stone Age sites with respect to rainfall. However, the Lambda symmetrical coefficient 0.04 shows that this is still a weak association. This fact is also confirmed by the low values of the coefficient of Phi and Cramer's V which are 0.41 and 0.29 respectively.

	600-700	700-800	800-900	900-1000	1000-1200	Total
ESA *Freq*	0	0	4	0	0	4
MSA *Freq*	0	1	4	0	0	5
LSA *Freq*	12	23	22	25	4	86
Total *Freq*	12	24	30	25	4	95

```
1. Chi-squared statistic
Degrees of freedom : 8
Chi-Square         : 16.05
Adjusted N         : 95

2. Measures of association based on Chi-Square for nominal variables
(Does not require any ordering of the row and col categories)

Phi coefficient         : 0.41
Contingency Coefficient : 0.38
Cramer's V              : 0.29

3. Measures of Association for Ordinal Variables
3.1 Measures Based on Concordant and Discordant pairs

Kendall's Tau-b : -0.01
Stuart's  Tau-c : -0.00
Gamma           : -0.02
Sormer's D Asymmetric - Col Var dep : -0.02
Sormer's D Asymmetric - Row Var dep : -0.00
Sormer's D Symmetric   : -0.01

3.2 Measures Based on Proportional Reduction in Error

Lambda Asymmetric - Row Var dep : 0.00
Lambda Asymmetric - Col Var dep : 0.05
Lambda Symmetric                : 0.04
```

Fig. 6. 2. Statistical analysis for the association of Stone Age sites and rainfall

There was no need to calculate the χ^2 for the relationship of the Stone Age sites and geology as all of them are in the same geological belt. Since all the Stone Age sites have paintings, the association is obviously apparent. However, it does not mean that the rock type influenced decisions on where to settle to facilitate painting.

The overall assessment that can be made is that there is no clear trend in the relationship of Stone Age sites and the environmental parameters. It can be observed however that the problem might be emanating from the combined use of obviously different traditions of the Stone Age period. The best way to investigate the relationships of association might be to use approaches whereby one tradition is analysed on its own merits without the influence of the other cultural phases. This would result in a different way of calculating the Chi-square, where the proportion of the area represented by each sub category in each variable becomes important as shown in Tables 6.1-2.

6.4.1.2. The Middle Stone Age

There are five MSA sites with large scrapers and blades. Most of the tools are from dolerite rock, although there are a few from quartz and diorite. The MSA evidence is found in and around shelters suggesting that the shelters were the focal points, probably as habitation areas or for other activities. Interesting however, is the north south axis that the sites form west of the crest of the higher mountains and the main watershed in Zimunya. The distance between these sites ranges between 11 and 12 km (see Fig. 6. 3). All are located west of the upland mountains and are in the low lying plains below 800 m in altitude. Chiuya 1 and Manjowe command wider views of landscapes below them. The other sites are located on the foot slopes of the hills that flank the rivers but within easy reach from the streams. Except for Manjowe shelters which are situated about 5.7 km from the nearest major stream, the other MSA are less than 3 km away.

However, in relationship to any nearest stream Manjowe is the furthest away at approximately 1 km. This is followed by the Chiuya sites which are around 0.8 km from the nearest stream. The other sites are less than 200 m away (Fig. 6. 3). With no evidence from the excavated data of means to carry water, there seem to be a stronger association of the MSA sites with the small streams. Unless the streams were perennial, this implies that the sites were occupied during the rainy season when the small streams were in flow.

In the study of the late Holocene hunter gatherers in the Matopo Hills, Walker (1995) interpreted the proximity to rivers as a reflection of an undeveloped means of carrying water. This may apply to the Zimunya sites since there was no evidence from the excavations, of material that could have been used to collect water except perhaps for the ceramics in later times of the later Stone Age. In many parts of southern Africa, ostrich egg shells were used for carrying water (Deacon and Deacon 1999; Walker 1995; Phillipson 2005). In Zimunya, evidence of the ostrich egg shell is very limited, appearing only in the form of less than 5 beads from the three excavated shelters.

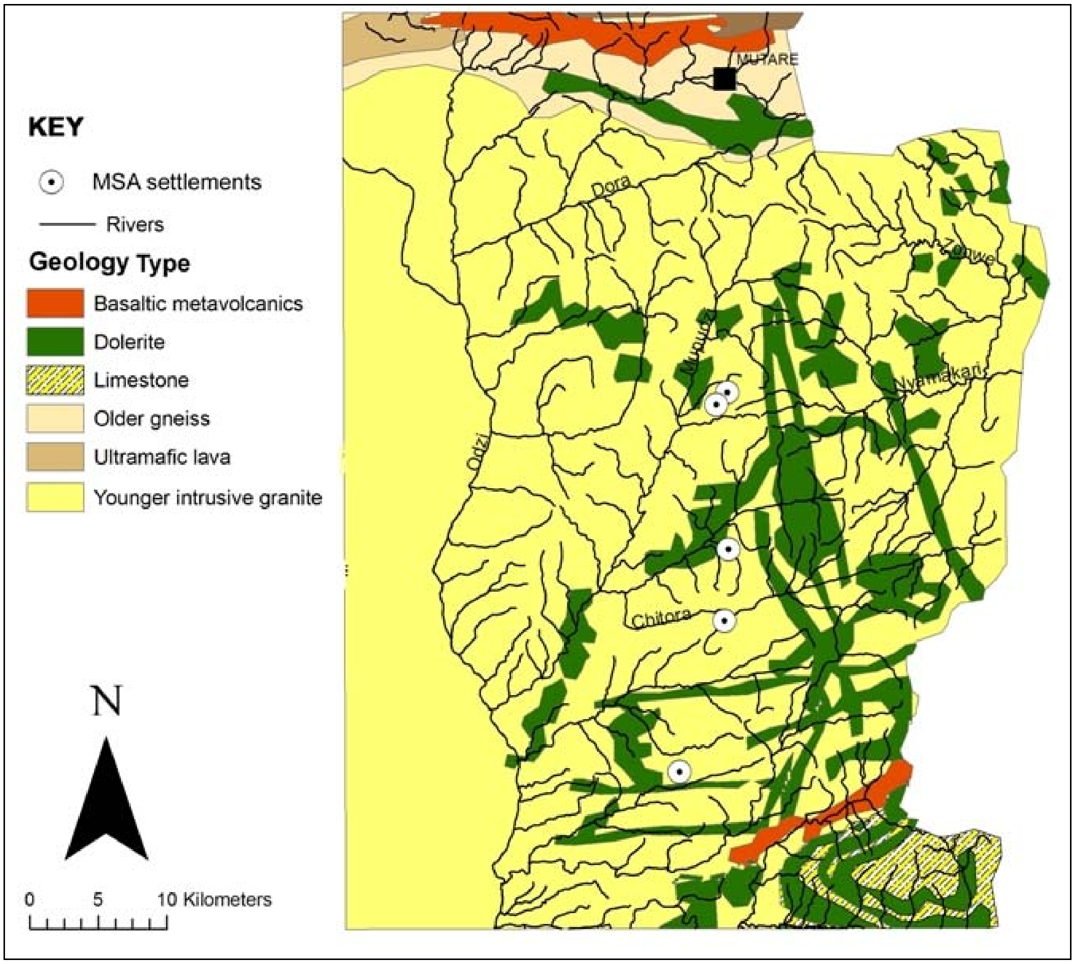


Fig. 6. 3. Distribution of MSA sites in the research area in relation to geology

As Fig. 6.3 shows, all the MSA sites are in the granite areas and on the lee side of the uplands. However, tables 6.3 and 4 suggest that the distribution is not significant. The MSA hunter gatherers chose shelters that were near rivers, most probably as a result of a less developed means to carry water as suggested by Walker (1995) for the Matopo hills). Soils may not have been directly relevant although their connection with geology and their effect on vegetation could have influenced the availability and distribution of some food resources such as fruit species. Since no apparently MSA material culture was recovered in the excavations, there is no date for this culture in Zimunya.

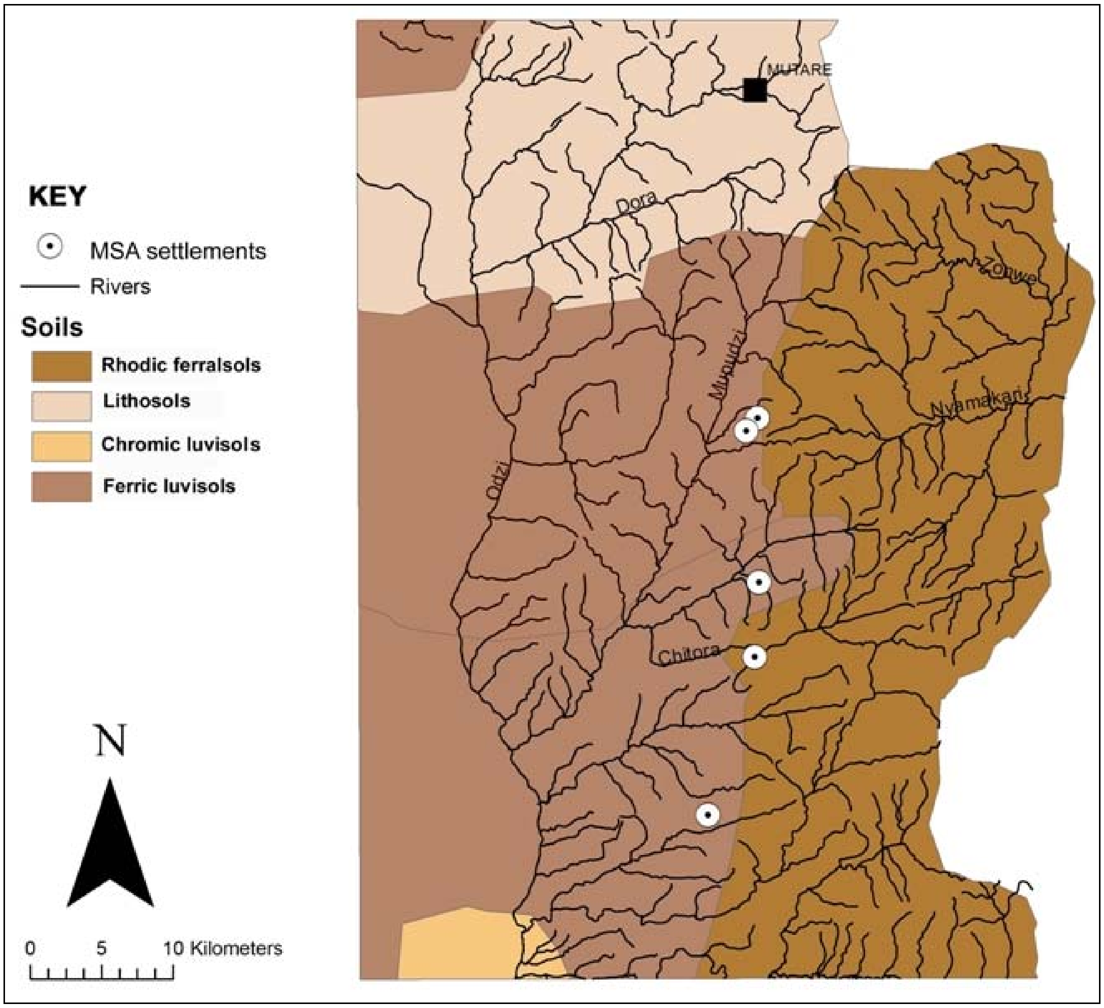


Fig. 6. 4. Distribution of MSA sites in relation to soil types

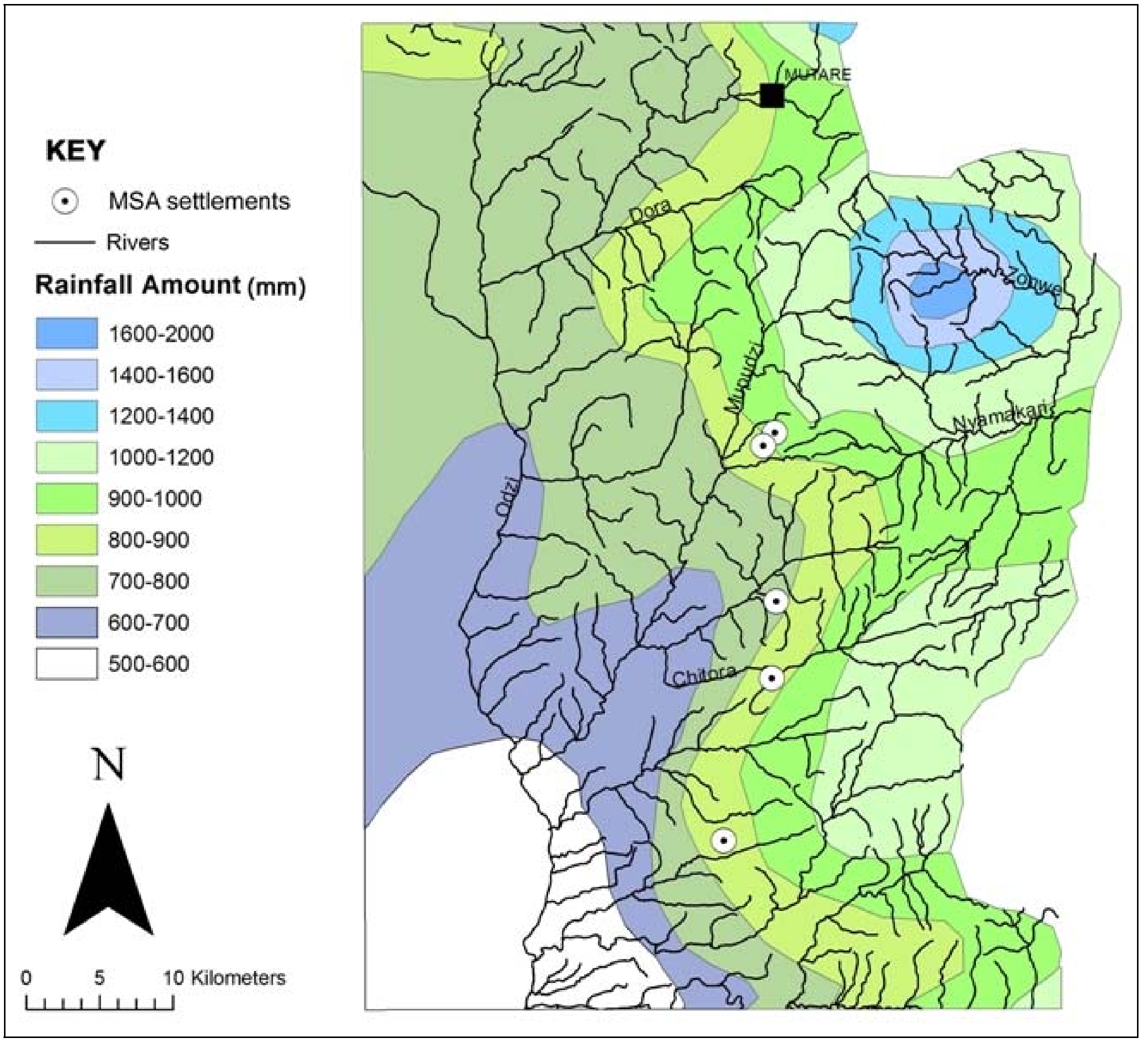


Fig. 6. 5. Distribution of MSA sites in relation to mean annual rainfall

Research on the Stone Age in southern Africa has shown that the MSA covers a very broad period, from about 200 000 years or more to around 22 000 years ago (Deacon and Deacon 1999; Larsson 2000; Mitchell 2002; Walker and Thorp 1997). Without dating evidence and without palaeo-evidence of vegetation and animal remains directly associated with this material, it is difficult to estimate the character of the palaeo-climatic conditions associated with these sites. In addition, given the small sample size of the MSA sites, it is difficult to come up with a reliable settlement pattern as there could have been many suitable locations for this low population. Furthermore, without excavated evidence of this period we do not have a clear idea of the life style of the MSA people. The pattern observed can therefore not be assumed to reflect that the rest of the research area was not suitable for habitation.

Soil Type	**Area%**	**Observed**	**Expected**	**Chi-square**
Rhodic Ferralsols	35	1	1.75	χ^2 *Cal* = 0.283
Lithosols	19	0	0.95	
Ferric Luvisols	46	4	2.3	2 df @ 0.05 = 5.99
Total	**100**	**5**	**5**	

Table 6. 3. Contingency table for the correlation of MSA sites with soil types

Rainfall (mm)	**Area%**	**Observed Sites**	**Expected Sites**	**Chi-square**
600-700	15.5	0	0.775	χ^2 *Cal = 0.0029*
700-800	31.7	1	1.585	
800-900	13.2	4	0.66	
900-1000	17	0	0.85	6 df @ 0.05 = 12.59
1000-1200	17.1	0	0.855	
1200-1400	3.1	0	0.155	
1400-2000	2.2	0	0.11	
Total	**99.80%**	**5**	**4.99**	

Table 6. 4. Contingency table for the correlation of MSA sites and mean annual rainfall

The contingency tables do not show significance in the distribution of the MSA sites, although visual assessment indicates that the rainfall belt of 800-900 mm mean annual has 4 of the 5 sites. The Chi-square value is affected by the absence of sites in some of the rainfall zones as shown in Table 6.4.

6.4.1.3. The Later Stone Age

The LSA settlement in Zimunya is represented mainly by painted rock shelters and the occurrence of microlithic artefacts in these contexts. There are 13 large painted sites in the area which I consider to have been the preferred sites for habitation during the LSA period. These sites have stone artefacts on the floors and are elaborately painted. The rest are small painted shelters with no other evidence to show that they could have been used for anything else. Of the 13 large sites, 5 have MSA material. However, the excavated evidence has no indications of direct continuity from the MSA to the LSA.

The analysis of the painted sites to determine the LSA settlements was based on the fact that throughout the surveys no open-air sites were discovered. Descriptive details such as topographic locations, motifs drawn and the size of the painted panels for the rock art sites were enumerated to establish means of quantifying the data. The morphology and the physical space within the shelters were also considered in order to assess whether or not the shelters were used as habitation areas. This was determined by the space enclosed by the drip line of the shelter, which gave an indication of the potential of the shelters to offer protection against the elements of weather, especially rainfall. The results of the enumeration formed the basis for ranking the sites as large, medium and small depending on the number of images at each site (Nhamo and Katsamudanga 2006). Large sites are those that have more than 50 figures while medium sites have between 25 to 49 figures and small sites have fewer than 25 figures.

From the ranking 13 large, 28 medium and 45 small sites were identified (Nhamo and Katsamudanga 2006). The large shelters can be described as Later Stone Age (LSA) settlement sites according to the size of the floor space and associated debris such as stone artefacts. As can be inferred from the evidence presented in Chapter 5, the excavated data at two of the sites demonstrated that they were inhabited during the Later Stone Age as they yielded faunal remains, ochre and stone artefacts that are typical of the LSA (Soper 2005).

The visual assessment of the spatial distribution of the ranked sites seem to show a clustered pattern where each large site is associated with either one or more small and medium sites, mainly within a radius of 3 km. Only one large site at the southern end of the research area exists by itself. Although it could not be statistically confirmed (see below), there seem to be between six and eleven clusters in the area depending on the level of cohesion perceived. One is in the Burma valley and the rest are west of the Vumba–Tsetsera Mountain range (Figs. 6. 6, 6. 7 and 6. 8). The clusters to the north have no clear separating boundaries. Probably there were many people around this area such that boundaries became fluid. There are no rock art sites in the higher mountains for topographic and climatic reasons. Geologically, the upland areas are mainly composed of dolerite massifs and lack suitable shelters for habitation and painting. The topographic relationship is more easily seen in the 3 dimensional (3D) view of Zimunya (Fig. 6. 8) than in the 2 dimensional (2D) maps (Figs.6.6, and 7).

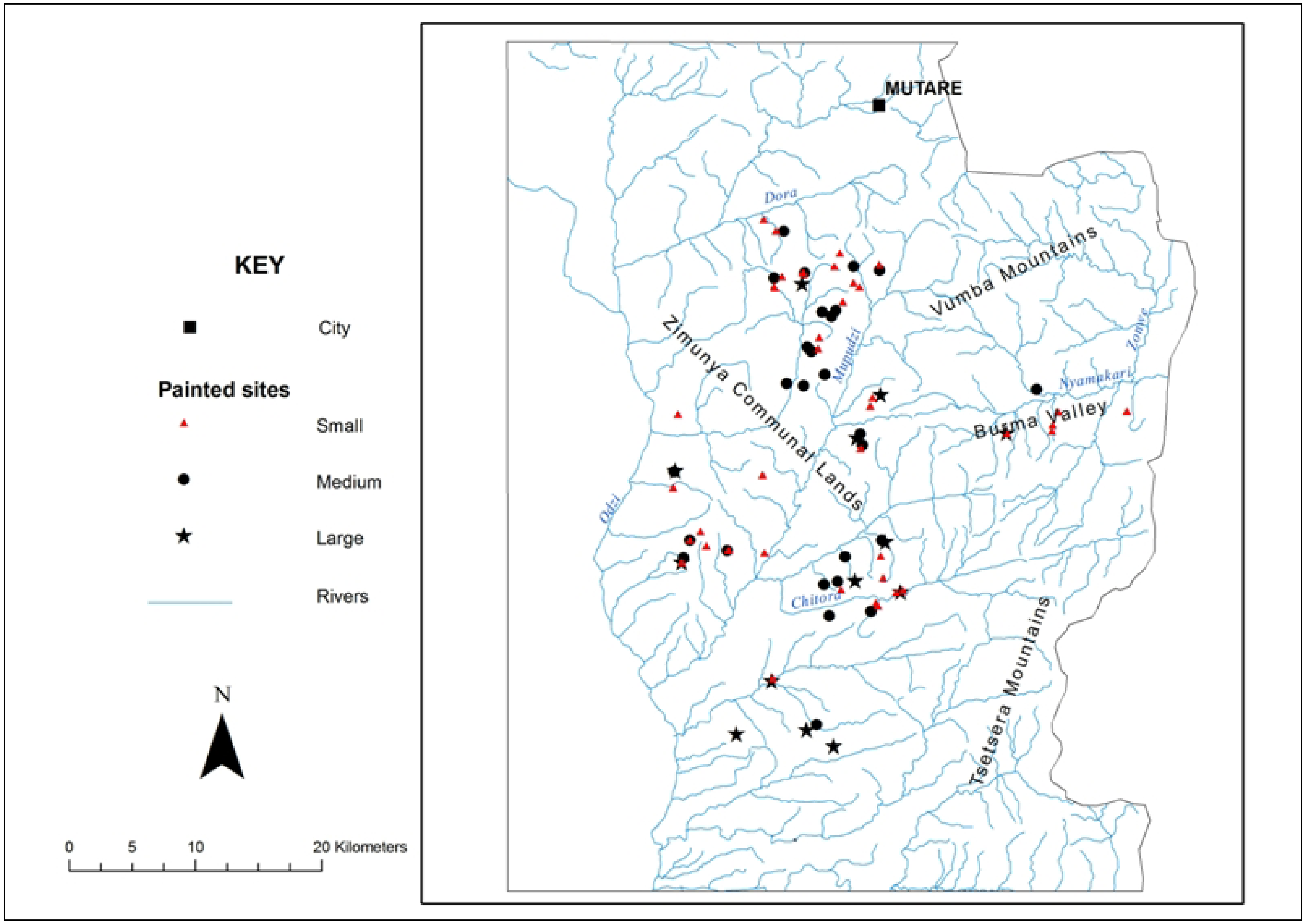


Fig. 6. 6. Distribution of the ranked rock art sites

Ethnographic studies in parts of southern Africa have shown that hunter gatherer communities live in bands of about 13 people or more, with each band owning a piece of land as demarcated by visible landmarks (Smith 1994). Among the !Kung of the Kalahari in Botswana, these territories are called *n!ore* (plural *n!oresi*). They are formed usually around a permanent waterhole and the borders are roughly defined by recognizable landmarks such as a hill, mountains, or simply in terms of the area surrounding the landmark (Lee 1976; Smith 1994). Within these *n!oresi* there is a central point, usually the waterhole, where food sharing and other social activities take place. Although there is a great distance in time and space between the Zimunya area and the Kalahari, it is possible that the large rock art sites of Zimunya represented the *n!oresi* of the area because they exhibit distinct motifs such as therianthropic images among others, which could have acted as reference points.

Whilst the clustering seen from the maps may reflect aspects of territoriality, the number of painted sites around each settlement site raises questions about the duration of the occupation of each habitation area. Using the GIS algorithms, I allocated space to each LSA settlement site to establish the space occupied by each cluster. The technique uses thiessen polygons which are calculated by linking equidistant lines that are drawn between the settlement sites (Fig. 6. 7). This analysis considers that each settlement site represents the centre of each cluster, and that spatial affiliation of the smaller and medium sites is based on the nearest habitation centre.

In reality, two or more large sites may belong to the same cluster and the extent of the territory under each centre is not always based on principles of equidistance but may be influenced by kinship and the occurrence of physical features such as valleys, rivers or mountains which act as barriers to the expansion or movement of a community (Sealy 2006). As the physiographic environment of the LSA sites in Zimunya is generally similar and with no evident physical barriers, aspects of territoriality could have been masked.

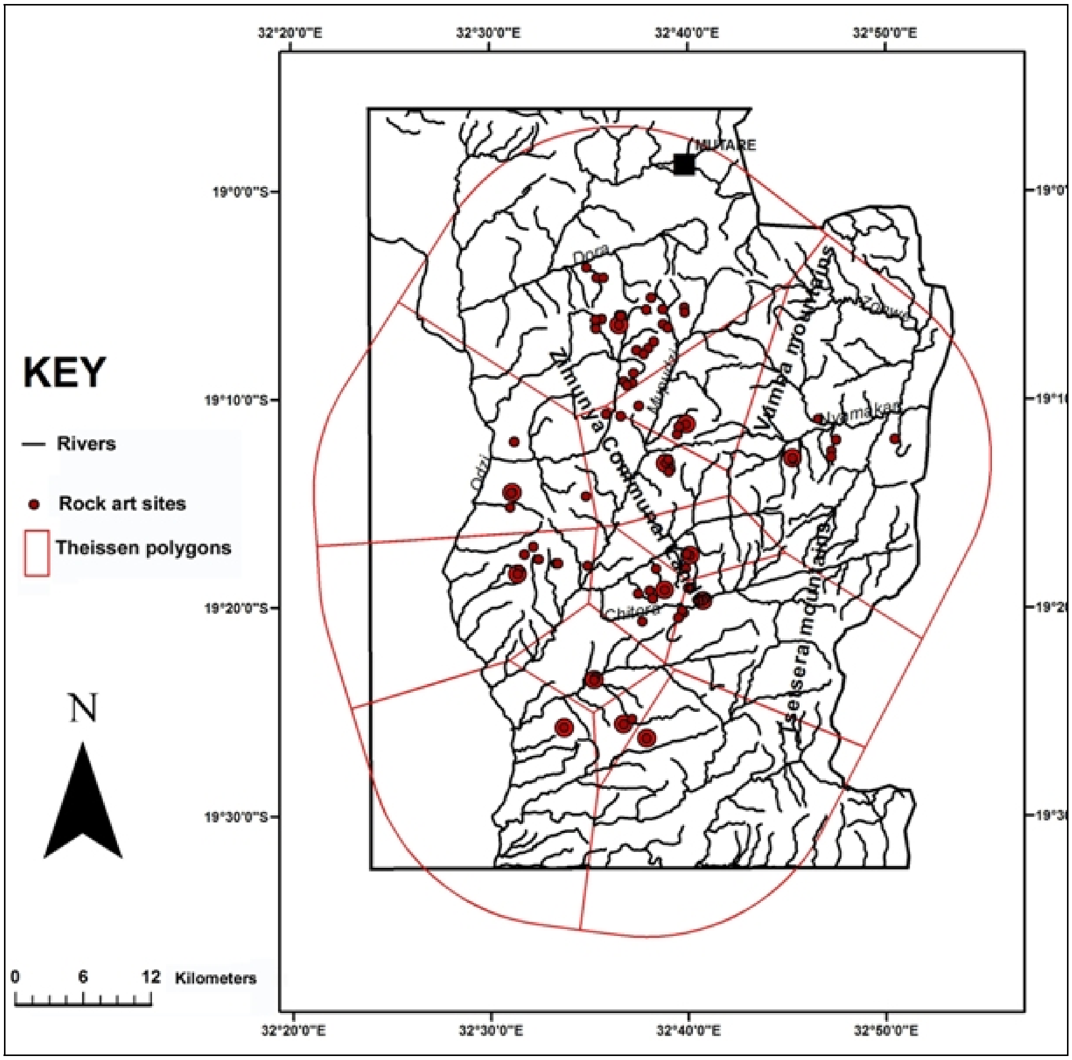


Fig. 6. 7. Thiessen polygons showing the allocation of space to the LSA site clusters

In spite of the limitations noted, the technique of allocating space using Thiessen polygons gives some idea on the distribution of the sites. The 13 polygons generated have a mean of 6.5 sites in them (Table 6. 5). This means that on average there are 7 painted sites around each large settlement. Considering that the oldest date from the excavations in Zimunya is more than 7000 years BP, the average of 7 painted sites to each habitation site suggests that there must have been some control that was exercised in the painting. Although a closer look at the clustering in the thiessen polygons shows that the clusters can be reduced to 6, leading to an increase in the density of sites in each cluster to 14 sites, this still raises questions on the duration of the occupation of the sites and the area. In addition, this does not solve the problem of delimiting the boundaries of the clusters. The conclusion that can be drawn is that painting could have been a controlled activity and that not everybody could paint.

% Area of Thiessen Polygons	**Number of Sites**
0.91	2
1.95	3
1.99	6
2.12	4
2.77	6
3.42	4
7.43	7
8.67	11
11.58	1
11.71	5
12.13	1
16.75	7
18.57	29
Total number sites	**86**

Table 6. 5. Number of sites in each Thiessen polygon

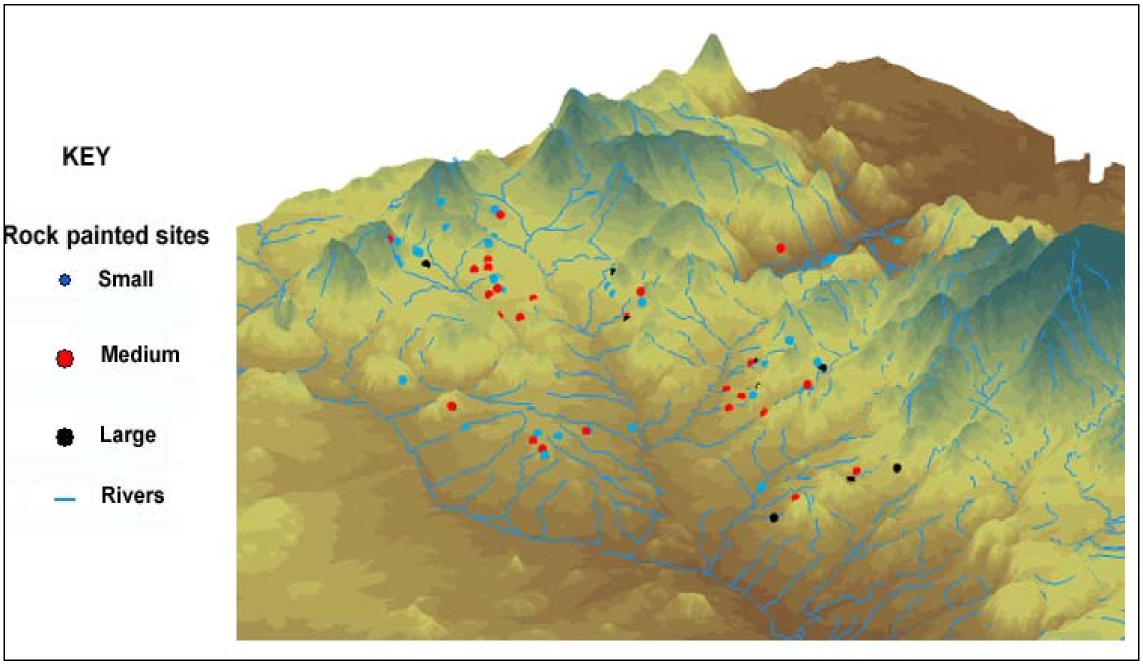


Fig. 6. 8. 3D view of Zimunya landscape viewed from the southwest

A series of multiple buffers around the larger sites up to a maximum radius of 5 km produced paired patterns of the larger sites. The merging of the buffers range between 2 and 4 km, showing that these must have been highly interacting pairs, assuming they were occupied at the same time. In the 5th kilometre buffer from the sites the buffers for the pairs start to merge, especially to the north of the research area (Fig. 6. 9). The assumption is that the band(s) at the paired sites might have been related families, probably along kinship lines or marriage links. Given the possibility that vegetation could have been thicker than it is today on account of differences in the human population, 5 km between the clusters accentuates the social necessity of the pairing for security reasons. The clusters may be defining kinship or social groups, or the availability of some localised resource. It is not clear if the spatial allocation from the thiessen polygons and the buffers can be related to subsistence territories.

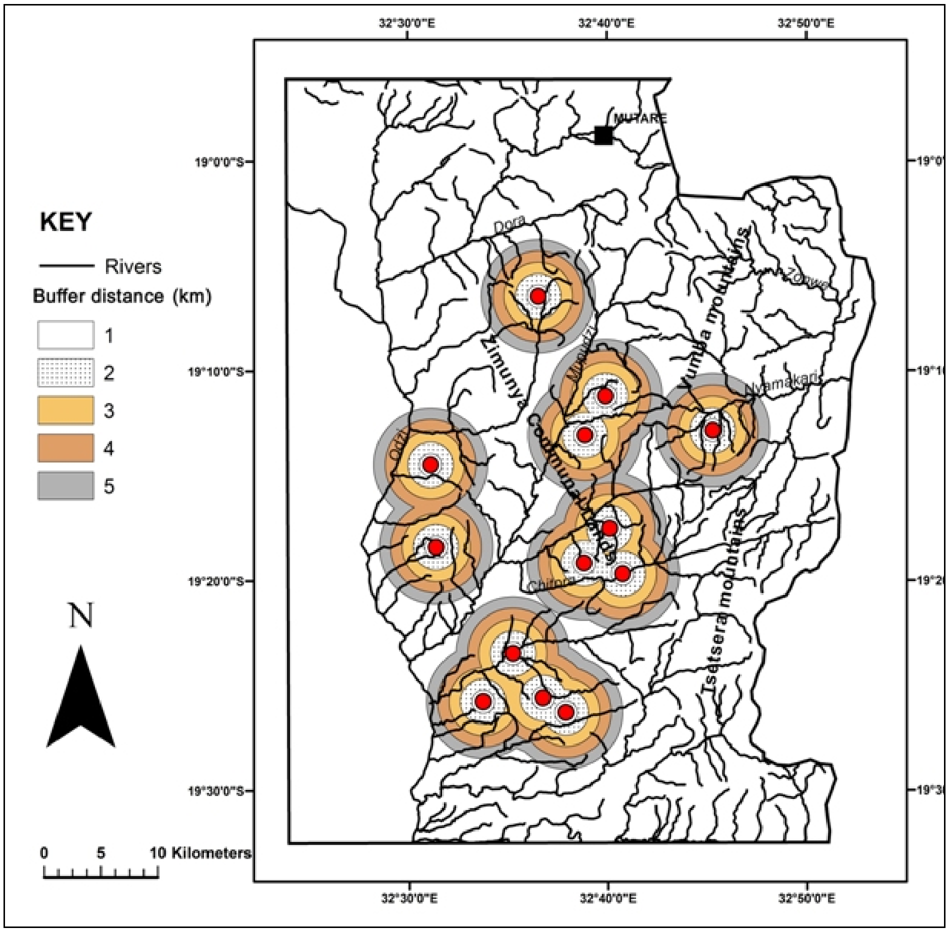
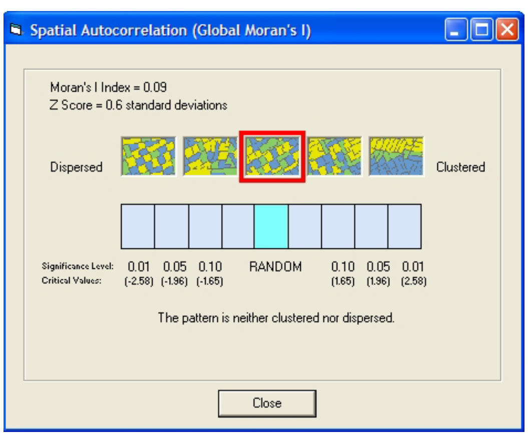


Fig. 6. 9. Concentric buffers of up to 5 km around the large rock art sites

The extent to which this pattern can relate to issues of territoriality would depend on the load or carrying capacity or biomass of the area during the LSA. A 5 km radius seems a small area to hunt some of the game represented in the faunal remains, such as zebra, because these animals have a territorial range that is larger than territories suggested in the clusters (Kenmuir and Williams 1975). However, with the smaller bovid species and scrub hares recorded in the faunal remains, this could have been adequate hunting territory, especially when the area was occupied seasonally. Although no figures of biomass load were calculated, I related the site clusters to the physical environment to investigate any economic or social implications of the relationships. The reliability of the assessment depends on the nature of the past environment, although the faunal remains indicate similarities to present conditions.

The aspect of clustering is however not statistically supported as shown by the results of the Spatial Autocorrelation and the Average Nearest Neighbour which had a Morans Index of 0.09 and a Z score of 0.6 for the former and a Z score of 118 standard deviations for the latter (Fig. 6. 10). The Arc GIS programme interpreted these resulted as showing that the LSA sites were neither clustered nor dispersed. A run of the Average Nearest Neighbour analysis algorithm on all the rock art sites determined that sites of each rank in the data were not clustered. However, visual assessment suggests that the sites could be clustered. Thus the use of the term clustering is based mainly on visual perception rather than on the statistical meaning.

a. 

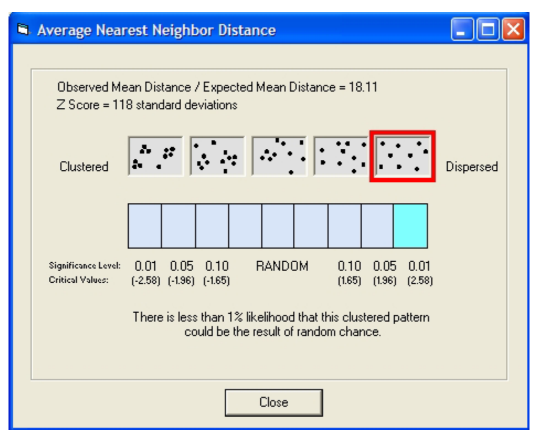
b. 

Fig. 6. 10. Results of the spatial autocorrelation and average nearest neighbour analysis of the LSA sites

In terms of rainfall distribution, there are four rainfall belts in the area, and these could have had partial influence on the distribution of sites. At present the higher altitudes receive rainfall frequently throughout the year, but the distribution maps show that there are no hunter gatherer sites in this area. Rather, all the rock art sites recorded are in the more open and lower areas which receive annual rainfall of 600-1000 mm. Water has been shown to be a major variable in choice of settlement locations for both hunter gatherers and farming communities, but here there is apparent absence of rock art sites in the wetter areas. The 3D image (Fig. 6. 8) and the mean annual rainfall distribution map (Fig. 6. 11) show this pattern quite clearly.

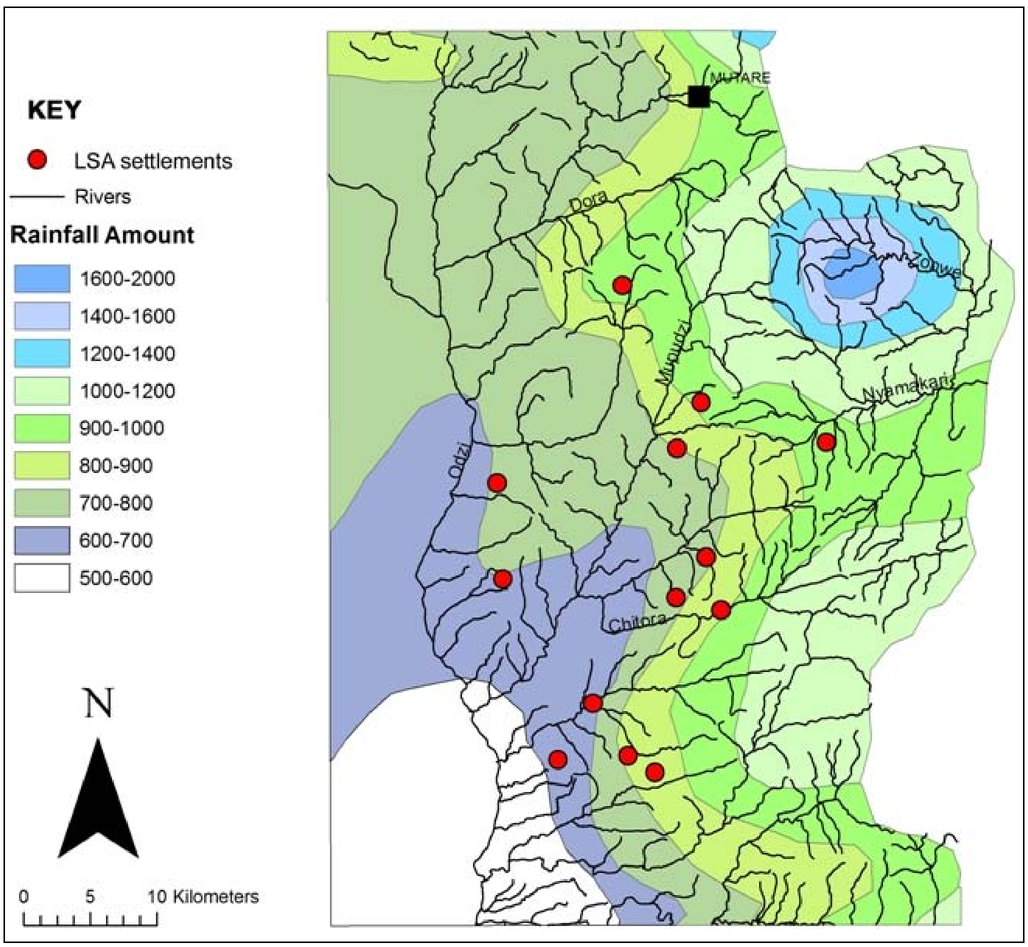


Fig. 6. 11. Distribution of LSA settlement sites in relation to mean annual rainfall

The upland mountains, with their montane grasslands, rainforests, rugged terrain with precipitous cliffs, cool temperatures and above all, frequently rainy weather makes them less suitable for settlement. In contrast, the territory in which the sites are found is generally open country with savannah woodland of mainly *Brachystegia* species, grasslands and sometimes bushland. This is the typical habitat for most of the animals identified in the faunal remains. Settling in the mountains would have been costly in terms of energy expenditure in negotiating the terrain, especially in connection with hunting and transporting the proceeds of both hunting and gathering to the settlement areas. The rainforests occupy a smaller percentage of the research area such that human communities could not have survived for all the seasons entirely on this ecology. The strategy could have been to exploit both biomes for subsistence. If this was the case, it would have been more economical to settle in the lower savannah plains than inhabiting the upland areas.

The hunter gatherer communities were certainly aware of the rainfall distribution over the year. There is a clear tendency to avoid the frequently wetter and rainy areas that receive more than 1000 mm annual rainfall. The same areas have cool to cold temperatures, especially the Tsetsera mountain, where there are reports of the occurrence of snow in some years (Dhliwayo 2004, *pers comm*.). This could have made these areas less attractive for settlement.

While it is apparent from Fig. 6.12 that the distribution of the sites follows the granite kopjes, the clusters are also close to quartz and sometimes dolerite out crops. The association was observed during the field surveys when it had been observed that most of the surface stone artefacts recovered were mainly of quartz. From the excavations, about 90% of the stone artefacts recovered were of quartz (Soper 2005). The association could have been, among other reasons, a conscious decision to settle near the raw material for stone tool making. However, one need not be dogmatic about this as the association could have been by chance and an adaptation to available raw materials.

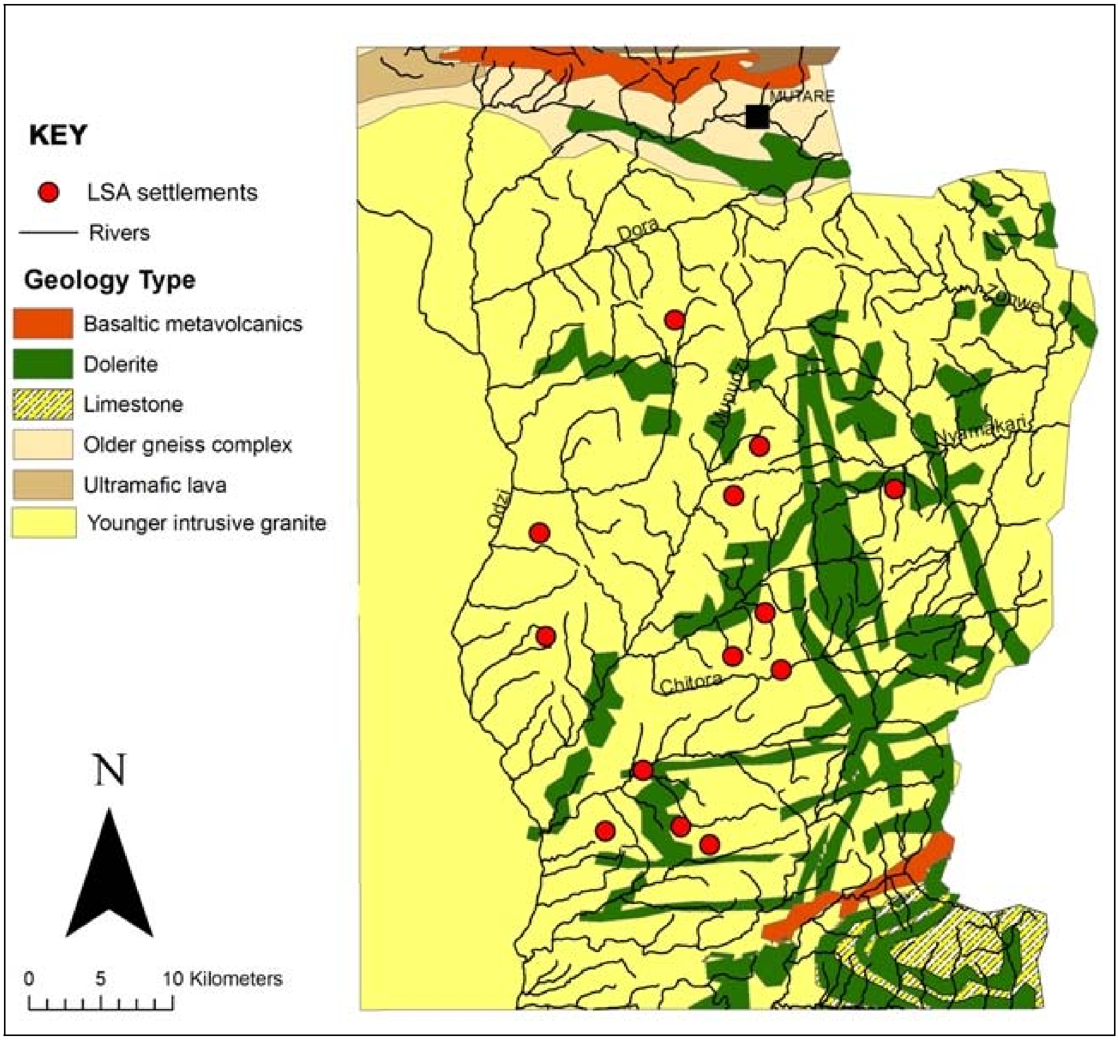


Fig. 6. 12. Distribution of LSA settlements in relation to geology

The analysis of the distribution of the LSA settlement sites in relation to soils (Fig. 6.13) was conducted for reasons of consistency as the soils do not seem to have any direct bearing to the survival of hunter gatherer communities. Although 11 of the large sites occur in the Luvisols compared to 2 that are in the ferralsols, this might be a pattern that is reflecting the influence of the parent geology. The only way soil type could have influenced LSA settlement would be indirectly through its effects on the availability of water and floral resources.

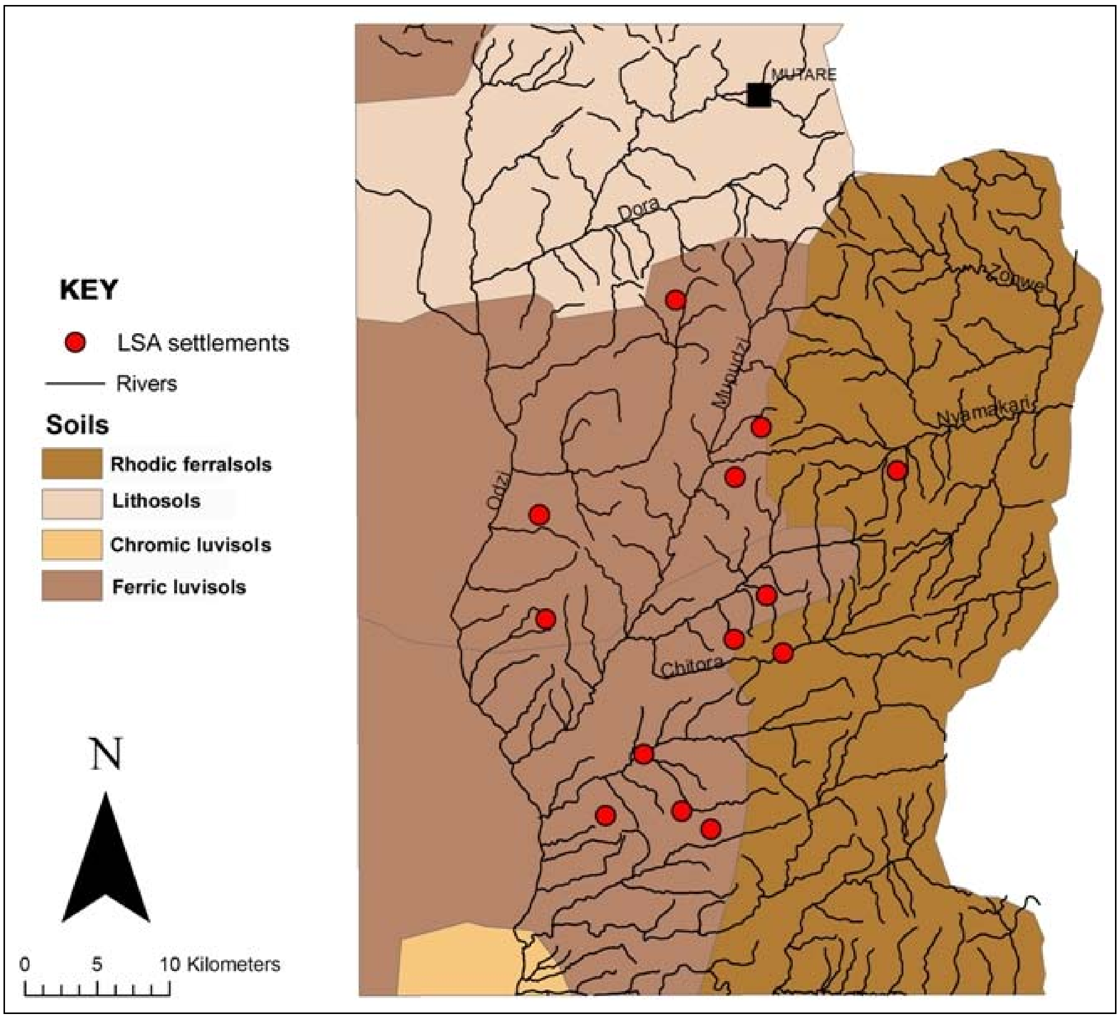


Fig. 6. 13. Distribution of LSA settlement sites in relation to soil types

The statistical analysis also shows no significant relationship between the LSA sites on the one hand and the soil types and rainfall on the other. Reclassifying the rainfall ranges into two categories of ≥ 1000 mm and < 1000 mm still does not lead to a significant relationship with the sites. It can be noted however, that 95.3% of the sites are found in the area that receives less than 1000 mm of rainfall. This is also the area that has Ferric Luvisols.

Soil Type	**Area%**	**Observed Sites**	**Expected Sites**	**Chi-square**
Rhodic Ferralsols	35	14	30.1	*χ^2 Cal = 3.776*
Lithosols	19	1	16.34	
Ferric Luvisols	46	71	39.56	2 df @ 0.05 = 5.99
Total	**100**	**86**	**86**	

Table 6. 6. Contingency table for the correlation of LSA sites and soil types

Rainfall (mm)	**Area%**	**Observed Sites**	**Expected Sites**	**Chi-square**
600-700	15.5	12	13.33	*χ^2 Cal = 3.146*
700-800	31.7	23	27.262	
800-900	13.2	22	11.352	
900-1000	17	25	14.62	6 df @ 0.05 = 12.59
1000-1200	17.1	4	14.706	
1200-1400	3.1	0	2.666	
1400-2000	2.2	0	1.892	
Total	**99.80%**	**86**	**85.828**	

Table 6. 7. Contingency table for the correlation of LSA sites and mean annual rainfall

With regards to elevation, values at the location of each site were extrapolated from the DTM. Fig. 6.14 below summarises the distribution of the LSA sites relative to the elevation. Although the pattern reflects the natural occurrence of the inhabited shelters, there are situations where some shelters seem to have been avoided. The 3D model in Fig. 6.8 shows the general altitude preference.

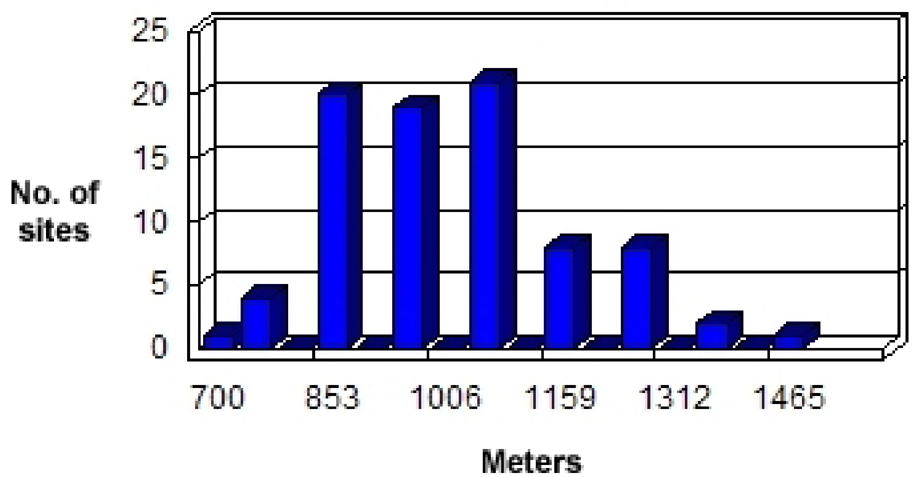
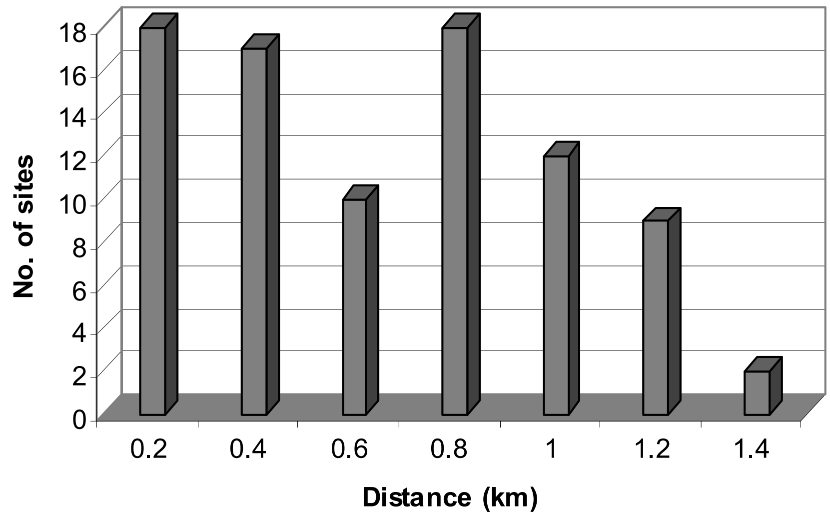


Fig. 6. 14. Frequency of rock art sites in relation to altitude

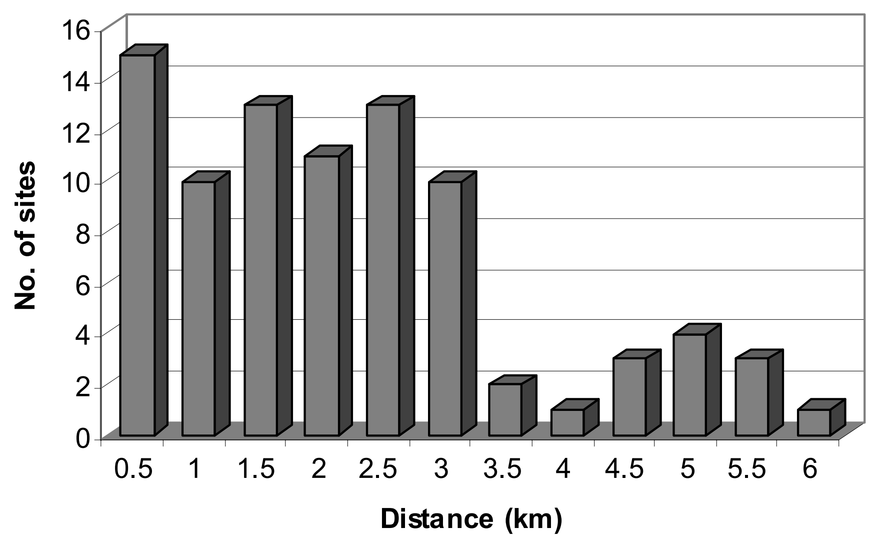
The distribution pattern of all the rock art sites shows that although their location is influenced by the natural formation of the shelters, there are fewer above the 1006 m contour. These are the upland areas in the mountains of Vumba and Tsetsera and in the wetter areas. Most of the rock art sites are therefore in the low hills found in the plains of Zimunya. The absence of open air sites is a clear indication of the exploitation of rock shelters for habitation. However, there is no clear evidence from the excavated data of the season when the shelters were occupied.

There appears to be an interesting pattern between the site clusters and the river systems. Each cluster seems to relate to a particular locality along the major streams that flow into the Odzi River. At present, and probably in the past, the major streams from the wet upland mountains are perennial, with the Chitora and Mupudzi rivers having significant volumes in the dry season. The almost regular distribution of the clusters reveals that there was no scarcity of water, suggesting that it was probably available in all the significant rivers throughout the year. The distribution of sites with respect to the river systems required the calculation of the Euclidian distance from each site to the nearest water source. The idea is that if water was a significant influence on site location, the sites should be found along or near the rivers/streams.

Fig. 6.15 shows the frequency of the occurrence of rock art sites in relation to distance from the nearest streams. The figure relates the distribution of the sites to two scenarios. The first relates all the rock art sites to all the streams, that is to the nearest stream of any order. This assumes that the sites were occupied at a time when all the streams were flowing, as in the rainy season or if all the streams were perennial. The second situation is one where only the major rivers were perennial. Thus Fig. 6. 15 shows the frequency distribution of all the rock art sites in the area in relation to all the streams in the area, graph (a), and all the rock art sites in relation to major streams which are perennial, graph (b). Table 6. 8 shows actual distances of the LSA settlement sites, that is the large rock art sites, in relation to all streams, graph (a), and to major streams only, graph (b).



(a).



(b).

Fig. 6. 15. Frequency of LSA sites in relation to distance from (a), the nearest streams of any order and, (b), from the nearest major streams

Site Name	Rank	Distance to nearest stream (meters)	Distance to major stream (meters)
Bopwe Hill	large	271	271
Chiuya 1	large	803	2588
Dzimbabwe hill	large	1077	2240
Gomoravadzimba	large	695	1201
Gwenzi	large	874	2731
Mabushmen 1	large	183	1667
Madzimbabwe	large	623	4871
Manjowe	large	1074	5694
Muranda manjowe	large	658	4505
Muromo	large	48	48
Nyamidzi hill	large	147	1290
Nyarupara1	large	1089	1696
Rowa Mountain	large	536	536

Table 6. 8. Frequency of LSA settlement sites (large rock art sites) in relation to distance from the nearest streams of any order and from the nearest major streams

The graphs show no obvious correlation, but a skew to the left is observed, when one considers the sharp drop in the frequency of sites after 1 km on Fig. 6.15(a) and after about 3 km on Fig. 6.15(b). 3 km may not be a considerable distance from the streams for both hunter gatherers and farming communities. However, situated within least effort principles in settlement location and resource exploitation, distances beyond 3 km might be prohibitive to settlement. With respect to water availability, distances above this average become costly in energy expenditure, and would also require an efficient means to carry and store water. With the large rock art sites the 3 km threshold distance from the major rivers is again evident. Taking 3 km as an acceptable threshold distance from the rivers, 10 of the 13 large sites show a skew towards the rivers. The similarity in the critical distance to the water sources between Figs 6.15(b) and Table 6. 8 may also be showing the existence of a skew towards the major streams. This suggests that the sites might have been occupied during the rain season when these would be the only streams flowing.

However, the spread of the skew in the graphs and maps above, suggests that at the micro scale, water was not a scarce resource. Considered as a whole region and in comparison to other areas in Zimbabwe, the eastern highlands would have been a boon for hunter-gatherer settlement. However, once people were already in the area, the choice of settlement location was not simply influenced by the availability of water. The behaviour of settlement distribution is thus expressing some other influencing variable. It is probable that the same technological limitation expressed for MSA communities also affected the LSA hunter gatherers.

The implication of the distribution pattern is that the area could have been occupied when the streams were perennial or during the summer rainfall season. The almost even distribution of the sites across the landscape, and the absence of sites in wetter areas (Fig. 6. 11), suggests once again that rainfall or water was not a cohesive factor at the micro scale. Thus the LSA communities preferred to be near rivers for technological and economic reasons that were related to the exploitation of riverine resources. From the distribution patterns above, the absence of rock art sites in the Vumba and Tsetsera areas has two explanations. The first one is topographical, where the rugged terrain makes these areas less suitable for foraging activities such as hunting. The second possible explanation relates to rainfall, not its amount, but its distribution throughout the year. Since the mountainous areas are frequently moist, they could not always have been conducive for settlement, especially where there was the option of drier areas nearby. However, the need to exploit the wetter ecosystems should have kept these communities nearby. For these reasons there are more sites along the rivers but away from the highlands. However, frequency of the occurrence of sites decreases as distance increases from the mountain foot slopes. This trend shows a strategy that depended on the exploitation of the two biomes.

The wet season cloud base that Soper (2002) presumes to have influence the settlement of the Nyanga uplands by later farming communities can equally be applied to the stone age of Zimunya. Given the frequent mist in the higher mountains which significantly reduces visibility, sometimes for several days (Bannerman 1993; Mutore 2004 *pers. comm.*), the area could have been difficult and dangerous to traverse. As the oral accounts indicate, the name Vumba is derived from the frequent mist that occurs in these mountains (Bannerman 1993; Mutore 2004, pers. *comm.*). Temperatures are also low in the mountains such that it can be very cold in winter. The combination of excessive rainfall, topography and subdued temperatures due to the high altitude could have influenced the pattern observed.

Fig. 6. 16 represents a model of the cloud base level in Zimunya. Giving the mist level a minimum elevation of 1500 m would put much of Tsetsera, Vumba, Chemukuti and the top of Rowa mountain (to the northwest) under mist. Lowering this further would render the whole of the uplands less visible. Although the minimum height of the mist and the reduction in visibility would vary for several reasons, chief of which will be the temperature and moisture available in the south east trade winds, the fact that this can go on for several days and accompanied by drizzle may have made these areas less favourable for settlement.

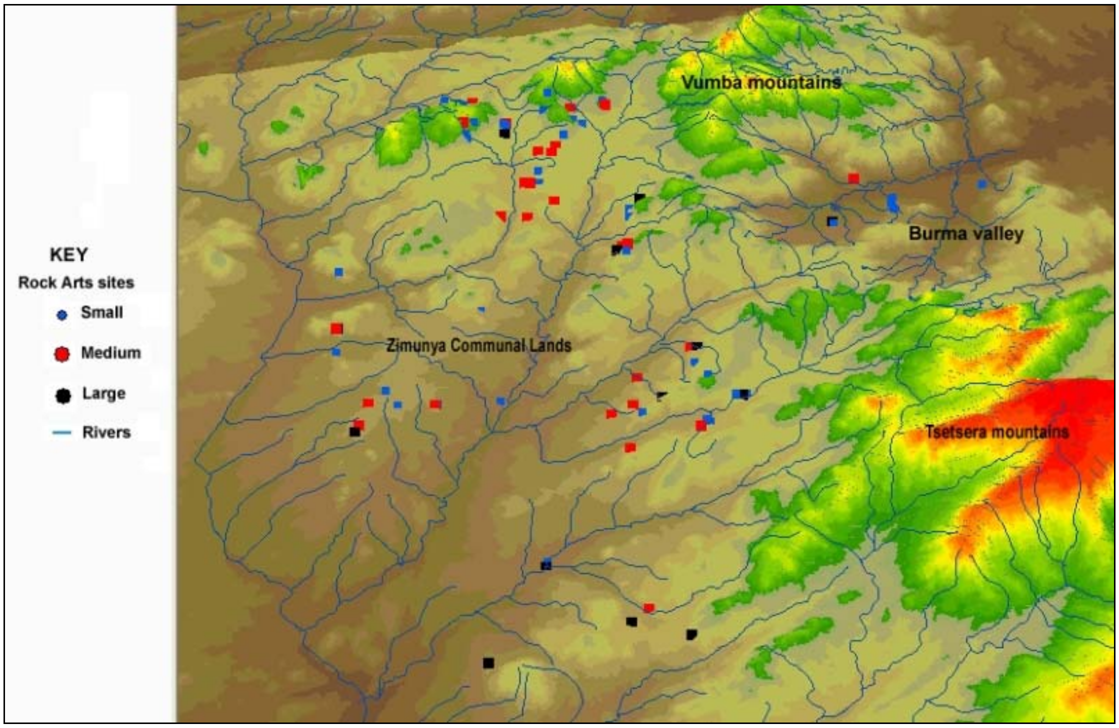


Fig. 6. 16. Cloudbase level at 1 500 m above sea level shown by the green to red patches

6.4.2 The Farming Communities

The spatial analysis of farming communities required identifying and enumerating the occurrence of the sites in the various environmental categories available. The use of the chi-square goodness of fit test on the data did not produce reliable results as the data did not closely match the requirements for the use of that statistic (Drennan 1996; Shennan 1997). There are many low values in the frequency tables and there were no sites in some of the environmental categories (Figs. 6. 17-19). Much of the discussion is therefore based on the comparison of site frequencies in the environmental areas that yielded sites.

6.4.2.1 Distribution patterns of the Early Farming Communities sites

The earliest evidence of early farming communities in Zimunya is the EFC Ziwa culture. This tradition is represented by isolated surface scatters of sherds at 8 sites. In 1979 there was report of an EFC Coronation tradition site at the stone walled site of Tsetsera, but these ceramics could not be located during the recent surveys. Four other EFC sites appear in the NMMZ register but only one of them (Murahwa's Hill) was confirmed. The other 3 could not be re-located for reasons explained in Chapter 4.

In more recent times, EFC pottery was reported at Muromo site on the basis of excavated evidence (Matsikure 2002). The recent excavations at Murahwa's Hill, Gwenzi and Manjowe sites led to the recovery of a few more EFC sherds. A date of 1180 +/- 45 BP (895 AD) was obtained from charcoal samples that were in association with the Ziwa material culture recovered from the basal levels at Murahwa's Hill. In the rock shelters, these sherds were in the same context with Stone Age material, suggesting the possibility of contemporaneous presence of ceramic using communities and hunter gatherers in the area. These ceramics could not be dated owing to the lack of datable material. However, similar levels in other test pits that yielded charcoal samples were dated to between the 13th and 17th centuries AD. These latter dates go against the generally held view that the transition from EFC to LFC cultures occurred at the end of the 1st millennium AD. However, we cannot assume that the EFC cultures were replaced by the LFC cultures at the same time everywhere. It appears this might be the trend in south eastern Zimbabwe as Thorp (2005) also found a very late presence of hunter gatherers in the Malilangwe conservancy near Chiredzi whose evidence lasted until the 15th century AD.

Figures 6.17 to 6.19 show the distribution of these sites in relation to geology, soils and rainfall. 80% of the sites are in the granite areas while 10% are on dolerite and the other 10% are on basalt volcanic rock. With regards to soils, 30% are in ferralsols, 60% in luvisols and 10% in lithosols. The influence of soils is better understood when related to the underlying parent geology. In this regard 80% of the sites are on granite derived soils (that is the sandy soils), while 10% are on dolerite and 10% on basalt derived soils. The ferric and chromatic variations in the luvisols might not have been significant enough to influence the settlement distribution. In terms of rainfall, there are no EFC sites recorded above the 1000 mm isohyet, although all are in the medium range of 600-1000mm per year. All the sites are in close proximity to extensive areas with slopes of 5^{o} or less. 80% of the sites are located less than 1km away from the nearest stream while the rest are between 1 and 1.2 km. All the sites are also in savannah vegetation.

The EFC sites have a similar general distribution as the Stone Age sites. The discovery of EFC sherds in the same context with SA material may be a reflection of the interaction of these communities. The association in the distribution of surface evidence of LSA and EFC appears consistent with data coming from other parts of southern Africa. Ethnographic evidence and Stone Age research in the sub-region suggests that hunter gatherers were important in the ritual activities of farming communities (Pwiti *et al* 2006). The hunter gatherers could also have traded with the farmers. There are suggestions that hunter gatherers might have been manufacturing their own ceramics (Burrett 2006). However, the scanty evidence of the EFC cultural material is a cause for concern. Except for Murahwa's hill, everywhere else only a few sherds were recorded.

6.4.2.1.1 Statistical analysis of the EFC sites

As much of the data are categorical, I thought it should be amenable to the Chi-square test for significance of association. Working with Microsoft Excel and WinIDAMS software programmes, I calculated chi-square values for the relationship of the EFC sites and the environmental variables. The null hypothesis indicated that there is no significant relationship between the observed values and the expected values if this was from a random sample. At the confidence level of 0.05 or 95%, no significant relationship was detected for all the three variables soils, rainfall and geology. Although a Chi-square statistic was calculated it was not reliable for the reason that the test does not work well with very low values in the contingency tables (Shennan 1997). For Zimunya there were several such instances where some environmental categories had no sites. It is in such cases that the power of visualization in GIS is more important as it makes it possible to have a perspective of the bigger picture in the distribution patterns. The distribution of early farming communities over the rainfall layer (Fig. 6.19 and Table 6. 10) shows the areas where sites are present and where they are absent.

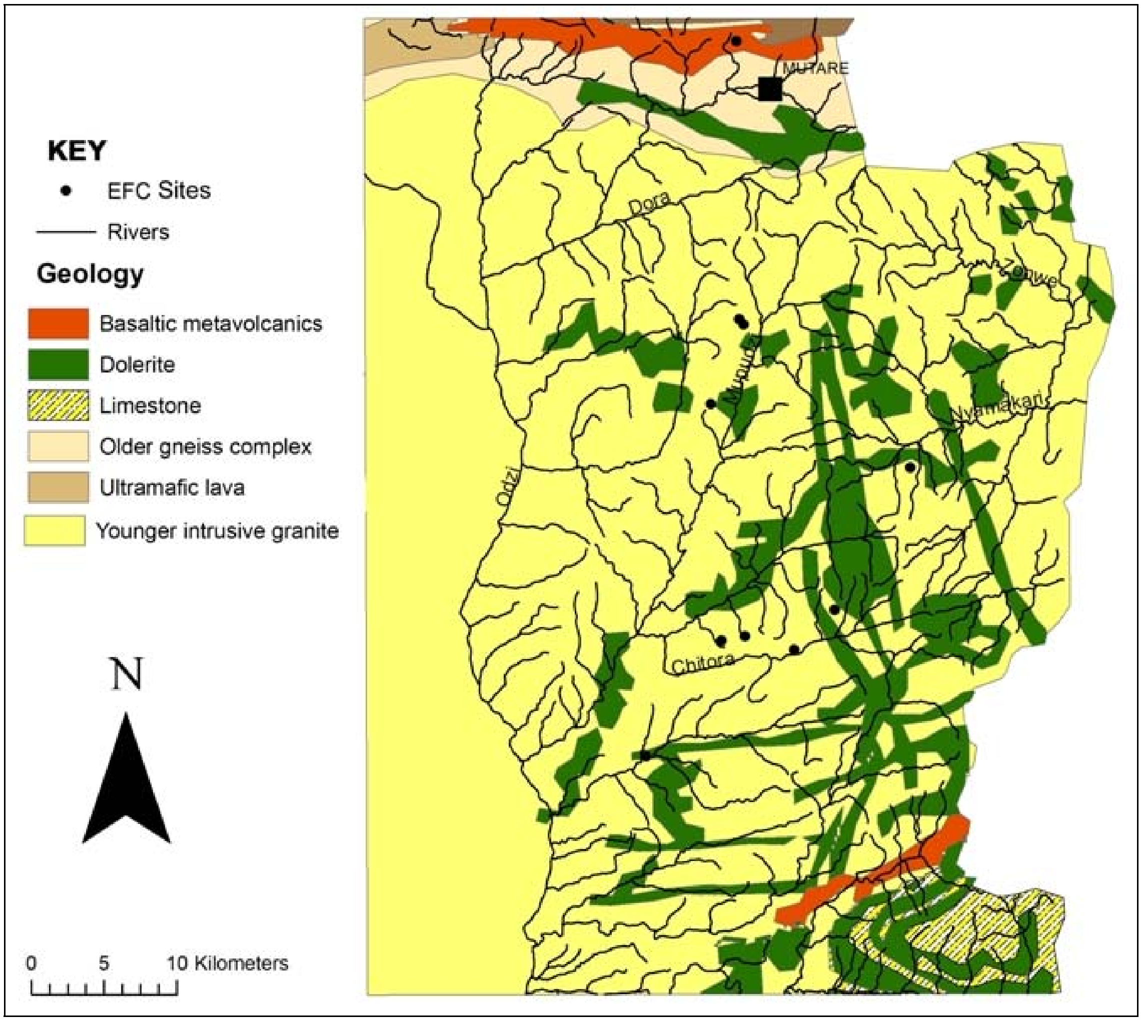


Fig. 6. 17 Distribution of EFC sites in relation to geology

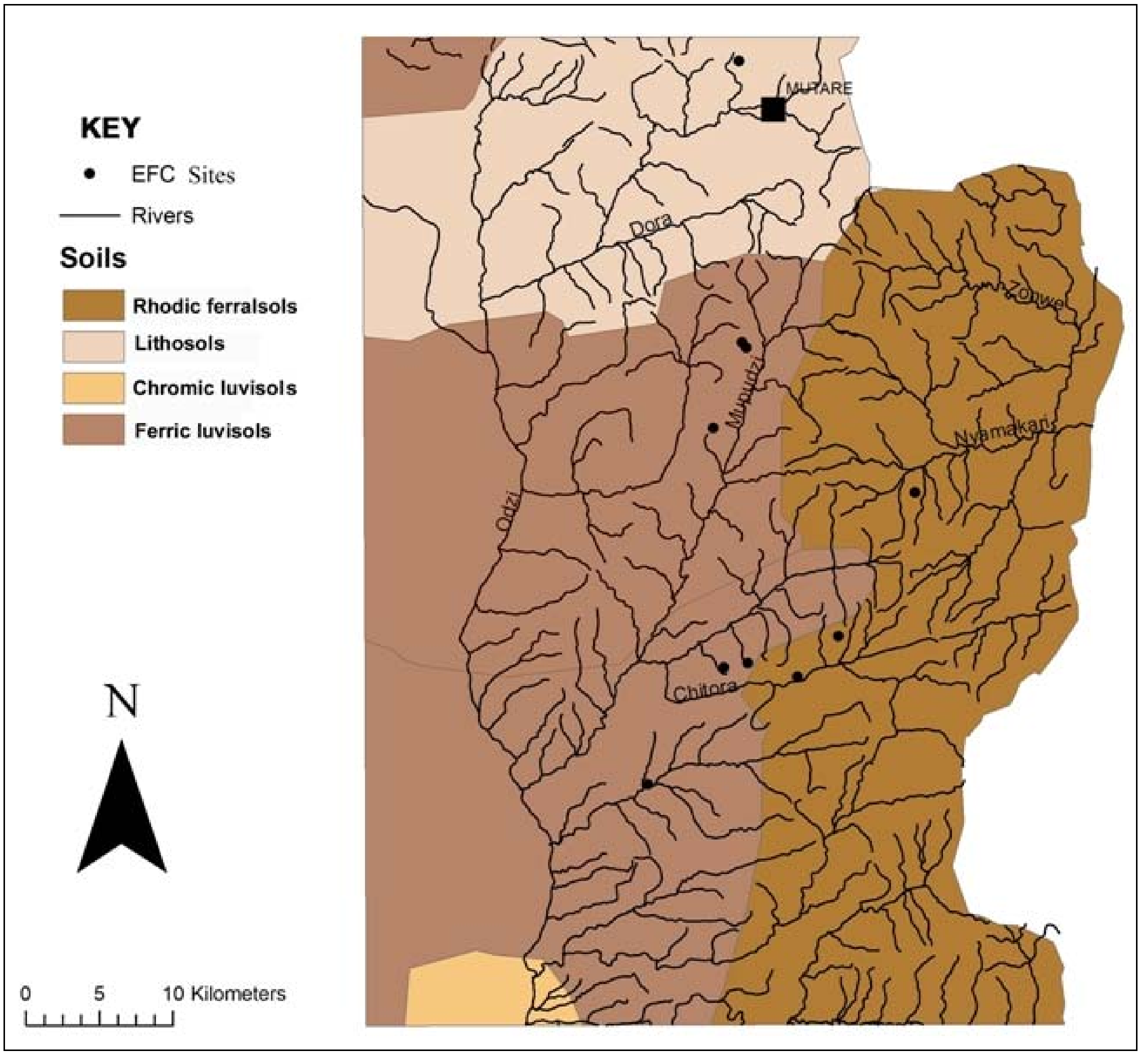


Fig. 6. 18 Distribution of EFC sites in relation to soil types

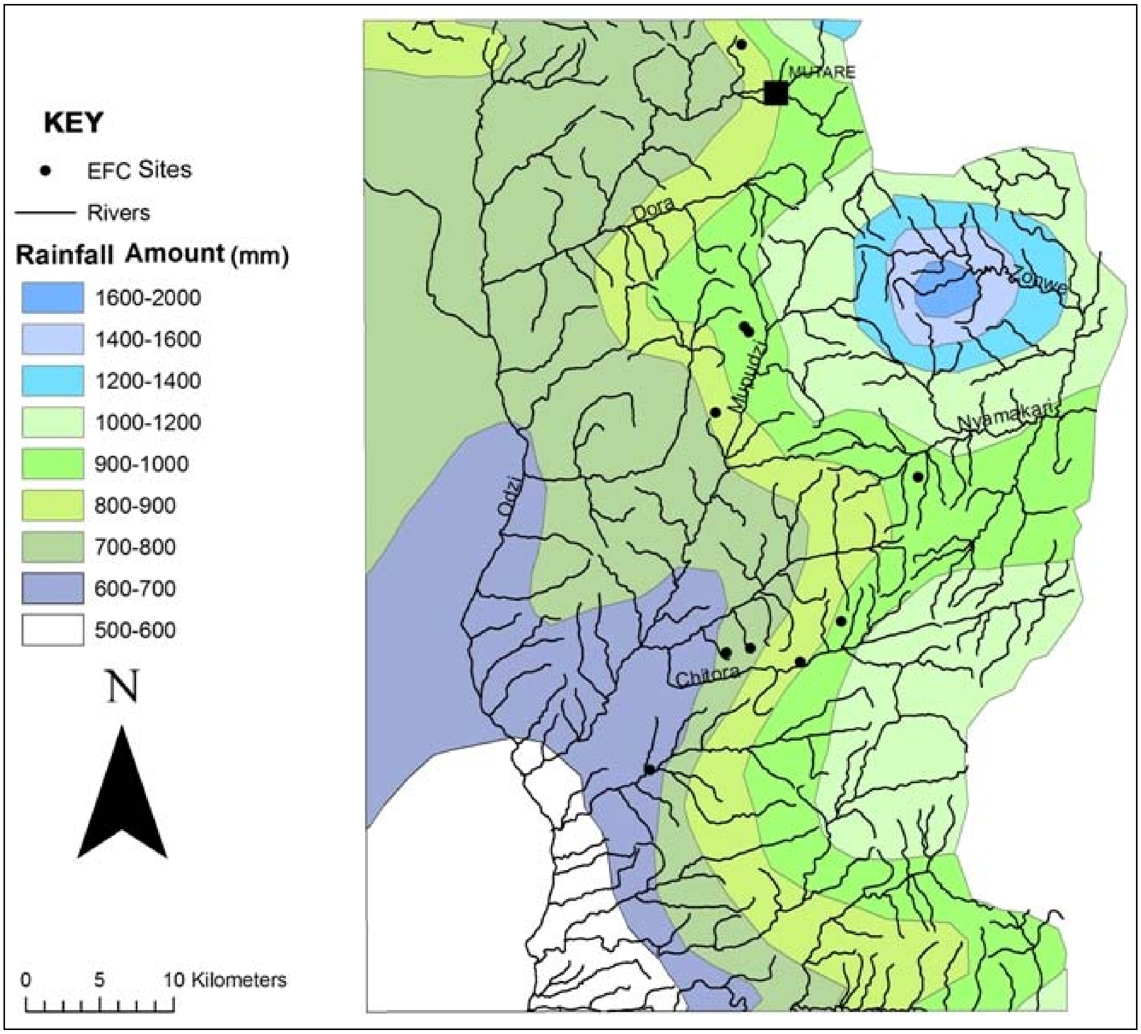


Fig. 6. 19 Distribution of EFC sites in relation to mean annual rainfall

The chi-square calculations do not indicate any significance in the distribution of these sites (Tables 6.9-11). All the calculated values are smaller than the ones from the statistical tables. As with the Stone Age sites the low frequency of EFC sites in Zimunya might have affected the results of the statistical analysis. Fig. 6.19 shows that the sites are along or near river valleys in the central part of the research area.

Soil Type	Area%	Observed sites	Expected sites	Chi-square
Rhodic Ferralsols	35	3	3.5	*χ^2 calc = 0.607*
Lithosols	19	1	2	
Ferric Luvisols	46	6	4.6	2 df @ 0.05 = 5.99
Total	**100**	**10**	**10**	

Table 6. 9 Contingency table correlating EFC sites and soil type

Rainfall (mm)	Area%	Observed Sites	Expected Sites	Chi-square
600-700	15.5	1	1.55	*χ^2 calc = 0.23*
700-800	31.7	2	3.17	
800-900	13.2	3	1.32	
900-1000	17	4	1.7	6 df @ 0.05 = 12.59
1000-1200	17.1	0	1.71	
1200-1400	3.1	0	0.31	
1400-2000	2.2	0	0.22	
Total	**99.80%**	**10**	**9.98**	

Table 6. 10. Contingency table correlating EFC sites and mean annual rainfall

Geological Type	Area %	Observed sites	Expected sites	Chi-square
Basaltic	2.2	1	0.22	*χ^2 calc = 1.167*
Dolerite	15.6	1	1.56	
Granite	80.2	0	8.02	3 df @ 0.05 = 7.81
Limestone	1.9	8	0.19	
Total	**100**	**10**	**10**	

Table 6. 11. Contingency table correlating EFC sites and geological belts

As with the Stone Age sites, the EFC occurrences are located away from the higher and wetter areas of Vumba and Tsetsera mountains. As will be shown in Chapter 7, the 9th century date for the EFC evidence at Murahwa' Hill coincides with a wetter climatic period in southern Africa. Important crops such as finger millet (*Eleusine coracana*), pearl millet (*Pennisetum glaucum)* and sorghum (*Sorghum bicolor*) that were grown in much of southern Africa (Jonsson 1998; Huffman 1996b; Phillipson 2005; Smith 2005; Tredgold 1986) do not grow well under constant rain and cool temperatures. Such climatic conditions lengthen the growing period of the crops and can spoil them when they eventually mature.

It has been shown that the agro-ecological regions in Zimunya range between Region 2 and 4 based on annual rainfall and other climatic conditions (Vincent and Thomas 1961). There is no great anomaly in the distribution of the EFC with respect to these agro-ecological regions as all the sites are in the areas with between 600-1000 mm annual rainfall. The minimum rainfall requirement for sorghum and millet is 300 mm per year (Huffman 1996b). Agriculture for EFC people must have been possible in Region 4 since these are drought resistant crops. We know from the excavated evidence at Murahwa's Hill that the EFC had cattle, but no seeds of cultivated cereals were recovered. The 9th century date is associated with a wetter climate in southern Africa (Tyson and Lindesay 1992; Holmgren *et al* 1999; Ekblom 2004). Thus agriculturally this area was suitable for crop production and cattle rearing during the Ziwa period.

The rarity of EFC sites could be a result of cultural factors rather than the environment. Although bias in site recovery was not quantified, the fact that some sites were recorded in all the survey strata minimizes the effect of such bias on the results obtained. The rare occurrence of the EFC sherds south of Murahwa may be an indication of a general absence of intensive EFC settlement. Resources could not allow for comparison with surrounding areas to assess the significance of this assumption. However, even previous reports of archaeological sites had indicated the limited presence of EFC sites.

6.4.2.2 The Later Farming Communities

Although excavation data showed that there is the presence of ceramics that have labelled Umtali Cordoned Ware (UMC) (see Chapter 5), no sites with such material were discovered during the surveys. As similar material was recovered at Great Zimbabwe, it is presumed to be an aspect of the Zimbabwe culture in eastern Zimbabwe. For these reasons, this material is not included in this analysis.

6.4.2.2.1 The Zimbabwe Tradition

Based on the current evidence, the Zimbabwe tradition is the earliest LFC culture represented in Zimunya. The 15th century date (1435 AD) for LFC material recorded at Murahwa coincides with the Khami phase of the Zimbabwe tradition. However, there are a few stone structures of the earlier Zimbabwe phase of this tradition in the area, but no dating evidence has been found that compares with the main stone building period at Great Zimbabwe. One Zimbabwe culture phase enclosure is on Tsetsera mountain (see chapter 4), but there is no indication that the site could have been settled for very long. A single wall, about 5m long and 1.5 m high remains as the only visible GZ architecture at the site. The rest of the other walls at the site are collapsed and some clearly show that they were poorly built and of undressed stones.

The Mutare Altar site, Murahwa's hill and one enclosure recorded in the recent surveys in the Burma valley are the other Zimbabwe sites in the area. Mutare Altar site and Murahwa's Hill have been regarded as the eastern fringes of the Zimbabwe state centred at Great Zimbabwe (Sinclair 1987). They have also been linked to the Zimbabwe communities at Chipadze in Makoni and at Matendera and Kagumbudzi in Buhera (Sinclair 1987). However, there is no firm dating of this Zimbabwe phase in Zimunya. There are no diagnostic sherds to illuminate on the phase, the settlements of which are all on hill locations. The 15^{th} century dates from Murahwa's Hill and Mutare Altar site would fit the sites into the Khami phase. This is supported by the fact that Khami phase ceramics were discoverd in the area (Musindo 2005). However, the absence of the characteristic Khami stone walling of retaining platforms appears to contradict the chronology obtained in eastern Zimbabwe. The conclusion that can be drawn is that there is co-occurrence of the two phases in the area, although their chronological sequence is not clear.

The Khami phase sites occur in two clusters, one to the west, and the other towards the northern limits of the research area (Figs. 6. 20-22). These sites are on very low hills, but do not have extensive enclosures. Only at Madzimbabwe and Murahwa's hill are there traces of very low terrace platforms. The sites to the west are tightly clustered between Odzi and Mupudzi rivers, while the northern sites are dispersed. The investigation on the possibility of correlationships between the Zimbabwe tradition sites to the physical environmental variables shows no significant association for both phases (Tables 6.12-17). This might be expected given that most of these settlements are on hilltops which hints at the significance of other variables in the location of the sites.

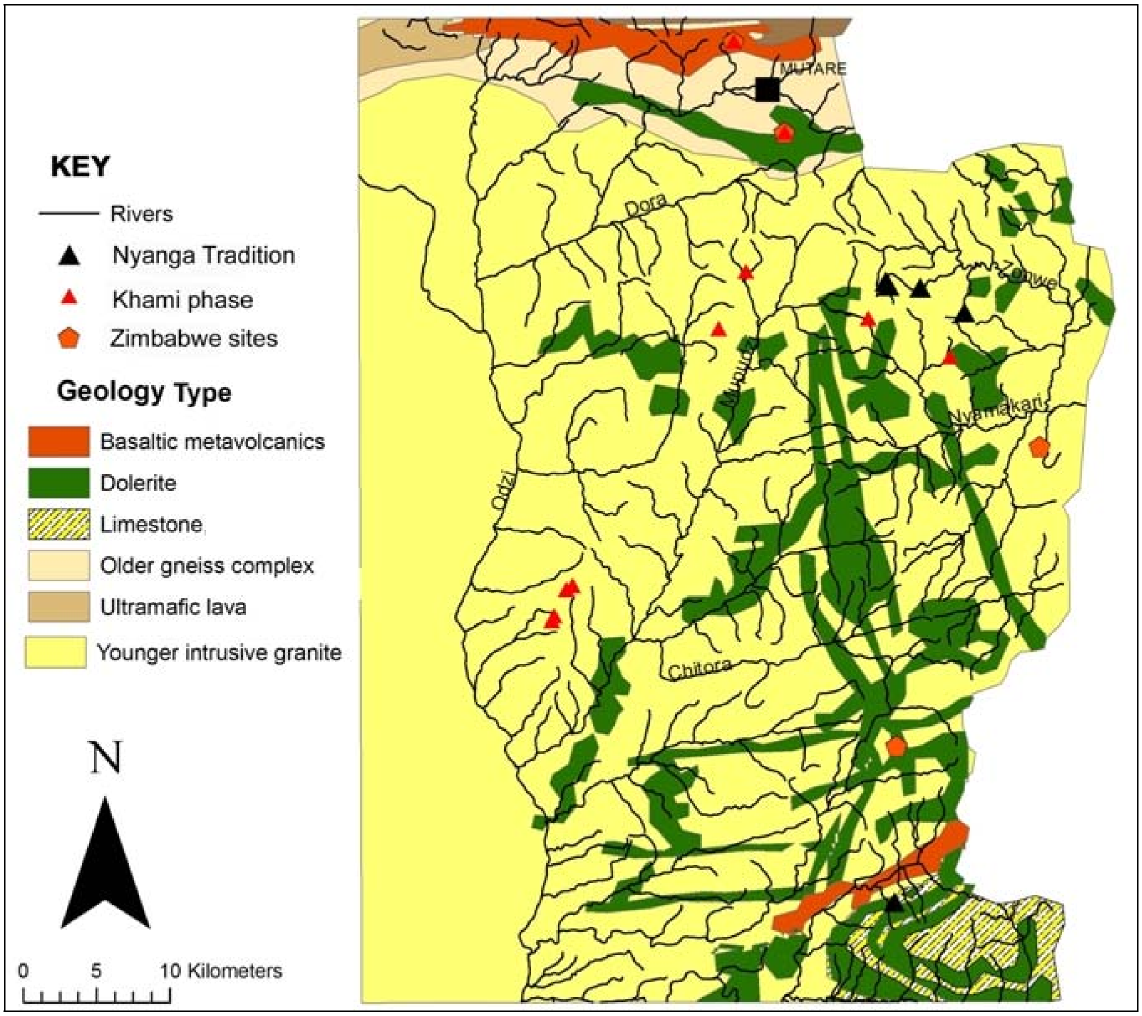


Fig. 6. 20. Distribution of LFC sites in relation to geology

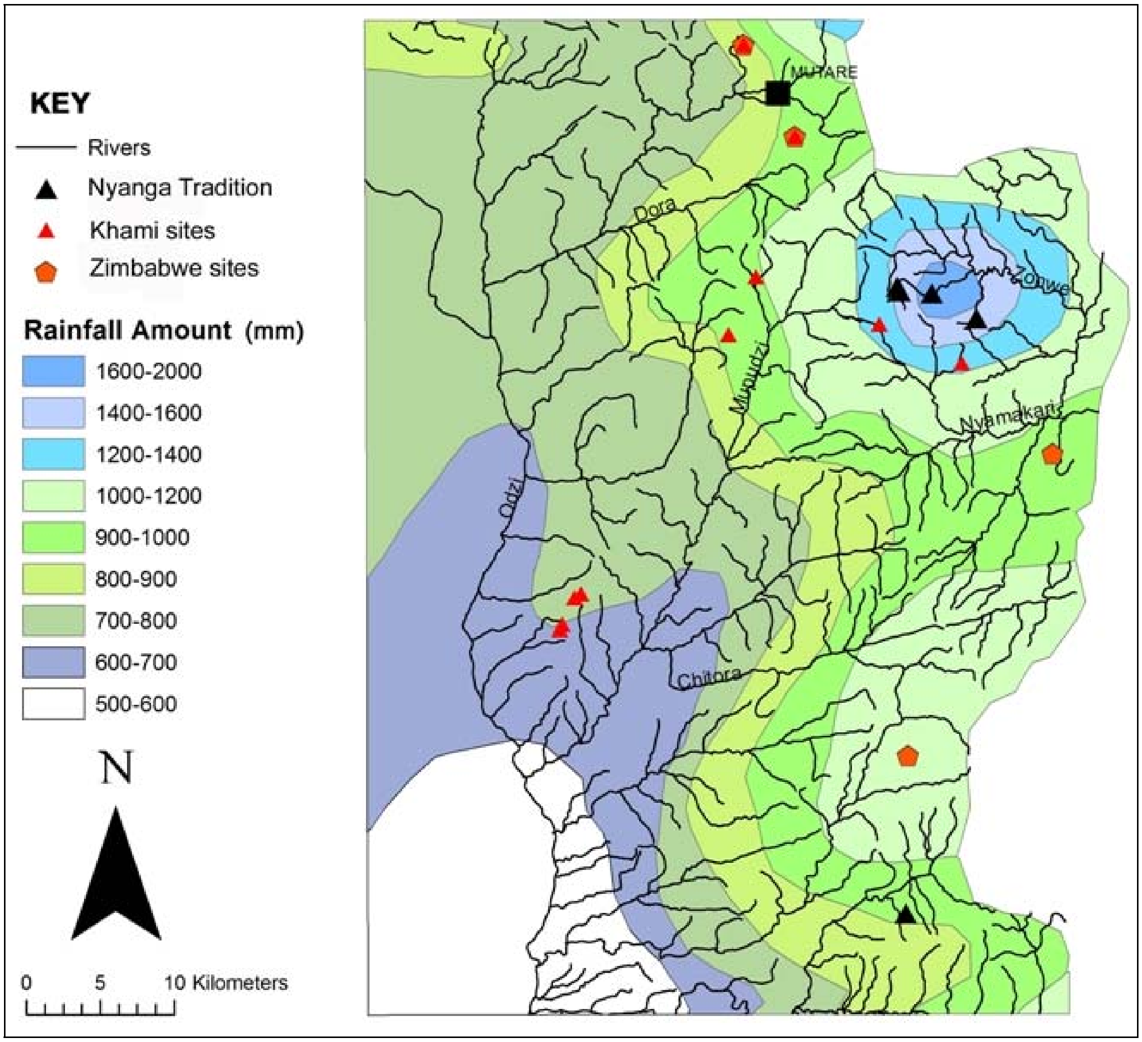


Fig. 6. 21. Distribution of LFC sites in relation to mean annual rainfall

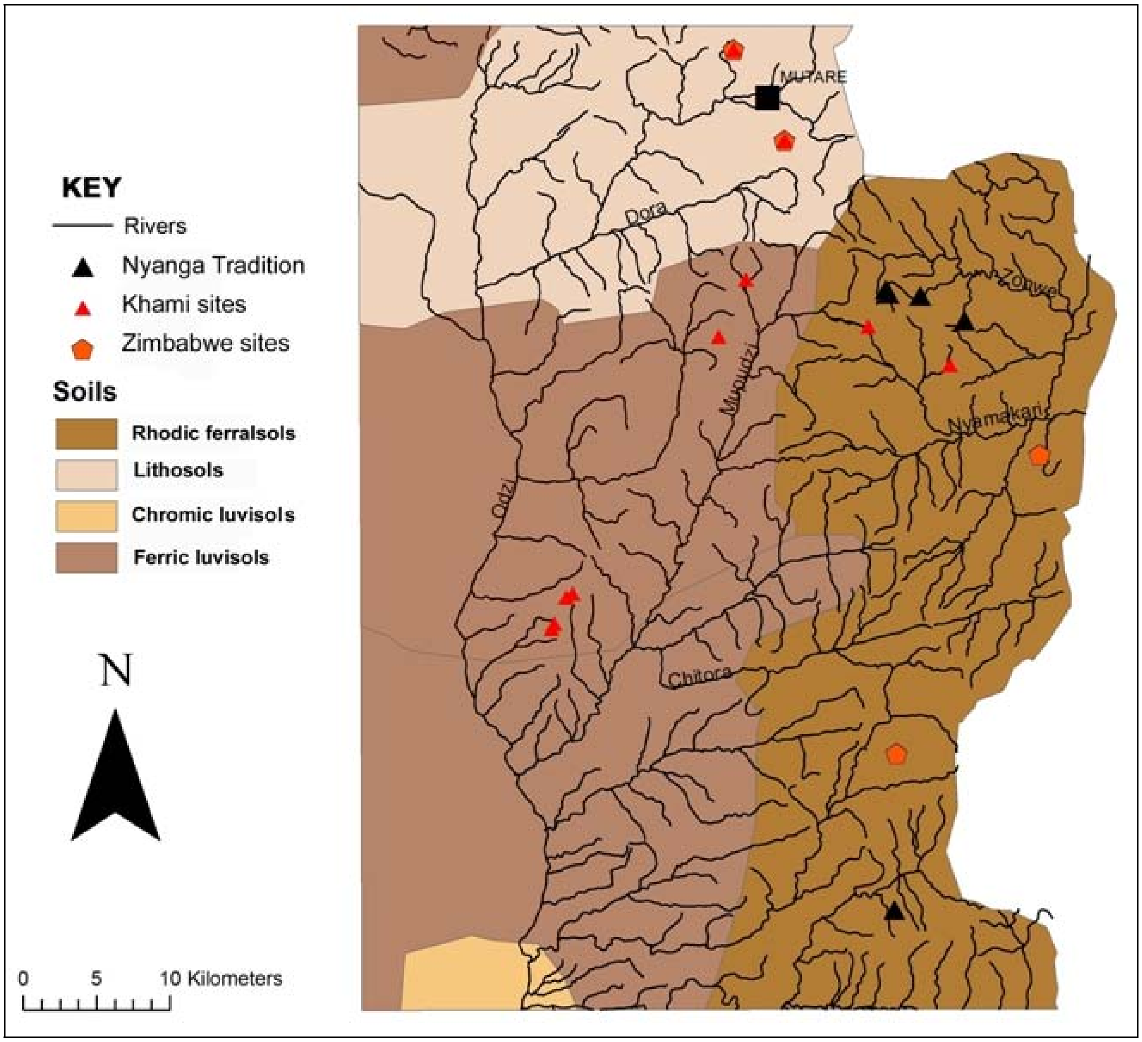


Fig. 6. 22. Distribution of LFC sites in relation to soil types

Soil Type	Area	Observed	Expected	Chi-square
Rhodic Ferralsols	35	2	1.4	χ^2 calc = 0.127
Lithosols	19	2	0.76	
Ferric Luvisols	46	0	1.84	2 df @ 0.05 = 5.99
Total	**100**	**4**	**4**	

Table 6. 12. Contingency table for the correlation of GZ phase sites with soil types

Rainfall (mm)	Area%	Observed Sites	Expected Sites	Chi-square
600-700	15.5	0	0.62	*χ^2 calc = 0.515*
700-800	31.7	0	1.268	
800-900	13.2	1	0.528	6 df @ 0.05 = 12.59
900-1000	17	2	0.68	
1000-1200	17.1	1	0.684	
1200-1400	3.1	0	0.124	
1400-2000	2.2	0	0.088	
Total	**99.80%**	**4**	**3.992**	

Table 6. 13. Contingency table for the correlation of GZ phase sites with mean annual rainfall

Geological Type	% Area	Observed sites	Expected sites	Chi-square
Basaltic	2.2	1	0.088	*χ^2 calc = 6.096*
Dolerite	15.6	2	0.624	
Granite	80.2	0	3.208	3 df @ 0.05 = 7.81
Limestone	1.9	1	0.076	
Total	**100**	**4**	**3.996**	

Table 6. 14. *Contingency table of the correlation of GZ phase sites with geology*

Soil Type	Area%	Observed sites	Expected sites	Chi-square
Rhodic Ferralsols	35	2	3.5	χ^2 *calc* = 0.584
Lithosols	19	2	1.9	
Ferric Luvisols	46	6	4.6	2 df @ 0.05 = 5.99
Total	**100**	**10**	**10**	

Table 6. 15. Contingency table of the correlation of Khami phase sites with soil type

Rainfall (mm)	Area%	Observed Sites	Expected Sites	Chi-square
600-700	15.5	2	1.55	*χ^2 calc = 0.047*
700-800	31.7	2	3.17	
800-900	13.2	1	1.32	
900-1000	17	3	1.7	6 df @ 0.05 = 12.59
1000-1200	17.1	0	1.71	
1200-1400	3.1	2	0.31	
1400-2000	2.2	0	0.22	
Total	**99.80%**	**10**	**9.98**	

Table 6. 16. Contingency table of the correlation of Khami phase sites with mean annual rainfall

Geological Type	% Area	Observed sites	Expected sites	Chi-square
Basaltic	2.2	1	0.22	*χ^2 calc = 0.368*
Dolerite	15.6	1	1.56	
Granite	80.2	8	8.02	3 df @ 0.05 = 7.81
Limestone	1.9	0	0.19	
Total	**100**	**10**	**9.99**	

Table 6. 17. *Contingency table of the correlation of Khami phase sites with geology*

6.4.2.2.2 The Nyanga Tradition

The Nyanga tradition is famous for its ancient agricultural terraces found in the Nyanga area in north eastern Zimbabwe (Chirawu 1999; Soper 2002; Summers 1958). In the research area, there are no terraces comparable to those found in the Nyanga area. Traces of terracing were observed during the surveys along Mupudzi river, the western slopes of Hwangura mountain and in the miombo woodlands in the northern fringes of Vumba. Those to the west of Hwangura mountain are being used by contemporary communities in Chigodora village such that their antiquity could not be determined. There are 4 sites with pit structures on the north facing slopes of the Vumba mountains along Chinamata river and to the east of Vumba Park and National Botanical gardens. All the Nyanga tradition sites with pit structures are in similar locations, close to streams and near dolerite outcrops. The dolerite rock was used in the construction of the stone walls that line the interior of some of the pits although the site east of the Vumba Park has some walls and mounds of granite blocks.

There are several but small arable patches along this river. Annual rainfall is sometimes over 2000 mm in the Vumba. The area falls under agro-ecological Region 2, but grain crops may not do well because of the subdued temperatures and the high possibility of leaching. Soper (2002) has suggested that the settlement in the uplands of Nyanga could have occurred at times of reduced rainfall during the Little Ice Age (1300-1850 AD). Whether this was the same with the Vumba uplands remains to be explored since sites of the Nyanga tradition found in the research area were not excavated. However, the pits seem to be associated with the characteristics that are unique to the eastern highlands of Zimbabwe, which is an elevated area with very high rainfall and cool temperatures.

For the farming communities, rainfall, and proximity to water and existence of suitable agricultural land would have been important considerations. Water for livestock and for domestic consumption must have attracted settlement near reliable sources of water. The surveys found no evidence for the existence of wells or water holes. This could mean that water for domestic use must have been readily available from the rivers. The Nyanga sites, all being less than 500 m from the streams, seem to demonstrate the need to utilize the river systems. In addition, only the Nyanga tradition sites seem to be related to aspect as all but one of the pit structures have a northerly orientation.

Geological Type	**% Area**	**Observed sites**	**Expected sites**	**Chi-square**
Basaltic	2.2	0	0.11	*χ^2 calc = 0.023*
Dolerite	15.6	0	0.78	
Granite	80.2	4	4.01	3 df @ 0.05 = 7.81
Limestone	1.9	1	0.10	
Total	**100**	**5**	**4.995**	

Table 6. 18. Contingency table of the correlation of Nyanga sites with geology

Soil Type	**Area %**	**Observed sites**	**Expected sites**	**Chi-square**
Rhodic Ferralsols	35	5	1.75	*χ^2 calc = 0.0096*
Lithosols	19	0	0.95	
Ferric Luvisols	46	0	2.3	2 df @ 0.05 = 5.99
Total	**100**	**5**	**5**	

Table 6. 19. Contingency table of the correlation of Nyanga sites with soils

Rainfall (mm)	Area%	Observed Sites	Expected Sites	Chi-square
600-700	15.5	0	0.775	*χ^2 calc = 9.49*
700-800	31.7	0	1.585	
800-900	13.2	0	0.66	
900-1000	17	1	0.85	6 df @ 0.05 = 12.59
1000-1200	17.1	0	0.855	
1200-1400	3.1	3	0.155	
1400-2000	2.2	1	0.11	
Total	**99.80%**	**5**	**4.99**	

Table 6. 20. Contingency table of the correlation of Nyanga sites with mean annual rainfall

6.4.2.2.3. Overview of the correlation of diagnostic FC sites with the environment

The figures below show the general tendency of the association of Farming Communities and the environmental variables. It can be argued that the correlation coefficients generated from individual cultural phases would be much more meaningful than these grouped assessments, due to the fact that there would be no mixing of perceptions and values of different cultural periods. Unfortunately, separating these sites into their cultural phases brings low values in the contingency tables such that it becomes difficult to calculate a reliable χ^2.

	Basaltic	Dolerite	Limestone	Younger Granite	Total
Ziwa Freq	1	1	0	8	10
GZ Freq	1	2	0	1	4
Khami Freq	1	1	0	8	10
Nyanga Freq	0	0	1	4	5
Total Freq	3	4	1	21	29

```
1. Chi-squared statistic
Degrees of freedom : 9
Chi-Square         : 12.29
Adjusted N         : 29

2. Measures of association based on Chi-Square
for nominal variables
(Does not require any ordering of the row and col
categories)

Phi coefficient         : 0.65
Contingency Coefficient : 0.55
Cramer's V              : 0.38

3. Measures of Association for Ordinal Variables
3.1 Measures Based on Concordant and Discordant
pairs

Kendall's Tau-b : 0.08
Stuart's  Tau-c : 0.06
Gamma           : 0.13
Sormer's D Asymmetric - Col Var dep : 0.06
Sormer's D Asymmetric - Row Var dep : 0.10
Sormer's D Symmetric   : 0.07

3.2 Measures Based on Proportional Reduction in
Error

Lambda Asymmetric - Row Var dep : 0.11
Lambda Asymmetric - Col Var dep : 0.13
Lambda Symmetric                : 0.11
```

Fig. 6. 23. Statistical results of the correlation of FC sites with geology

The χ^2 from statistical tables at 9 degrees of freedom and 95% is 16.92 and is larger than the calculated one (Fig. 6.23). This makes it possible to retain the null hypothesis. In other words there is no significance exhibited in the relationship between FC archaeological sites and geological belts. The fact that no major mining operations have been discovered in the area perhaps confirms the lack of association. Although the Phi coefficient is slightly stronger and towards a positive association, Cramer's V tells us that the relationship is weak. The same interpretation can be said of the Lambda statistics.

	Rhodic Ferralsols	Lithosols	Ferric Luvisols	Total
Ziwa Freq	3	1	6	10
GZ Freq	2	2	0	4
Khami Freq	2	2	6	10
Nyanga Freq	5	0	0	5
Total Freq	12	5	12	29

```
1. Chi-squared statistic
Degrees of freedom : 6
Chi-Square         : 14.74
Adjusted N         : 29

2. Measures of association based on Chi-Square for nominal variables
(Does not require any ordering of the row and col categories)

Phi coefficient         : 0.71
Contingency Coefficient : 0.58
Cramer's V              : 0.50

3. Measures of Association for Ordinal Variables
3.1 Measures Based on Concordant and Discordant pairs

Kendall's Tau-b : -0.27
Stuart's  Tau-c : -0.27
Gamma           : -0.38
Sormer's D Asymmetric - Col Var dep : -0.26
Sormer's D Asymmetric - Row Var dep : -0.29
Sormer's D Symmetric   : -0.27

3.2 Measures Based on Proportional Reduction in Error

Lambda Asymmetric - Row Var dep : 0.16
Lambda Asymmetric - Col Var dep : 0.41
Lambda Symmetric                : 0.28
```

Fig. 6. 24. Statistical results of the correlation of FC sites with soil types

As Fig. 6.24 shows, the calculated χ^2 value of 14.74 for the association between the 29 diagnostic FC sites is larger than the 12.59 obtained from statistical tables at 6 degrees of freedom and 95% confidence level. This implies that there is a significant association between the soils and the sites. This association might be demonstrating the significance of agriculture to these farming communities. However, this could not be confirmed by the calculations using individual traditions. For example, although the Phi-coefficient of 0.74 in Fig. 6.24 shows that there is a strong association as this is closer to +1, the other statistics seem to be showing the contrary. The Cramer's V is only 0.50 while the contingency coefficient is 0.58, and the Lambda and Kendall's Tau-c values are also weak.

	600-700	700-800	800-900	900-1000	1000-1200	1200-1400	1400-1600	1600-2000	Total
Ziwa Freq	1	2	3	4	0	0	0	0	10
GZ Freq	0	0	1	2	1	0	0	0	4
Khami Freq	2	2	1	3	0	2	0	0	10
Nyanga Freq	0	0	0	1	0	0	3	1	5
Total Freq	3	4	5	10	1	2	3	1	29

```
1. Chi-squared statistic
Degrees of freedom : 21
Chi-Square         : 35.86
Adjusted N         : 29

2. Measures of association based on Chi-Square for nominal
variables
(Does not require any ordering of the row and col categories)

Phi coefficient         : 1.11
Contingency Coefficient : 0.74
Cramer's V              : 0.64

3. Measures of Association for Ordinal Variables
3.1 Measures Based on Concordant and Discordant pairs

Kendall's Tau-b : 0.38
Stuart's  Tau-c : 0.39
Gamma           : 0.48
Sormer's D Asymmetric - Col Var dep : 0.41
Sormer's D Asymmetric - Row Var dep : 0.36
Sormer's D Symmetric   : 0.38

3.2 Measures Based on Proportional Reduction in Error

Lambda Asymmetric - Row Var dep : 0.42
Lambda Asymmetric - Col Var dep : 0.11
Lambda Symmetric                : 0.26
```

Fig. 6. 25. Statistical results showing the association of FC sites and mean annual rainfall

Fig. 6.25 shows that the majority of the FC sites are in areas that generally receive less than 600-1000 mm of rainfall. The χ^2 value from statistical tables for the association of diagnostic FC sites with rainfall at 21 degrees of freedom and 95% confidence level is 32.67. This is lower than the calculated result making it possible to reject the null hypothesis that there is no significance. In other words there is a significant relation between the FC sites and rainfall, although the Lambda symmetric value suggests that this is a weak relationship. On the contrary however, the Phi-coefficient of 1.11 is quite strong and on the positive. The Cramer's V coefficient is also towards 1 indicating as well that this is a stronger association.

6.4.2.2.4 Refuge period sites

The Refuge period dates to the 19th century and is known from both oral traditions and written accounts. There have been problems over the naming of this period as Refuge (Pikirayi 1993; Mazarire 2005) but it is not the purpose of this research to discuss the appropriateness of the term. However, there is evidence of grain bins and the occupation of rock shelters by later farming communities, poorly built enclosures at Vumba Castle Beacon and Murahwa's Hill, and other hilly locations such as Tsvimbanwa and Chinyamutupwi that justify the use of the term Refuge. The term as used here also implies an extension of the decadence reflected in stone building (Pikirayi 1993) to ceramic decoration. However, the use of the term in this research is not in dispute with terms such as Mahonje (Pikirayi 1993) or Nharirire (Mazarire 2005), but is simply out of chronological necessity.

The relationship between Khami, Nyanga and the Refuge period has not been clarified in eastern Zimbabwe. In the Nyanga area, the early part of the Nyanga culture existed contemporaneously with the terminal phase of the Zimbabwe tradition while the terminal period lies in the Refuge period (Soper 2002, 2006). Soper (2002) suggested a period of contemporaneity between the Zimbabwe tradition and the Nyanga culture on the basis of some Zimbabwe phase sherds that were found on the surface at some sites in the Nyanga area such as the Ziwa Acropolis. Excavations at Murahwa's Hill however revealed no clear separation between Khami material and the 19th century material belonging to Murahwa people (Mupira 2007). This lack of hiatus makes the position of the Nyanga tradition a subject of debate.

There are no distinct fortified walls which can be associated with the Refuge period in Zimunya, although the occupation of rock shelters is apparent. The limited evidence of walling which can be related to the Refuge period occurs at Vumba Castle Beacon and Murahwa's Hill. Another stone walled site which could have served the purpose of a hide out is in Binga mountain, overlooking Chitora valley. However, this shelter is very small and could have only accommodated a few individuals.

As stated above, the rough stone walls in the Vumba, Murahwa and other hills around the Zimunya landscape can be associated with the Refuge period. Elderly members of the contemporary Zimunya community still recall oral traditions of the unstable periods linked to the Nguni of Gaza who were raiding the kingdom of Manyika in the first half of the 19th century (Bhila 1982; Beach 1984; Liesegang 1970; Musabayana 2002, *pers. comm.*). There is every possibility that Zimunya was invaded in the run to Manyika as the Nguni were coming from the south (Liesegang 1970). It is also claimed that the Nguni camped somewhere in the vicinity of the Zimunya kingdom (Liesegang 1970).There are several grain bins in rock shelters which together with the numerous undecorated pottery attest to the Refuge period. Pottery found in some of these shelters is similar to the undecorated material which has been described as Manyika (Bernhard 1968). There are also reports of tunnels to which the Zimunya people retreated during the Nguni raids.

If the numerous sites with undecorated pottery can be firmly linked to this period, then this implies that there was now a significant population in Zimunya by the 19th century. A marked increase in the number of sites is evident in the Vumba and Burma valley areas. From the oral accounts, the people of Zimunya came from the west as part of the splintering groups during the last years of the Mutapa dynasty. The location of the Refuge sites was obviously aimed at taking advantage of the hills when there was danger. One can assume that the storing of food in the hills as shown by the grain bins in rock shelters was more against local groups such as the Nguni than against the Portuguese. There are however, a few sites in the Vumba mountains that can be associated with the Portuguese. Oral accounts revealed that some of these could have been used for trading up to the time of the Anglo-Portuguese demarcation of the eastern highlands. The oral accounts seem to confirm that the Refuge sites were retreat sites against the Nguni, and not the Portuguese (Kaswa 2004 *pers comm.*).

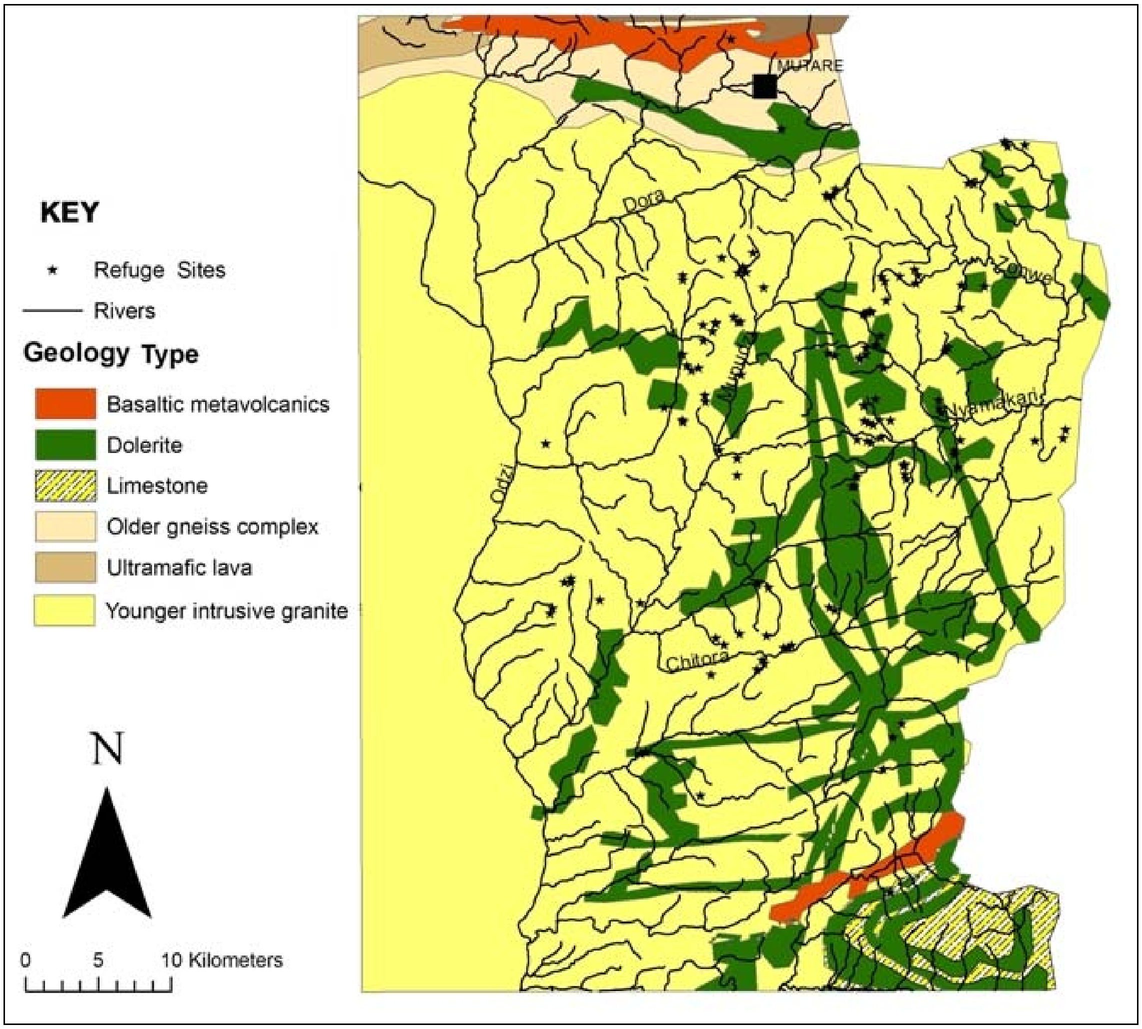


Fig. 6. 26 Distribution of Refuge period sites in relation to geology

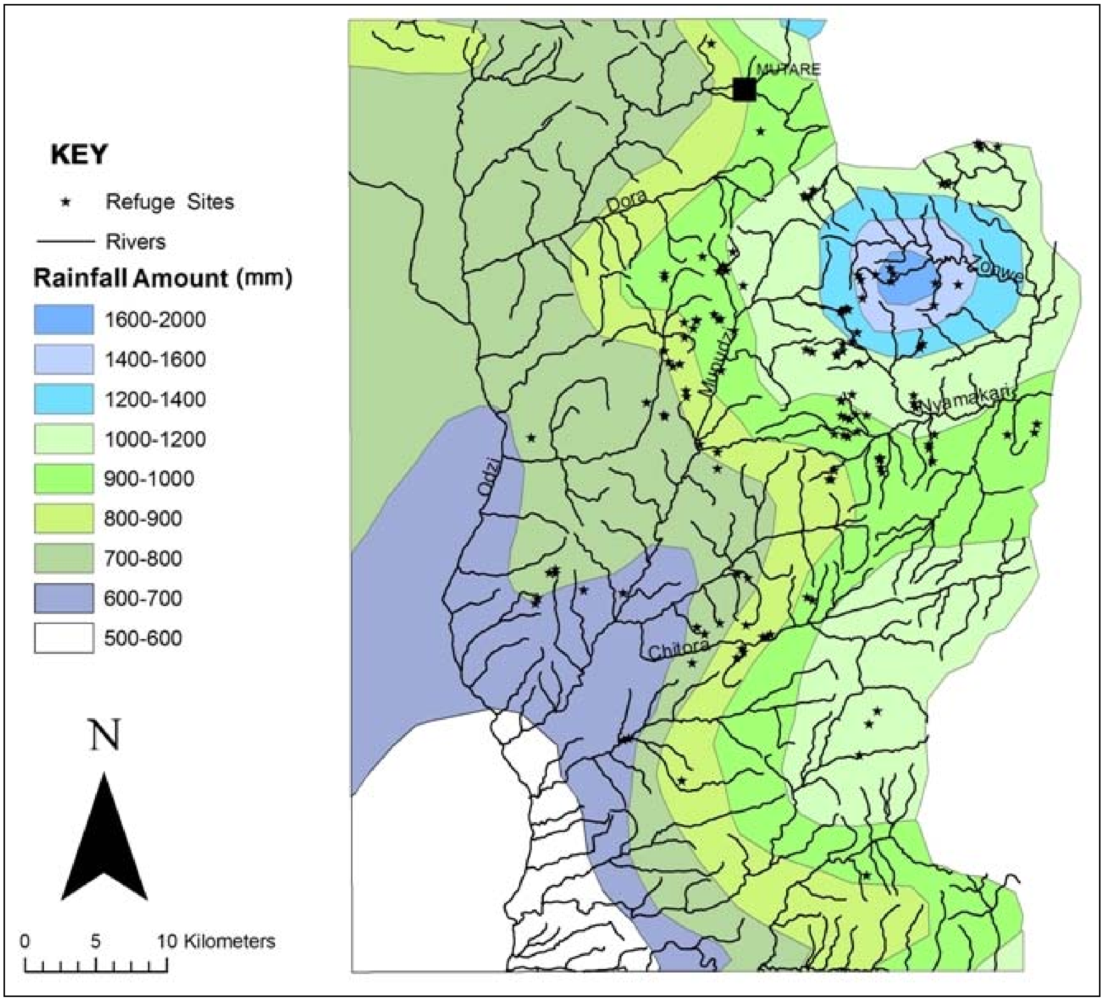


Fig. 6. 27 Distribution of Refuge sites in relation to mean annual rainfall

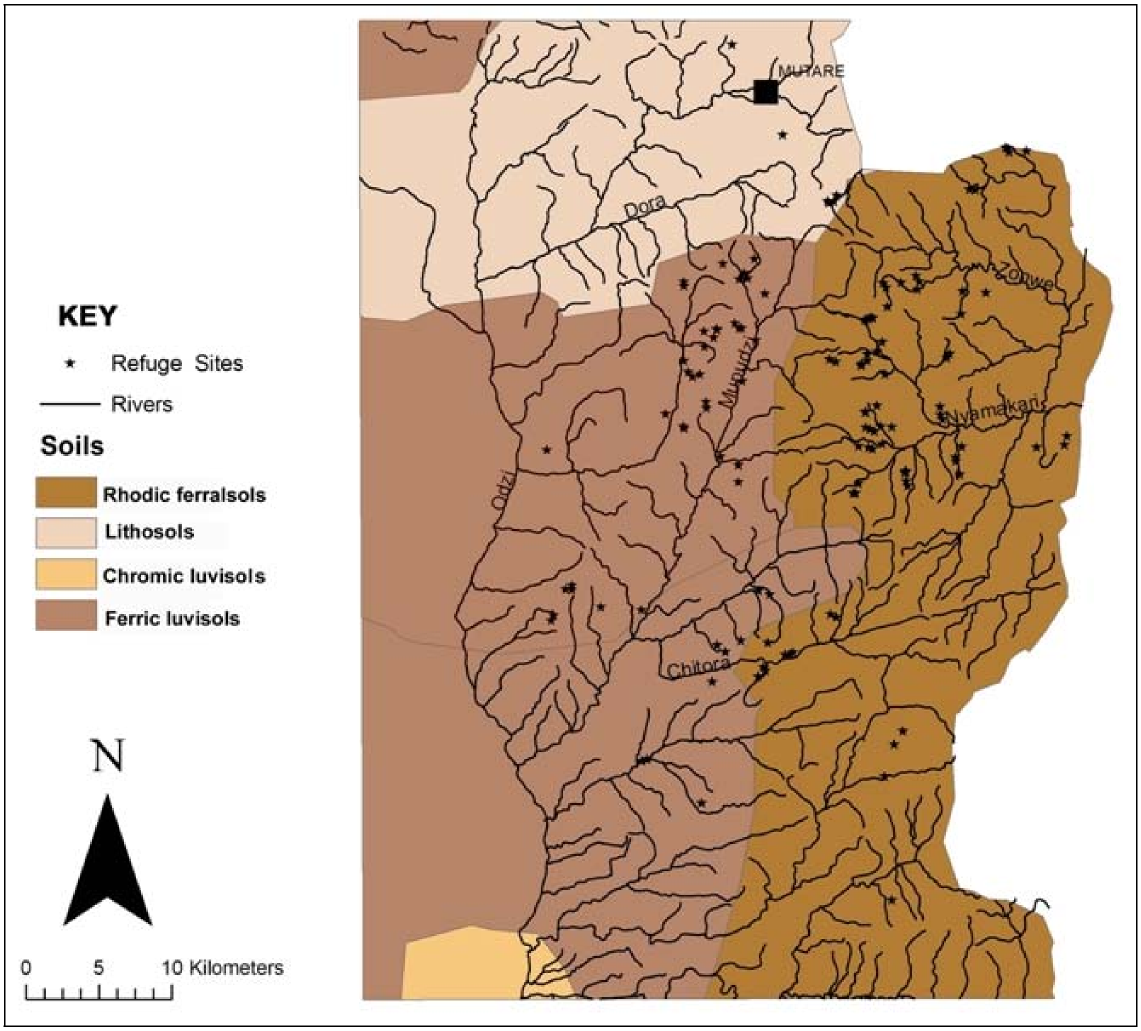


Fig. 6. 28 Distribution of Refuge period sites in relation to soil types

Figs. 6.26-28 show that there is a significant increase in the number of sites that are associated with this period. There is also evidence of the occupation of sites that were inhabited in earlier periods such as Murahwa's hill and Tsetsera. This increase was certainly a result of migrations as there is no ceramic indication of direct continuity from the earlier periods. Historical documents have indicated that there were various population movements from the late 17th century onwards (Beach 1980; Bhila 1972, 1982).

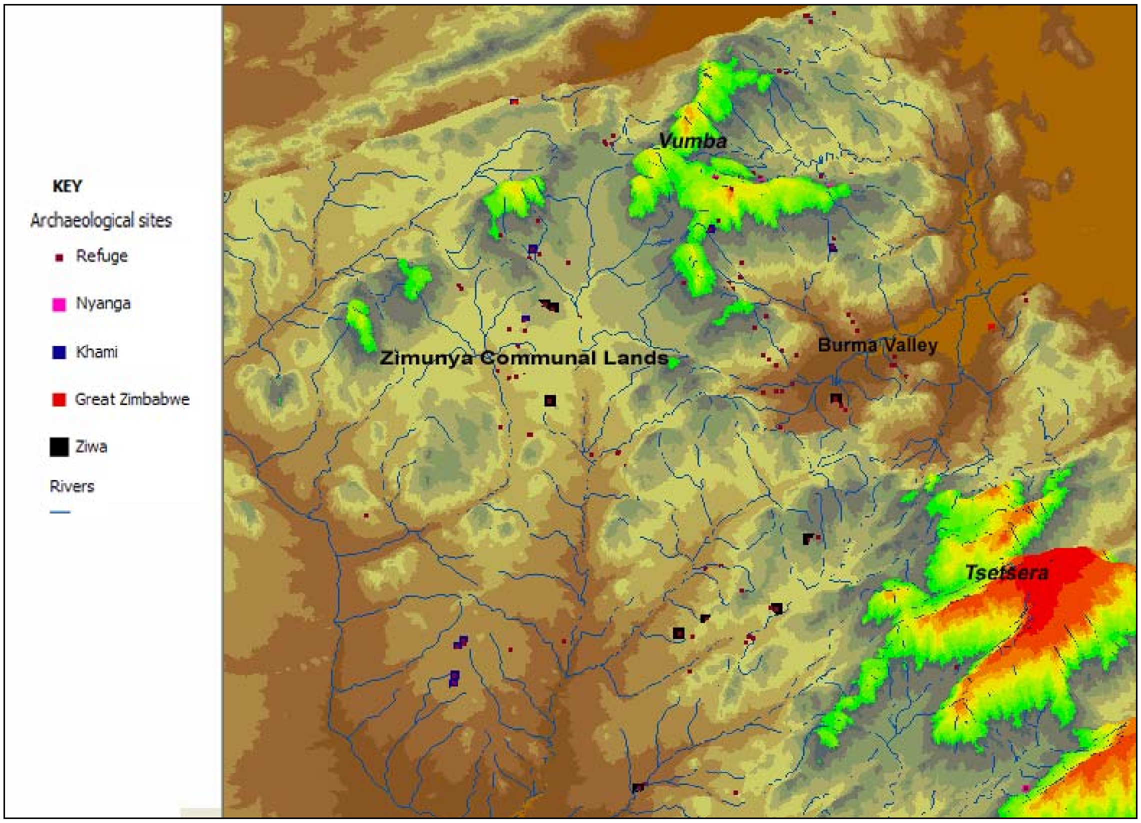
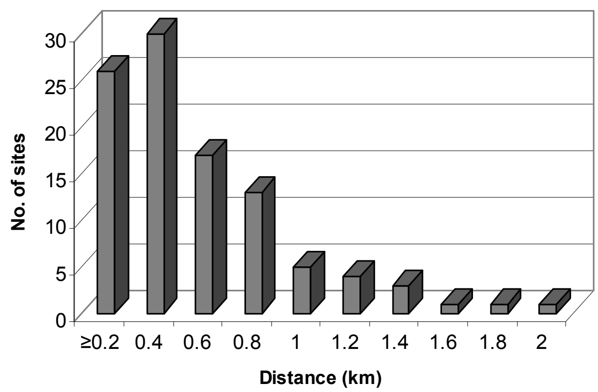


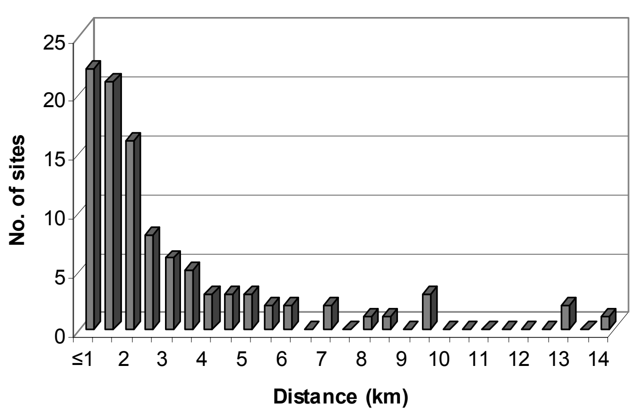
Fig. 6. 29. 3D model of the Zimunya terrain showing the distribution of the various cultures/traditions of the Farming Communities, and the effect of the 1500m cloud base

The distribution of sites of the Farming communities varies with traditions. The Ziwa EFC sites are found in the valleys, especially in the Chitora area west of Tsetsera mountain and in the central parts of the research area. A single EFC site was discovered in the Burma valley. Due to their low representation, sites that are contemporary with the Zimbabwe period also have no reliable pattern. The same applies to sites of the Nyanga period. However, there are numerous Refuge sites on the slopes flanking the Burma valley and up on the Vumba mountains. These are the only sites from the survey data that have a significant presence in the upland areas.

Figures 6.30(a) and 6.30(b) of the distance from water sources for the Refuge sites show a significant skew towards the rivers. The sites show a significant skew towards the rivers, as most of the sites are located within 1 km from the rivers. It was possible to determine that many of the sites are nearer Mupudzi river than the other rivers. While there are problems with the precise identification of these sites in terms of cultural traditions, there is a strong relationship between the sites and the river systems.



(a).



(b).

Fig. 6. 30. Frequency of the occurrence of Refuge period sites in relation to distance from (a), any nearest stream and (b), major streams

6.4.2.3 Visibility analysis

Given the unstable conditions associated with the Refuge period, I considered it necessary to investigate aspects of visibility in relation to security concerns. Visibility can be a useful variable when studying defence strategies, especially within the context of lookout posts (Mitcham 2002). Defensive sites may be strategically located so that they provide a wide view of the surrounding territory. However, not every settlement site would be located in such a manner. It would be imperative then to look for key sites which could have been used as lookout posts or as hideouts.

The location and nature of the stone wall on the Vumba castle beacon is strategically defensive, although there is no other evidence that there was a community that was settled on the hill. At Murahwa's Hill much of the pottery, being of the Khami tradition, predates the walling to the east of the hill. Although the siting of the walls could have been for defensive reasons, the height raises doubts. The wall in the Vumba is about 1.5 m in height while the one in Murahwa's Hill is even lower. Unless it was abandoned before completion, it is unlikely that the wall could have been used for defensive purposes. The settlement on Chinyamutupwi hill also suggests that it was a location with a visibility advantage. The narrow and only way to the summit of the hill could have made it easily defended.

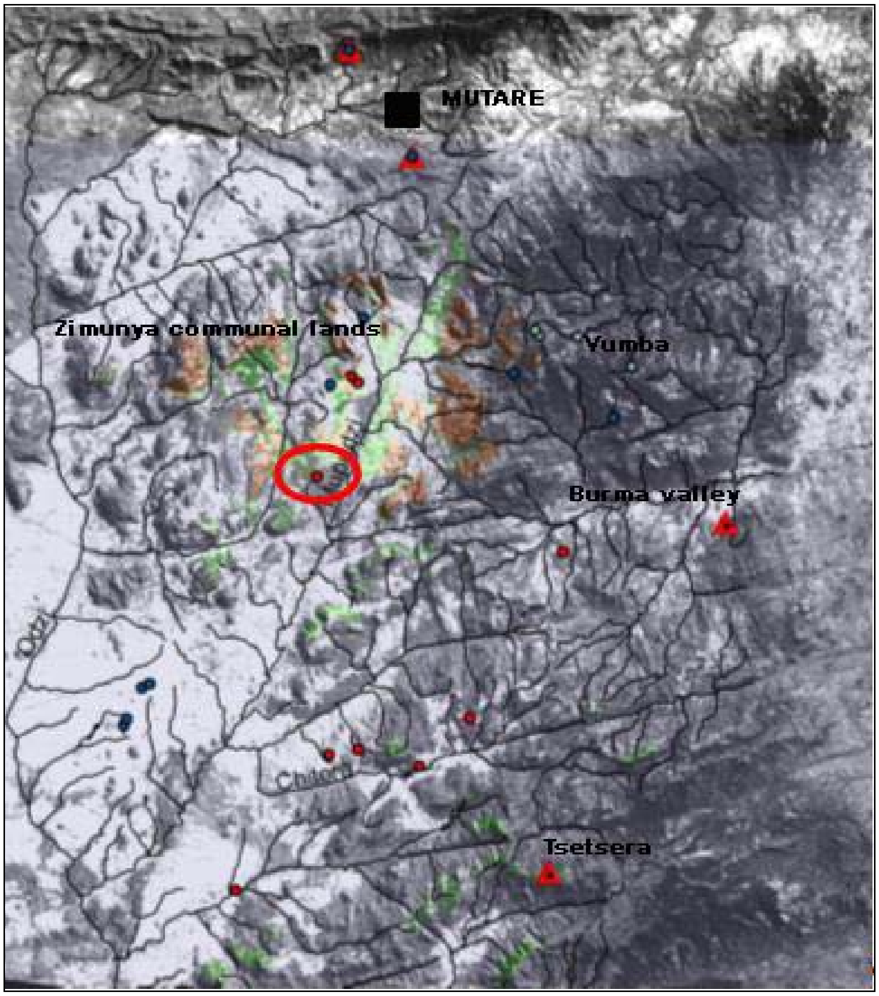


Fig. 6. 31. Visible areas from Chinyamutupwi site

The green colour on Fig. 6.31 is the visible areas from Chinyamutupwi hill. Chinyamutupwi hill has a wide view of its surroundings provided the vegetation or the so-called tree factor was not a serious impediment. The issue of visibility is potentially interesting, but without knowledge of the target that was being observed, there is no certainty on how advantageous the location could have been.

Another site which appears to have a strong link with issues of visibility is the stone walled site on Tsetsera mountain. Fig. 6.32 shows the extent of the visible area from the site. As has been mentioned above the significance of visibility depends on the knowledge of the target, its size and movement across the landscape. For Tsetsera site the most visible area is to the north, northwest and west of the site. To the east, there is only a short distance that is visible before the view is blocked by mountain peaks that form the border with Mozambique. The immediate hinterland around the site is not visible due to steep sides marking the edges of the site.

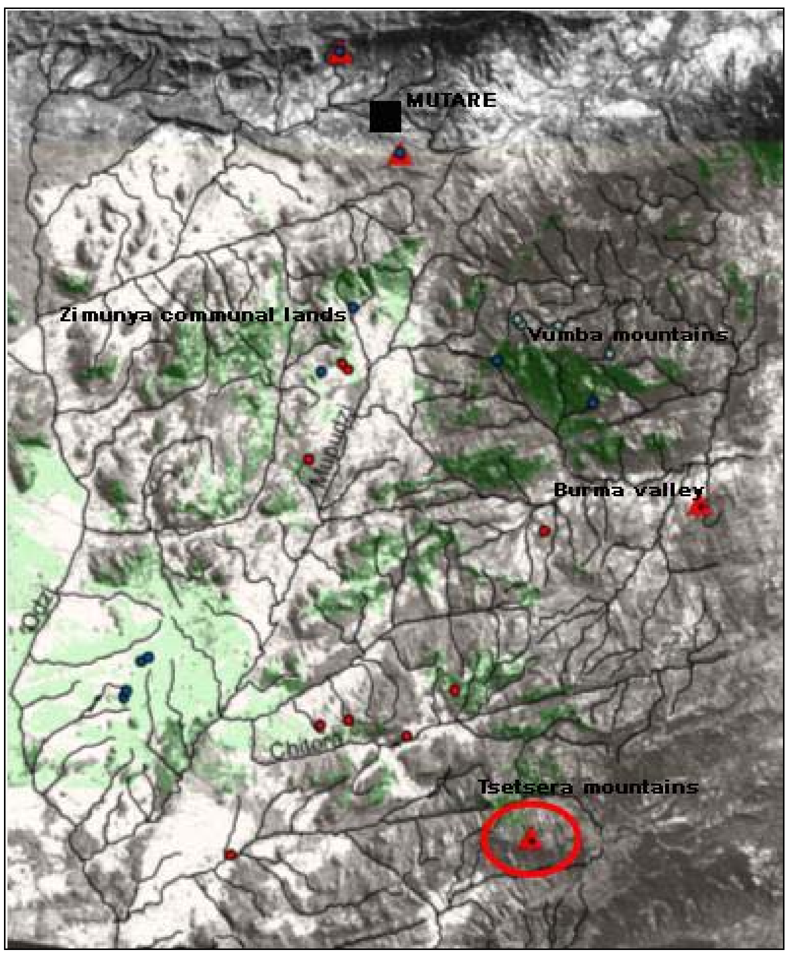


Fig. 6. 32. Area visible from Tsetsera site

The significance of viewshed analysis in studying defence strategies in prehistory faces a number of challenges. Besides the tree factor mentioned above, it is equally important to know whether the observer would not be visible from the target position (Conolly and Lake 2006). This requires determining the position of the target and understanding its movement across the landscape. In defence issues, it is also important to realize that the human target may also be aware of the possibility of being observed. It is therefore difficult to evaluate the effectiveness of particular locations given these problems. In addition, visibility studies are much more suited for situations where sites have adequate evidence that they were forts. Besides their topographic location, there are no other forms of evidence to support the use of the Zimunya Refuge sites for observation purposes. Visibility studies may therefore be regarded as interesting avenues for future research.

6.5 Evaluating environmental influence on settlement location

To understand the significance of the variables to settlement location I evaluated their correlation with the sites. This analysis required updating the site database with environmental data and then export the data to statistical software to assess the cross relationships. Table 6. 21 shows the results of the cross relationships processed in WinIDAMS software. The table relates three variables; that is soils, geology and rainfall to answer the question such as "how many of the sites that are in ferralsols are also in granite areas and in the 900-999 mm rainfall belt?" Out of the 25 possible variable combinations, 26.9% of the farming community sites discovered in the surveys are in the ferralsols where there is average rainfall of 1000–1200 mm. This is followed by 15.4% of the sites in Luvisols that are in the 900-1000 mm. Sites in Luvisols and on granite tend to be found in the areas with lower rainfall.

		600-700	700-800	800-900	900-1000	1000-1200	1200-1400	1400-1600	1600-2000	Total
Rhodic Ferralsols	Dolerite *Freq*	0	0	0	0	1	0	0	0	1
	Limestone etc *Freq*	0	0	0	1	0	0	0	0	1
	Younger Granite *Freq*	0	0	1	3	0	2	3	1	10
	Total *Freq*	0	0	1	4	1	2	3	1	12
Lithosols	Basaltic *Freq*	0	0	3	0	0	0	0	0	3
	Dolerite *Freq*	0	0	0	2	0	0	0	0	2
	Total *Freq*	0	0	3	2	0	0	0	0	5
Ferric Luvisols	Dolerite *Freq*	1	0	0	0	0	0	0	0	1
	Younger Granite *Freq*	2	4	1	4	0	0	0	0	11
	Total *Freq*	3	4	1	4	0	0	0	0	12
Total	Total *Freq*	3	4	5	10	1	2	3	1	29

Table 6. 21. Cross tabulation of environmental variables in relation to diagnostic sites of the Farming Communities period

For the 29 sites of farming communities whose cultural traditions could be determined, 10 are in the combination of Rhodic ferralsols and younger granite zone. This is followed by 11 sites in the belt with Ferric luvisols and younger granite rock type. With respect to all the three variables, a significant combination is of ferralsols, granite and the 900-1000 mm rainfall zone. It appears then that the combination of Rhodic ferralsols or Ferric luvisols, granite and the 900-1000 mm rainfall range had a greater attraction to the farming communities than the other combinations. 22 of the sites are found in the area that receives less than 1000 mm of rainfall while 7 only occur in the area above it. These areas are also closer to the river systems.

6.6 Chi-squared test for LFC Refuge sites

After the general assessment of site distribution across the landscape, the sites were grouped to enable the application of statistical analysis techniques. The frequencies were exported to WinIDAMS for statistical analysis because these analyses allow for clarification and ascertaining the significance of structure or relationships in spatial data (Conolly and Lake

2006). The null hypothesis was that the sites are equally distributed across the soil types or rainfall zones indicated in the contingency tables. In other words there is no significant relationship between the site occurrence and the presence of a particular variable. The calculation of the chi-squared test on the LFC Refuge sites at the confidence level of 0.05 produced results that rejected the null hypothesis that the distribution of the sites shows no significant relationships. In other words the sites are not distributed equally in some of the variables. The results were however inconclusive due to the prevalence of values in the dataset that were very low.

Tables 6. 22-24 show the chi-square calculations to investigate the association between Refuge period sites and environmental factors. The calculated Chi-square values are 34.7 for soils and 52.3 for rainfall. At 95% confidence level and with three degrees of freedom, the calculated chi-square value for soils allows the rejection of the null hypotheses. This means accepting the alternative hypotheses which is that the sites are distributed unevenly across the Zimunya landscape. To reduce the effect of low values on the calculations, I combined all areas that receive 1400 mm or more rainfall into one category of 1400-2000 mm. The calculations produced a chi-square value of 52.3. At 95% confidence and 6 degrees of freedom, the chi-square would be 12. 6. As the calculated value is greater than the value from the statistical tables, there is a basis to reject the null hypotheses again.

Soil Type	% Area	Observed Sites	Expected Sites	Chi-square
Rhodic Ferralsols	35	62	35	χ^2 *Calc* = 34.7
Lithosols	19	5	19	
Ferric Luvisols	46	34	47	2 df @ 0.05 =5.99
Total	**100**	**101**	**101**	

Table 6. 22. Contingency table for the correlation of Refuge sites with soil types

Rainfall (mm)	Area%	Observed Sites	Expected Sites	Chi-square
600-700	15.5	5	15.7	χ^2 *Calc* = 52.3
700-800	31.7	8	32.0	
800-900	13.2	16	13.3	
900-1000	17.0	34	17.1	6 df@ 0.05 = 12.6
1000-1200	17.1	21	17.6	
1200-1400	3.1	7	3.1	
1400-2000	2.2	10	2.2	
Total	**99.8%**	**101**	**101**	

Table 6. 23. Contingency table for the association of Refuge sites with mean annual rainfall

Geological Type	% Area	Observed sites	Expected sites	Chi-square
Basaltic	2.2	1	2.24	χ^2 *Calc* = 1.26
Dolerite	15.6	17	15.81	
Granite	80.2	82	80.99	
Limestone	1.9	1	1.96	3 df @ 0.05 = 7.8
Total	**100.0**	**101**	**101**	

Table 6. 24 Contingency table for the correlation of Refuge period sites with geological regimes

Although these values suggest that there is some significance in the distribution of the sites in relation to soils and rainfall, they have to be accepted with caution, especially the relationship with rainfall. As rainfall also tracks elevation, the detected significant association might be a result of the fact that Refuge communities chose the higher inaccessible areas for security reasons, not to directly exploit the rainfall. There is an apparent association of rainfall, high-lying areas and dense forests in eastern Zimbabwe, of which the last two are important for refuge and defence strategies. In addition, rainfall is also a dynamic variable which could have had different distribution patterns in the past.

The relationship between the Refuge sites and geology retained the null hypothesis. This lack of significant association might be an indication that the sites are responding to some factor other than the parameters modelled. This could be some of the idiosyncrasies of human behaviour that Kvamme (1997) mentions. The absence of a significant relationship between the sites and geology can be expected given that these are Refuge sites which are being affected by political and military conditions.

6.7 Spatial Autocorrelation

The cluster analysis using the spatial autocorrelation tool in ArcGIS indicates that the farming communities are clustered to a certain degree (Fig. 6.33). Using coded values for all these sites, I differentiated them by tradition into Ziwa (1), Zimbabwe phase (2), Khami phase (3), and Nyanga tradition (4). The autocorrelation function suggested a tendency towards a clustered pattern (Fig. 6.33), but did not show which tradition was clustered.

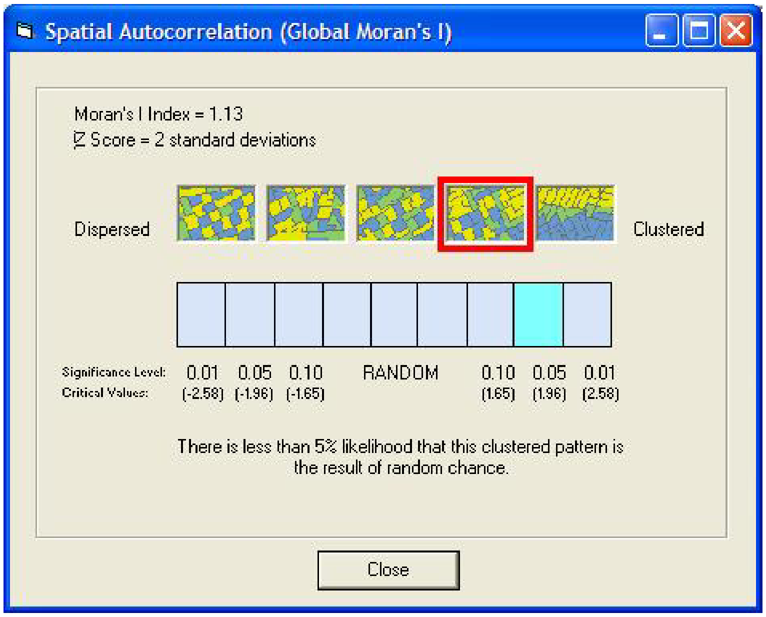


Fig. 6.33 Investigating the dispersion of LFC sites in Zimunya

As suggested by the program, there is less than 5% likelihood that the clustered pattern was a result of random chance. The chi-square investigation of the relationship between the Refuge sites and rainfall and soils did not provide a significant goodness of fit. The implication is that this is not a random pattern. Since survey units were chosen randomly, the statement in the picture means the pattern is not a product of survey bias. It is therefore not clear what is influencing the clustering. As Kvamme (1997) pointed out, while the physical environment has an influence in settlement patterning, the social environment and the idiosyncrasies of the human cultures have their input in the patterns.

6.8 Conclusion

The results from the recent archaeological surveys in Zimunya revealed that the whole of the research area was sparsely inhabited since the early Stone Age until the second half of the second millennium AD. There are only 4 ESA, 5 MSA and 13 LSA settlements recorded for the Stone Age in the area. The distribution patterns show that these sites occur in similar physiographic environments, being the savannah woodlands and granite dominated area of Zimunya landscape. The 13 LSA settlements form central points around which 85 painted sites were discovered. After the Stone Age, the cultural sequence is followed by isolated occurrences of EFC material at 8 locations. Three more EFC occurrences were discovered in rock shelters from excavated material. The EFC occurrences are generally in the same area as the Stone Age sites. There are indications of a possible coexistence of the LSA hunter gatherers and the EFC communities as there is a mixture of Stone Age artefacts and potsherds in the upper levels of the excavated rock shelters. The presence of EFC in Stone Age contexts may be indication of the interaction between the two cultures in either trade or ritual practices, although Burrett (2006) thinks the hunter gatherers could have been manufacturing some of the ceramics found in these contexts.

The 4 Zimbabwe phase sites that follow do not have much material to show that they were used for a significant period. The Khami phase that followed still lacks evidence of having been a large and fully established community, except at Murahwa's Hill and to the west of the research area near the Odzi river. The excavations could not provide evidence with which to measure the duration of the Zimbabwe and Khami phases in the region. The Khami phase also lacks the characteristic stone walling known for these sites. However, the Khami tradition is now known beyond the eastern highlands at sites such as Niamara and other places in Mozambique (Macamo 2005, 2006; Macamo and Madiquida 2004; Soper 2006). The Zimbabwe and Khami phase sites in eastern Zimbabwe have been interpreted in the past as outposts of the Zimbabwe and Khami states (Pikirayi 2001b; Sinclair 1987). It is not clear from the evidence in Zimunya if these were elite or privileged centres since there are no typical stone enclosures. In addition, there is no parallel and different evidence of what can be considered to be commoner settlements during the period of the Zimbabwe culture.

The next identified tradition in the research area is the Nyanga tradition which is also minimally represented, being found only in the Vumba mountains by way of pit structures. This culture is not well represented in terms of ceramic evidence. However, the ceramic evidence from Murahwa suggests a possible co-existence of the Nyanga and the Zimbabwe culture (Mupira 2007). Although there is no direct evidence of the Nyanga culture at Murahwa's Hill, the contemporaneity of the Khami and Murahwa/Refuge cultures is paralleled by the existence of the Nyanga culture in the Vumba mountains basing on the known dates for the occupation of the pit structures in the Nyanga area. The Nyanga culture has been dated from the 14th / 15th century to the 19th century in the Nyanga area (Soper 2002, 2006). The LFC material from Murahwa's hill has a similar range of dates. Thus the occupation of the pit structures in the Vumba mountains can be considered to have been to be contemporary with similar well preserved pit-structures in the Nyanga area which have been dated to 18th/19th centuries AD (Soper 2002). However, there are three pits further up the Chinamata river which could have been occupied earlier than the ones near the Vumba National Park, because they lack evidence of stone lining. Whether the stone walling is buried or not could not be determined as the pit structures now remain as hollows on the ground. In the Nyanga area, such pits have been dated to the 16th / 17th centuries AD (Soper 2002). The dates of the contexts in which Khami material was recovered at Murahwa's hill are contemporary with this period (see Chapter 5).

Despite the indication of the presence of prehistoric communities since the ESA there is not much evidence to indicate the establishment of large communities in the research area. However, there was a sudden influx of people by the middle of the 19th century such that by the early part of the 20th century this area was reported to have been overpopulated (Whitlow and Zinyama 1988). There is reason to investigate why there were no large settlements in Zimunya before the 19th century. It is equally necessary to investigate if the increase in the number of archaeological sites in the Refuge period can be associated with climatic changes. Chapter 7 examines this problem through an analysis of the spatial patterns in the context of palaeo-environments.

CHAPTER 7

Palaeo-environments and prehistory in Zimunya

"… human adaptation and development should be viewed in the context of the contemporary natural (physical and biological) environment of the people concerned." (Avery 1982, p.185).

7.1 Introduction

The interpretation of the evolution of settlement patterns in prehistory requires investigation of the palaeo-environmental setting of the periods represented in the archaeological record. The realisation that climatic conditions influence human behaviour is not new in archaeology (Butzer 1982; Deacon and Lancaster 1988; Deacon and Deacon 1999; Huffman 1996b; Sinclair and Lundmark 1984; Summers 1960). It has been observed that whilst the social environment has an effect on settlement patterns, the physical environment also has a significant input. This chapter investigates the nature of the palaeo-climate of Zimunya and how it could have influenced the prehistoric communities in this area. The inference of the palaeo-environment of Zimunya is based on a synthesis of several published works from southern Africa as well as on data from the excavations in the research area.

While Chapter 6 examined spatial patterns of the settlement sites in Zimunya in relation to contemporary environmental variables, this chapter relates those patterns to palaeo-climatic evidence from the area. It examines palaeo-indications of rainfall and temperature and how they could have influenced floral and faunal species resources. Where possible, these are related to soil fertility, water availability and other socio-economic implications for particular cultural periods. The implication of the palaeo-climatic evidence to the distribution maps in Chapter 6 is also assessed.

7.2 The palaeo-climates of southern Africa

The reconstruction of past climates of southern Africa has mainly been derived from research in South Africa. In recent years however, research has expanded into Botswana, Namibia, Mozambique and Zambia (Bateman *et al*. 2003; Ekblom 2004; Huntsman-Mapila *et al.* 2006; Kinahan 2004; Scott and Vogel 2000; Stokes *et al.* 1998; Thomas 1983; Thomas *et al.* 2003). Although much of the material is derived from specific localised sites, the evidence has been applied in the general reconstruction of the palaeo-climate of the whole of southern Africa. Such regional coverage does not however, always correspond well with the microclimates of particular sites and areas in the region. These microclimates influence human behaviour in different ways in different localities. Detailed investigations of palaeo-environments, such as the recent isotope investigations in South Africa (Scott *et al*. 2003; Smith 2005), have urged caution when using microclimatic data to reconstruct palaeo-climatic conditions that cover broad regions. Circumscribed environments have enabled the survival of communities in areas that are today considered climatically harsh (Manyanga 2001, 2006). Thus, it is important to investigate the relationship between the local environment and the regional climate and to assess their impact cultural developments.

To understand the palaeo-environment of southern Africa, I synthesise climatic data that has been recovered from various parts of southern Africa. I draw upon the work of Tyson and Lindesay (1992), Holmgren *et al* 2003; Holmgren *et al* (1999), Scott and Vogel (2000), Scott *et al*. (2003), Smith (2005) and Tyson *et al* 2003 among others. Reference is also made to research that has been conducted in east Africa, especially in the Great Lakes region (Holmgren and Öberg 2006). Palaeo-climate research in Vilanculos, Mozambique (Ekblom 2004), is also fundamental given its proximity to the research area. While some of the data has come from palaeo-environmentalists who have been interested in the climate only, archaeologists have related these data to the development of prehistoric cultures with varying results. Tyson and Lindsay's (1992) work has been related to cultural changes in prehistory, particularly for the Shashi-Limpopo valley in southern Africa (Huffman 1996b). Deacon and Deacon (1999) have also discussed the role of the environment in the evolution and cultural development of early hominids as reflected by the evidence from South Africa.

However, problems of relevance and applicability of the reconstructed climatic records frequently crop up, considering the distances between the application areas and the sources of the environmental data. Recent work in the Shashi-Limpopo for example, has alerted us to the problems of uncritical use of climatic data collected elsewhere (Smith 2005), for example from the northern hemisphere, to simulate climatic conditions of the southern hemisphere. Terrestrial and oceanic conditions that have a bearing on climatic conditions are not uniform across latitudes. Topographic variations cause changes in air mass conditions, while the circulation of the solar system and anthropogenic forcing also influence environmental patterns. The ideal situation would be to have environmental data recovered in archaeological contexts. In many instances however, the archaeological contexts are not sufficiently dated to provide a close relationship with the environmental record. Caution is therefore required in cross-linking palaeo-environmental records to archaeological evidence.

To complement the implications of these broad covering researches, I discuss studies that have also examined the past environment of eastern Zimbabwe. These include Wild's (1958) botanical notes and Thomlinson's (1973) work in the Nyanga Park in north-eastern Zimbabwe. The Nyanga area is less than 100km north of Mutare, and at present has a climate that compares with much of the eastern highlands of Zimbabwe. It is noted that there is very limited palaeo-climatic research in eastern Zimbabwe, as well as in the whole country. A discussion of the environmental implications of the faunal evidence from Zimunya is expected to show the relationship between the environment and the settlement patterns observed in Chapter 6.

Available literature shows that there is general consensus that the climate of southern Africa fluctuated considerably in the last 20-10 000 years BP (Deacon and Deacon 1999; Holmgren *et al* 1999, 2003; Lawes 1990; Scott and Vogel 2000; Scott *et al* 2003; Smith 2005; Tyson and Lindesay 1992). However, the records do not always agree on the nature of the fluctuation during particular periods. Since the excavated evidence from Zimunya begins with the Later Stone Age, a useful starting point for the discussion would be the cold phase between 18 000 and 12 500 years BP because this could have had a bearing on the LSA communities of the area. This period, known as the Last Glacial Maximum (LGM), had temperature figures that ranged between 2-9°C below the present average annual figures for southern Africa (Deacon and Deacon 1999). Although temperature figures that have been produced for this event vary with researchers, 5°C is considered to be a reliable annual average of the variation from present temperature levels (Deacon and Deacon 1999). The environmental conditions inferred from pollen evidence at Wonderkrater in South Africa suggest that the coldest conditions of the LGM occurred at about 17 000 years before present.

After the end of the last glacial maximum, there followed generally warmer and wetter conditions in the region indicated at Makapansgat from about 10 to 8 kyr before present when this was succeeded by a shorter phase of cooler conditions (Holmgren *et al* 2001). This cold phase, known in the northern hemisphere as the 8.2 kyr event or the minor glacial, ended around 6.5 kyr BP and was followed by conditions which have been interpreted as closer to those of the present (Holmgren *et al* 1999). The pollen record at Wonderkrater indicates that there was a slight cooling between 12.7 and 10.2 kyr before present, followed by a warmer phase which lasted from 9.5 to 6 kyr BP (Scott *et al* 2003). This early Holocene period has conflicting evidence as Holmgren et al (2003) later inferred cooling conditions after 6 kya.

The evidence shows that the warmer conditions at Makapansgat persisted until they were interrupted by a cold phase which reached its lowest values around 3 kyr before present (Holmgren *et al* 1999). The Wonderkrater sequence of environmental conditions after 2 kyr before present is not reliable as the samples had low resolution (Scott *et al* 2003). However, the warm conditions which began after 6.5 kyr at Makapansgat are considered to have continued with minor fluctuations until 100 BC, when they were followed by a warmer period that lasted until 300 AD. From 400-600 AD there was another cold and dry phase which was followed by a very short pluvial interval that lasted until the end of the 8th century AD. The 9th-10th century AD could have been cold and dry (Holmgren *et al* 1999; Smith 2005). After the 10th century, there was a rise in temperatures and precipitation that ended around 1300 AD. There seem to be conflicting evidence as this warm epoch is thought to have begun in the 10th century (Huffman 1996b). The following cold phase, known as the Little Ice Age, lasted until 1850 AD, with minor rises and troughs in between (Holmgren *et al* 1999). The last phase of this period is estimated to have been 1ºC lower than present temperature values (Holmgren *et al*., 2001).

The causes of the temperature fluctuations are not fully understood. There are suggestions that there could be an association between climatic change and some changes in the solar system. Of interest has been the eleven-year sunspot cycle which causes fluctuations of temperature across the world (Dincauze 2000). According to Dincauze (2000), climatologists have observed that the low sunspot activity in the last half of the 17th century AD coincided with the most severe years of the Little Ice Age. This cold phase is regarded as the coldest weather of the Holocene (Dincauze 2000; Ekblom 2004; Holmgren *et. al.* 1999).

Most of the studies on palaeo-environments view the changing climates as products of natural events with limited anthropogenic influence. This has been the major difference with contemporary issues of global warming, where the depletion of the ozone gases is raising temperatures without a corresponding increase in precipitation as suggested in the climatic models above. Global warming therefore appears to be an anthropogenic induced phenomenon, resulting from industrial emissions and probably veld fires. It is not necessarily a product of the oscillations in the solar system. In light of the different situations resulting from warmer temperatures, the simulation of past environments should be based more on direct evidence of rainfall fluctuations than on temperature aberrations. For this reason research that is based on vegetation and animal remains is very significant.

Although these climatic cycles are associated mainly with changing temperatures, the net effect has been to bring drier conditions during the colder periods and wetter conditions when it was warmer in the summer rainfall region of southern Africa. These fluctuating conditions occur because of the changes in sea surface temperature which consequently influence the air masses that bring summer rainfall in southern Africa. These changes result in the shifting of the position of the Inter Tropical Convergence Zone (ITCZ). Although we do not have full knowledge of how these changes in temperatures occur, it has been observed that when temperatures are warmer the ITCZ is pushed further south of the equator during the summer rainfall season in southern Africa (Lawes 1990; Holmgren *et al* 1999), bringing rainfall to the sub-region. Drier conditions are associated with a northerly shift of the front, a shift that is similar to what the ITCZ attains during the winter dry season of southern Africa in contemporary times.

Together with fluctuating rainfall and temperature patterns, parallel changes have also been noted in the expansion and contraction of the distribution and extent of floral and faunal species in prehistory (Lawes 1990). Warm temperatures are associated with more precipitation, lush vegetation and expansion of forests. On the other hand when it is cold there is less precipitation, grasslands expand while forests retract. Lawes (1990), for example concluded that the grasslands which thrive in the cooler climates expanded during the Last Glacial Maximum and during the 8.2 kyr event. In contrast, the pluvial period after the cold phase of 8000-6500 BP could have led to the expansion of the Afromontane rainforest of southern Africa to its present boundaries. There is no adequately documented evidence of the effect of the cold phase towards the end of the Little Ice Age on the vegetation of the region. Changes in vegetation lead to a change in the distribution of some animal species, especially those that are very sensitive to changes in habitat conditions (Kenmuir and Williams 1975). Thus the change in temperature has far reaching consequences to the distribution limits and extent of vegetation biomes and faunal species. As the effect of climate change is wide ranging, there are also various methods and techniques to detect these changes. These include methods that trace direct and indirect evidence of temperature, rainfall, and vegetation and faunal changes.

Evidence of erosion surfaces, gravel accumulations, speleothem thickness and colour, remains of faunal and floral (pollen) species compositions, and stable isotopes of oxygen, carbon or nitrogen gases have all been used to investigate past climate and climatic change. Other researchers have also focused on dendrochronology, fluctuating lake levels and glacial remains while remnants of wind processes such as ancient sand dunes have also been studied.

Earlier determinations of climatic change in Zimbabwe were based on evidence of coarse gravels and alluvium depositions found along major rivers across Zimbabwe such as the Zambezi and Umguza rivers (Summers 1960). It was observed that the presence of coarse gravels in rivers such as the Zambezi, reflected greater amounts of energy to move the load, and that energy could only have been available from large volumes of water flowing in the river. This meant that there were heavy rains, and consequently wetter seasons at the time. Much of Summers' (1960) environmental discourse on the personality of Zimbabwe was based on accounts by Bond and Summers (1951, 1954, cited in Summers 1960), as well as his independent observation of erosion surfaces in the Nyanga area. It is however not clear if more water flowing in the Zambezi river meant wetter seasons for Zimbabwe since the river originates in eastern Angola, and also gets inflows from western Zambia. An increase in precipitation in Angola does not necessarily mean more rains further south. It has been observed, for example, that eastern Africa experienced wetter phases when southern Africa was experiencing droughts and famine during the Little Ice Age (Ekblom 2004; Holmgren and Öberg 2006). It has also been observed that climatic conditions in Angola are often the opposite of those of southern Africa (Stokes *et. al.,* 1998). Interestingly, some of the regional climatic postulations of the 1960s seem to concur with recent findings that are based on isotope studies. However, the absence of reliable dating of the geological sequences of the gravels or sediments created room for inaccuracies, as will be shown below. In addition, some shorter variations in rainfall amounts could not be detected in the gravel or sediment records.

One of the most illustrative researches on the palaeo-climate of southern Africa is the work by Holmgren *et al.* (1999, 2003) which almost had a decadal resolution on the environmental changes that occurred in the last 25 kya years in the Makapansgat valley, South Africa. The work was based on the analysis of carbon ($\delta^{13}C$) and oxygen ($\delta^{18}O$) isotopes from stalagmites (T7 and T8) cut from the Cold Air cave in Makapansgat. Although the complete T7 specimen is thought to date to as far back as 6600 BP, the section that was analysed in detail and published in 1999 had an earliest date of 3000 BP (Holmgren *et al* 1999). The evidence was however extended to about 25 000 years ago after the isotope analysis of the T8 specimen. (Holmgren *et al* 2003). The conclusion derived from the $\delta^{13}C$ and $\delta^{18}O$ evidence was that the period from 23-21, 19.5-17.5 and 15-13.5 kya had lower temperatures and grassy conditions (Holmgren *et al* 2003).

The Makapansgat T8 stalagmite has a break in climatic indications between 12.7 to 10.2 kya but is followed by warmer wetter conditions from 10 kya until 6 kya. There is conflicting signals during this period, as there is evidence of increased grass cover after 8.5 kya which suggests cooler and drier conditions during this period. The T8 specimen shows that there was gradual cooling from 6 kya to around 3 kya. This conflicts with climatic readings from the T7 which had suggested warm and wet over the same period (Holmgren *et al* 1999). If the T8 record can be accepted, there was cooling during mid to late Holocene, 6-2.5 kya, followed by warmer from 2 to 1 kya. The earlier investigations at Magapansgat had indicated a slightly cooler period between 100 BC and 300 AD. This was followed by a rise in temperature that was interrupted by a cool phase between 400 and 600 AD. There followed an increase in temperatures until 700 AD when cool conditions followed until 900 AD. From 900-1300 AD there were warmer temperatures during the period known in the northern hemisphere as the Medieval Warming. This was followed by a sharp decline in temperatures after 1300 AD, a period known as the Little Ice Age, which lasted until 1800 AD (Ekblom 2004; Holmgren *et. al.* 1999; Tyson and Lindesay 1992). Maximum Holocene cooling is believed to have occurred at 1700 AD.

According to these researchers, there is general agreement between the Makapansgat results and those collected from other sites for particular periods of the late Holocene (Tyson and Lindesay 1992; Holmgren *et. al.* 1999, 2003; Ekblom 2004). Tree ring evidence from Karkloof is one example, although this only covers about 600 years before present (Hall 1976; Holmgren *et al.* 1999, 2003). Holmgren *et al.* (1999, 2003) found general similarities across correlated data from Zambia, Malawi, Namibia, Botswana, western Zimbabwe and various parts of South Africa and some parts of east Africa, suggesting that even allowing for localised climates, the general conditions would have been similar. Ekblom (2004) found similar correlations between data from Vilanculos, Mozambique, and data from Makapansgat. There is also the suggestion that the pollen evidence from Wonderkrater complements the isotope indications from Makapansgat, despite conflicting signals at some periods (Scott *et al* 2003). It is therefore possible that generally similar conditions prevailed in eastern Zimbabwe. If this general applicability of these results from Makapansgat and other sites can be accepted, then the resolution reflected in the results would be useful in matching the dates from Zimunya with particular climatic events. However, the dates of 7655 +/-40 BP (GrA-26884) and 4955 +/-35

BP (GrA-26834) from Zimunya show that only the mid to late Holocene palaeo-climates have a bearing to this research.

The same research in the Makapansgat valley alerts us to the factors that may make generalisations difficult to apply to some sites. As already noted, recent research in the Shashi-Limpopo valley has also emphasized caution when relating climatic conditions to cultural developments (Manyanga *et al* 2000; Manyanga 2003, 2006; Smith 2005). Although regional environmental patterns depend on the general position of the ITCZ and other dynamics of the solar system during the period under consideration, local topographic variations would also have caused deviations from the regional pattern. While in some instances the differences were just in terms of time lags on the onset and end of events between the regional and the localised areas, in other cases there were noticeable climatic differences. The El Nino Southern Oscillation (ENSO) system for example, has been noted for producing unpredictable results, even in areas within the same region (Holmgren *et al* 1999). Its opposite, La Nina, has similar unpredictable patterns of cold weather. In addition, the conflicting signals from stalagmites from the same cave (T7 and T8) apparently call for caution in the application of the palaeo-climatic record to interpret archaeological situations.

Research by Herries and Latham (2003) in South Africa used the amount of magnetism detected from a trench profile at Rose Cottage Cave to infer past climatic conditions in southern Africa. Although their results highlight the same major episodes in the climate of southern Africa, the resolution was too coarse to be usable in Zimunya. However, Herries and Latham (2003), as well as Holmgren *et al* (1999, 2003) and Scott *et al* (2003) drew attention to the fact that localised climatic conditions affect different sites differently. Thus in reconstructing the palaeo-climate of a particular area there is need to use climate data series that is derived from the same research area.

Interesting research has been taking place in Mozambique where similar climatic indications as those discovered in Makapansgat in the last 2000 years have been observed in changing lake levels and pollen data near Vilanculos on the Mozambican coast (Ekblom 2004). The evidence from Lake Nhaucati shows that water levels kept falling after 1200 AD until the lake was probably dry from 1500 AD to 1800 AD. Citing several documents, Ekblom (2004) demonstrates that the evidence from the lake levels concurs with documentary evidence of droughts and famines during the same period in southern Mozambique and in the Zambezi valley in Zimbabwe. Using Portuguese documents, Pikirayi (1993; 2003) had also highlighted the role of environmental history in the socio-economic and political changes that occurred in the Zambezi valley since the 15th century AD.

The concordance between the Vilanculos and Makapansgat data are crucial for understanding events in Zimunya, given that the eastern highlands of Zimbabwe is almost mid-way between the two. As Ekblom (2004) shows, the Makapansgat data are very important because of their high resolution compared to the 200 year intervals at Vilanculos. After Holmgren *et al* (1999), later research by Scott and Vogel (2000) who worked with stable isotopes from hyrax dung seem to agree with the Makapansgat model on the major temperature troughs and rises. As mentioned above, recent research in the Shashi-Limpopo basin has been using stable isotopes of nitrogen and oxygen to investigate cooler and wetter conditions in the valley (Smith 2005). The research in the Shashi-Limpopo valley calls for a revision of what had become the entrenched environmental interpretation for the Shashi-Limpopo (Huffman 1996b), if not the whole of southern African sub-region, that had been based on climatic modelling by Tyson and Lindesay (1992). The Tyson and Lindesay (1992) model was derived from the simulation of climatic events in the northern hemisphere and does not accurately mirror events in the southern hemisphere. In trying to estimate the climatic and social conditions in Zimunya, I relate the dates from the excavations to the Makapansgat model.

The availability of water for animal and domestic consumption is important to human settlements. One of the immediate effects of temperature changes is on water availability. From most of the reconstructions of past environments it has not been possible to estimate the absolute changes in the amounts of precipitation associated with particular events. The general interpretation has been that cold periods are associated with drier climate while warmer weather is associated with wetter conditions. However, there is no clear indication of how drier the drier climate was or how wetter the wetter periods were. This has led to assumptions that the drier climatic conditions directly translates to low rainfall that was enough to cause droughts. Huffman's (1996b) synchronisation of the Tyson and Lindsay (1992) climatic model to the archaeological data from the Shashi-Limpopo valley clearly reflects this thinking as farming communities were presumed to move in and out of the valley in response to climate change (Huffman 1996b). We are however not informed of why the circumscribed areas to which people migrated could have been spared for a long time from the same climatic phenomenon that was general to the region. One would be inclined to argue that a change in the climatic conditions of one part of the sub region could have had ripple effects elsewhere. It is now argued that some communities remained in the valley, and developed strategies to cope with environmental change (Manyanga 2006). The emerging model suggests that the basin was never completely abandoned since the decline of the Mapungubwe state (Manyanga 2006).

The attempt to tackle the problem of human response to climatic change has led to the growth of the concept of "resilience" (Manyanga 2001, 2006; Redman and Kinzig 2003). In this concept, human communities are known to be able to adapt to changing environments without moving to different areas (Redman and Kinzig 2003). Spiritual attachments to the landscape and fear of the unknown in "foreign" territories are other factors that are associated with community resilience. However, prehistoric communities would have eventually migrated from less favourable environments to better areas. In that case, resilience can be considered to be a temporary moment in which communities will be hoping for the better, and that moment can be short or long term depending on the resilience strategies and the socio-technological conditions. Although technological innovation has always counteracted the effect of deteriorating environments for some communities (Dincauze 2000), there are documented cases where cultural systems declined as a result of deteriorating environments, among other factors (Coombes and Barber 2005; Hassan 1996; Holmgren and Öberg 2006).

The research in Mozambique is important as it was used to estimate when droughts are likely to have occurred in the coastal area of Vilanculos based on the changing lake levels at Nhaucati and Xiroche (Ekblom 2004). This has significant implications for prehistoric communities of both Mozambique and eastern Zimbabwe. Summers (1960) estimated the rainfall amounts in Zimbabwe during the pluvial periods that were detected in the geological record. The values obtained are however, not reliable as they were derived from Bond's rainfall approximations at Khami and implications in the sediments observed (Summers 1960) in the Zambezi river. In spite of the assumed variation in rainfall amounts, it is thought that environmental conditions might not have been significantly different from what they are today (Summers 1960). However, Soper (2002) has doubts on this observation given his suggestion that the Nyanga uplands could have been occupied at a time when general environmental conditions were deteriorating, leaving the Nyanga uplands as one of the few areas with favourable conditions for settlement.

7.3 The palaeo-climate of the eastern highlands of Zimbabwe

To understand the effects brought about by the alternating wet and dry, warm and cool conditions to the prehistoric cultures in the eastern highlands, it is necessary to investigate if there is evidence for these events in the area. High resolution palaeo-environmental data such as that by Holmgren *et al* (1999, 2003) and Smith (2005) are rare in southern Africa, and are not available for Zimbabwe. However, geomorphological and pollen studies in the country have generally indicated similar wetter periods (Summers 1960; Thomlinson 1973; Wild 1958), although the importance of the conclusions drawn about the human impact of the climatic evidence are relative.

Pollen data have always been the backbone of palaeo-climatic reconstructions. Precise identification of the pollen approximates precise identification of the source vegetation and consequently, the climatic conditions leading to the existence of such vegetation. In this light Thomlinson's (1973) pollen work in the Nyanga Park could have been important for this research had it not been for the methodological problems in the work (Meadows and Linder 1993; Soper 2002). Although Thomlinson (1973) concludes that his work agrees with the observations from other researchers such as Wild (1958) who gave a palaeo-climatic review for the Nyanga area, the results are however not conclusive (Meadows and Linder (1993). The work has been criticised on the grounds that there were no good sites in the Nyanga Park from which to collect reliable samples of pollen evidence (Soper 2002). As Meadows and Linder

(1993) observed, some of the sediments from the five cores drilled were not dated. In the light of current research however, the pollen reflections over a period of 12 000 years BP which suggest a long record of grasslands in the Nyanga highlands concurs with the effect of the last glacial maximum (Thomlinson 1973). The cold temperatures of this period would have favoured the expansion of grasslands. Thomlinson (1973) saw no further marked changes in vegetation patterns up to the 20th century AD, suggesting that there were no significant fluctuations in climatic patterns. A date of 4670 +/-60 BP from Core I of his research was associated with pollen evidence that indicated the dominance of grass *(Gramineae)* species, strengthening the postulations of a climate which favoured grasslands. However, Muller (1999) has a contrary opinion regarding the origins of grasslands, seeing the grasslands in the Nyanga and Vumba mountains as a consequence of human induced clearance of the rain forests through fires. As there are no dates to support when this clearance could have happened, there is need for further palaeo-climatic research to investigate these ideas.

In a study of the distribution of the Samango monkey (a forest species) in southern Africa, Lawes (1990) remarked that the eastern highlands could have suffered similar shrinkage and expansion of Afromontane vegetation as occurred elsewhere in the region as a result of climatic changes. It is thought that the present distribution patterns of this type of vegetation resulted from the Last Glacial Maximum, which also separated the Samango monkey of this area from the rest of the areas with montane vegetation in southern Africa (Lawes 1990). The implication of that research is that subsequent climatic changes did not lead to total loss of this vegetation since both the Afromontane vegetation and the Samango monkey persisted to the present day. The conclusion that can be made from Lawes' (1990) research is that subsequent changes of vegetation and animal compositions after the effects of the Last Glacial Maximum were minor and could only have been the result of anthropogenic factors. This agrees with Thomlinson's (1973) conclusion that there were no major vegetation changes after the last glacial maximum.

The persistence of the rain forests and the Samango monkey species has significant implications regarding the effect of the subsequent climatic changes recorded for southern Africa. Lawes (1990) did not show if the continued existence of the Samango monkey species in eastern Zimbabwe can be associated with the persistence of similar climatic conditions through time or that the species managed to adapt to changing environments. The evidence is not conclusive about the climatic developments in the eastern highlands up to the present. It appears that the changing regional temperatures did not lead to significant long term changes in the floral and faunal composition of the eastern highlands. The problem with these investigations and the climatic models generated is that of resolution. While the research from South Africa is estimated to be reflecting changing environments at nearly 10 year intervals (Holmgren *et al* 1999, 2003), similar levels of resolutions are difficult to achieve with cultural data recovered from archaeological excavations. In the eastern highlands, there is no adequate research on palaeoclimatic conditions. In recent years, only Soper (2002) has suggested climatic influence as a possible factor to the settlement of the upland areas of the Nyanga area.

7.4 Past environments in Zimunya

There is no specific work that has looked at the past environments of Zimunya in detail since Wild's (1958) botanical notes. The reconstruction here is my own attempt towards that endeavour by assessing the evidence from faunal remains. The nearest research by Thomlinson (1973) in the Nyanga Park is too coarse to be used as a reference base while that by Wild (1958) is too smooth and relies too much on data from lake levels in east Africa. The research by Holmgren *et al* (1999, 2003) and to a certain extent that by Scott *et al* (2003), therefore remains the only reliable model to cross date events in Zimunya.

7.4.1 Faunal evidence

The faunal evidence presented here is a combination of animal species represented in the rock paintings and those identified from the excavated remains in Zimunya. It was assumed that suitable data to reconstruct the past environment of southern Manyikaland would be found from the excavated evidence, especially from evidence that was recovered in the rock shelters. The excavated faunal remains do not differ significantly from what is in the rock art list (see chapter 4). Analyses of the faunal material from the excavated sites by Manyanga (2006) and Shenjere (2006) show the species compositions that are presented in Tables 7.1 and 7.2, and in Fig. 7.3. Much of the faunal material from Gwenzi and Manjowe came from the top 50 cm of the stratigraphy. Some of the bovid bones show that they were crushed, a behaviour that possibly indicates the use of stones. This behaviour might be considered to be consistent with hunter gatherers (Manyanga 2006, *pers comm*.). The persistence of the crushing to the upper layers seems to be consistent with the pattern noted for the continued presence of stone artefacts to the top levels as well. The evidence suggests that this is a typical hunter gatherer faunal assemblage with a wide range of wild species such as dassies, greater cane rats and some non-domestic indeterminate bovid I, II and III.

The faunal species list recovered from the excavations as well as that from the rock art has no clear evidence of animals that are endemic to the region to enable the identification of specific and sensitive habitats that are useful for detecting ecological changes. Only the reedbuck and the greater cane rat can be considered endemic to eastern Zimbabwe. The common reedbuck survives in grasslands or woodlands near water or in wetter areas while the greater cane rat thrives in areas where there is cane-like grass. This grass is found in the higher mountains and along the major rivers of eastern Zimbabwe. The rest of the species are animals that can survive in a broad range of environments. The Anglo-Portuguese delimitation commission of 1892 reported coming across animal species such as kudu, buffalo, eland, sable, cane rats and many others (Leverson 1893). In terms of faunal composition therefore, the excavated faunal evidence and the pictorial representations of animals on the rock art show no major differences from the present species in the area (du Plessis 1968; Smithers 1965; Zaloumis and Cross 2005).

Fig. 7.1 and Tables 7.1-2 show animal species identified from the three recently excavated sites in Zimunya. The MNI figures from Gwenzi show a dominance of *Achatina* shell. The values are derived from the existence of the apex parts of the shells, but there were numerous *Achatina* fragments which could not be converted to MNI figures. Although the land snail may indicate wet environments, this could have been in the rain season and may not indicate generally wet climatic conditions for Zimunya. The concentration of this evidence along the shelter edge at Gwenzi indicates the location of a midden and suggests self intrusion as land snails can burrow through the stratigraphy. It is also known from archaeological evidence in southern Africa that *Achatina* was used in making beads, but no *Achatina* shell beads were recovered at any of the sites. Thus the *Achatina* shell could not have been imported into the shelters. Apart from land snail, the *bovidae* species have a significant proportion in the assemblage. However, most of the specimens could not be identified to species level. The MNI value of 4 reptiles at Gwenzi and 2 at Manjowe 1 raises questions about their introduction into this assemblage. As they show no other modification apart from being charred, they could have been self introduced.

Scientific Name	Common Name	Gwenzi		Manjowe Ms		Manjowe 1	
		NISP	MNI	NISP	MNI	NISP	MNI
cf. Homo sapiens sapiens	*cf.* Human	0	0	1	1	1	1
Otolemur crassicaudatus	Bushbaby	0	0	0	0	1	1
Orycteropus afer,	Antbear	5	2	0	0	0	0
Equus burchelli	Zebra	5	3	4	2	6	5
Heterohyrax brucei	Hyrax	0	0	3	2	0	0
Bovidae 3 cf. Bos Taurus	Cattle	0	0	2	2	0	0
Bovidae 1 indet		12	7	6	5	9	6
Bovidae 2 indet		8	5	10	6	8	7
Bovidae 2 non domestic		1	1	0	0	2	1
Bovidae 3 indet		9	7	8	5	6	4
Bovidae 3 non domestic		0	0	2	2	0	0
Sylvicapra grimmia	Common duiker	0	0	2	2	0	0
Manis temminckii	Pangolin	1	1	0	0	0	0
Thryonomys swinderianus	Cane rat	3	2	1	1	0	0
Geochelone pardalis	Tortoise	2	2	7	3	11	5
Rodent cf. rattus rattus	*cf.* Rodent	3	2	0	4	13	4
Lepus saxatilis	Hare	5	3	10	10	8	5
Aves (large) chicken size	Bird	0	0	0	0	2	2
Aves (medium)	Bird	3	2	0	0	0	0
Aves (small)	Bird	2	1	0	0	0	0
Reptile cf. snake	Snake	11	5	0	0	4	2
Asphatharia sp	Fresh water muzzel	1	1	0	0	0	0
Achatina sp.	Land snail	38	31	0	0	0	0

Table 7. 1. NISP and MNI counts animal species represented at Gwenzi, Manjowe main site and Manjowe 1

The evidence from Gwenzi and Manjowe shows a wide range of wild animals while that from Murahwa shows the dominance of cattle which is consistent with hunter gatherer and farming communities respectively (Shenjere 2006; Manyanga 2006 *pers comm*.). The data series from Murahwa's Hill shows a higher proportion of cattle (*Bos Taurus*) and some indeterminate *Bov* III bovidae species. The cattle bones could be significant for they indicate the existence of suitable environments for the species. The cattle bones were recovered in varying proportions throughout the stratigraphy down to the basal levels with Ziwa material culture. Only a few ostrich (*Struthio camelus*) egg shell beads were recovered from Gwenzi and Manjowe sites, but no other ostrich remains were recovered.

Table 7.2 compares the faunal remains from the excavated sites in terms of the species represented. The idea is to investigate changes in both species composition and exploitation through time. The results may not necessarily reflect changing habitats, but possibly changing hunting technology and preferences. The range of species and the MNI counts shows efficient hunting in the period of farming communities, although it may also be a result of preservation conditions. Apart from the *Lepus saxatilis, Sylvicapra grimmia* and the *Thryonomys swinderianus*, there are no other common species between the LSA and farming communities periods. The indeterminate *bov* 2 sized species are possibly goat/sheep (Manyanga 2006 *pers comm*.). This investigation is limited by the significant proportion of *bovidae* animals which could not be identified to species. With the presence of pottery in the Stone Age contexts and rock art figures of what appear to be cattle art at Manjowe main site, this possibility is likely.

Scientific Name	Common Name	MUR	MMS	Man 1	GW
Orycteropus afer	Antbear				x
Bos taurus	Cattle	x	x?		
Procavia capensis	Dassie	x			
Heterohyrax brucei	Hyrax		x		
Sylvicapra grimmia	Common duiker	x	x		
Ovis aries	Sheep	x			
Felis caracal	African lynx	x			
Capra hircus	Goat	x			
L. lepus saxatilis	Scrub hare	x	x	x	x
Taurotragus oryx	Eland	x			
Potamochoerus porcus	Bush pig	x			
Tragelaphus stepsiceros	Kudu	x			
Redunca arundinum	Reedbuck	x			
Struthio camelus	Ostrich	x			
Thryonomys swinderianus	Greater cane rat	x	x		x
Aepyceros melampus	Impala	x			
Lagomorpha	Hare	x			
Canis	Jackal	x			
Suid	Bushpig/warthog	x			
Viverridae	Civets/ mongoose	x			
Genetta sp.	Genets	x			
Bov 1, 2, 3 *indeterminate*	Bovids 1, 2, 3	x	x	x	x
Cypraeidae	Cowrie	x			
Achatina	Snail shell	x	x		x
Osteinchthyes	Fish	x			
Aves	Birds	x	x	x	x
Varanus sp	Lizards		x		
Equus Burchelli	Zebra		x	x	x
Geochelone pardalis	Tortoise		x	x	x
Otolemur crassicaudatus	Bush baby			x	
Homo sapien sapien	Human		x	x	
Asphatharia	Fresh water muzzle				x
Serpentes	Snake		x	x	x
Rattus rattus	Rodent		x	x	x
Manis temminckii	Pangolin				x

Key: **GW**-Gwenzi 2, **Man 1**-Manjowe 1, **MMS**-Manjowe main site, **MUR**-Murahwa's Hill

Table 7. 2 Comparison of species diversity at Gwenzi, Manjowe main site, Manjowe 1 and Murahwa's Hill

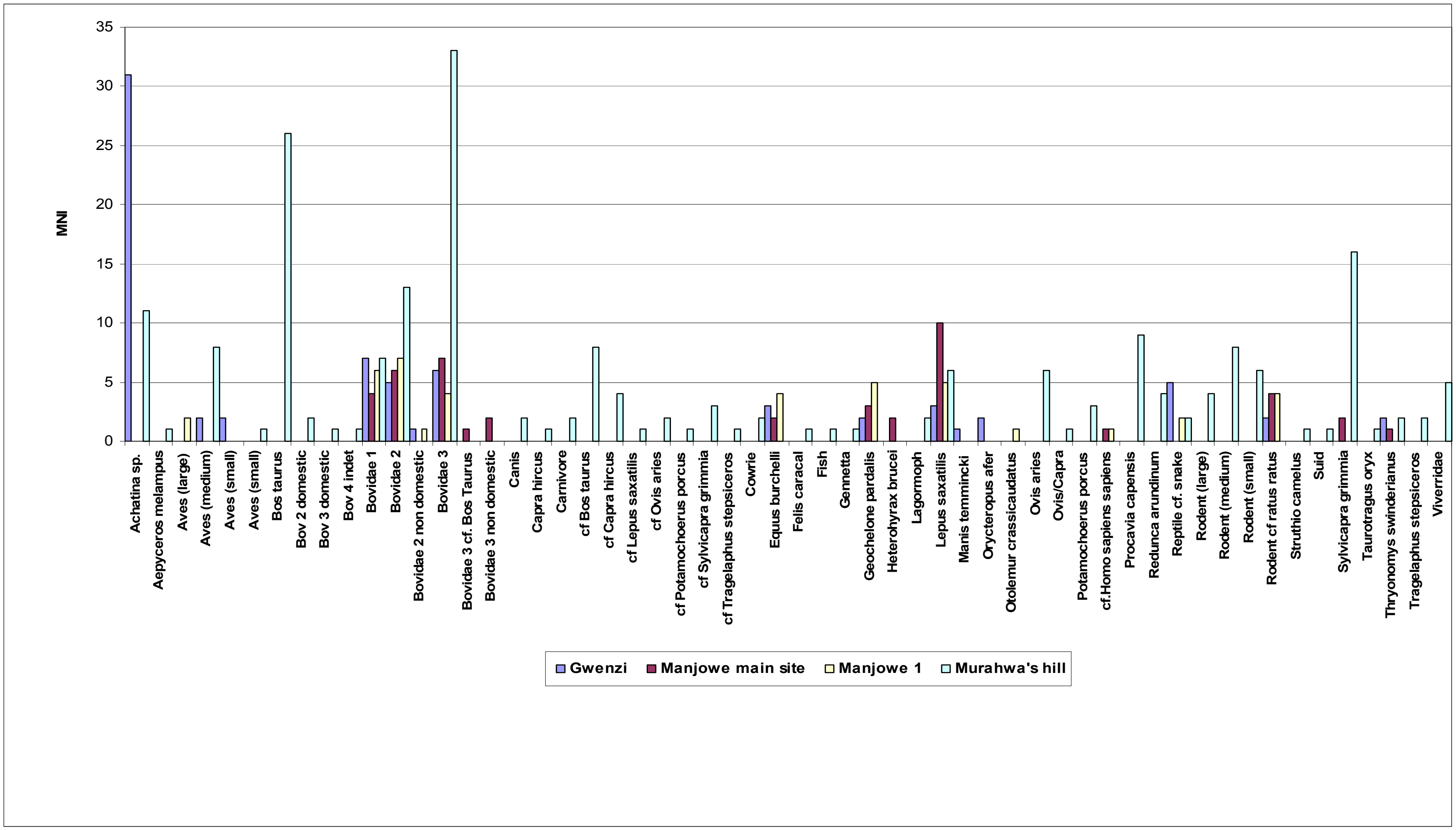


Fig. 7. 1 Comparison of MNI counts of faunal species from the recently excavated sites in the research area

The assessment of species composition by excavation units and levels at Murahwa's Hill does not show significant differences or changes through time. For the rock shelters, there are no distinct patterns in the animals exploited except for Manjowe 1 where there seem to be an increase in the exploitation of larger animals as the stratigraphy gets deeper. Although the *Otolemur crassicaudatus* might indicate forest vegetation, this does not necessarily mean that the area around Manjowe mountain was wetter than it is today. That hunter gatherer communities exploited the rainforests is one of the reasons to explain the presence of this species. The general pattern seems to concur with Lawes' (1990) observation that subsequent climatic changes after the last glacial maximum could have had little effect on the distribution of animal species in eastern Zimbabwe. The faunal remains show similar species composition throughout the stratigraphic levels at Murahwa's hill. In the excavated rock shelters of Gwenzi and Manjowe, there is nothing further to suggest that the Stone Age environment could have been less favourable apart from the limited cultural material recovered.

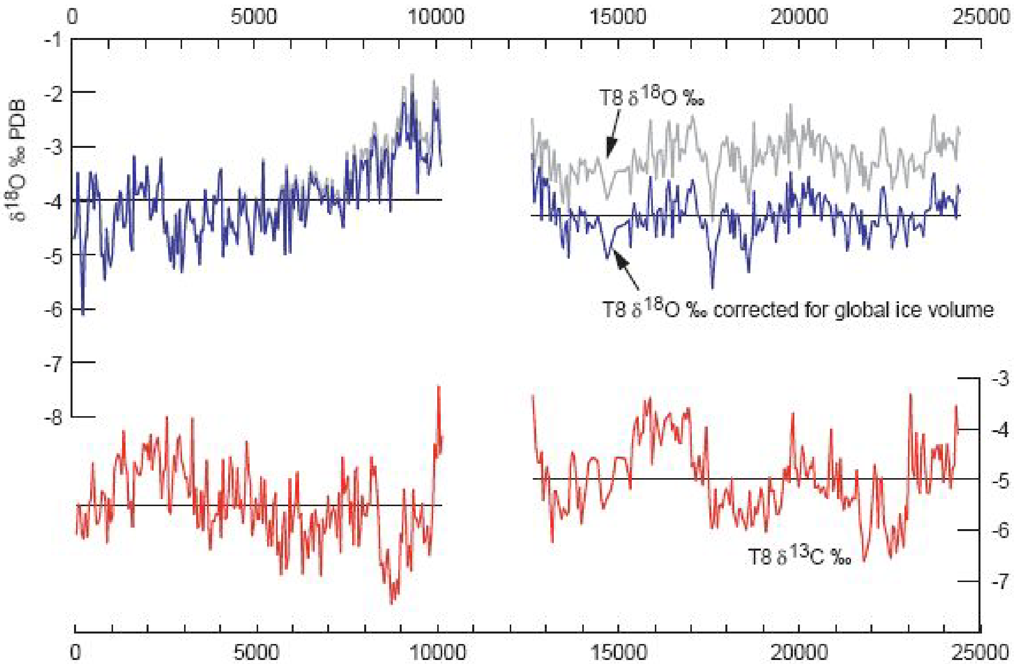
7.4.2 The stone tools

A precise identification of formal tools may give indications on how the tools were used and may be used to infer on past environments. Mazel and Parkington (1981) conducted research in the Clanwilliam District in south-western Cape, South Africa, that aimed at understanding the variability of stone tool assemblages at different sites as a function of environmental variables. This was not a new thinking as Childe (1954) had already postulated that material culture is a product of its environment. While this had potential to illuminate on the role of environment on technological developments, it has limitations in that the tools were considered task-specific (Mazel and Parkington 1981). This confinement of tool use to particular tasks throughout their life cycle is not a practical reality. Tools can be modified or adapted for other uses that were not the originally intended functions.

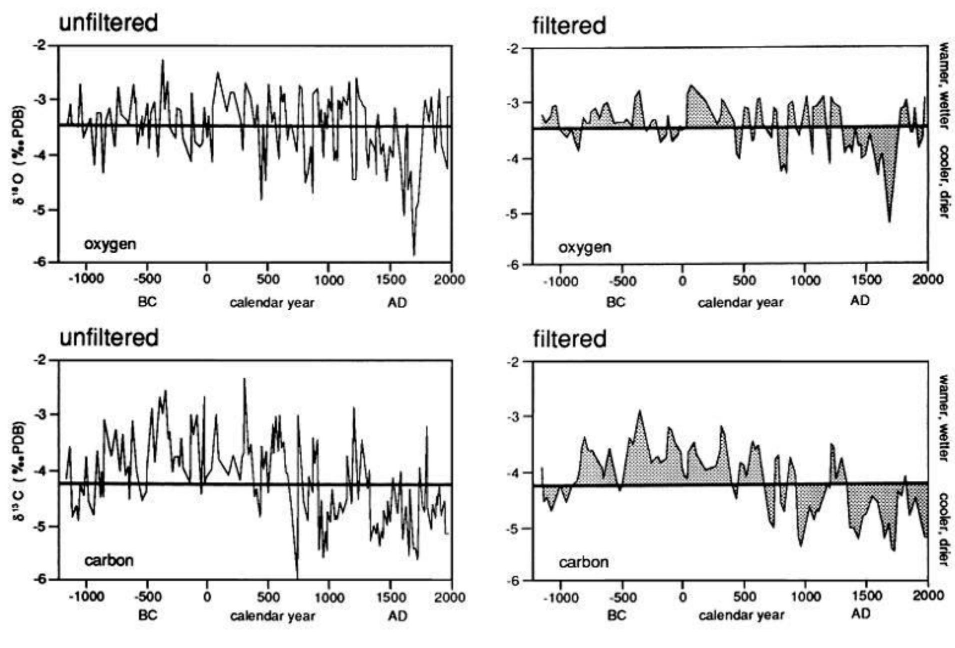
The stone tool assemblage from Zimunya has limited trends. Although backed bladelets decrease while scrapers increase with the sequence, this is not repeated at Manjowe 1 and Manjowe main site. Soper (2005) observed an association of scrapers and pottery, and a general dominance of scrapers in the assemblages across sites. There is no apparent association between tool-size reduction and the reduced frequency of the remains of large bovids in the faunal remains as we move up the stratigraphy. Therefore, there are no conclusive deductions that could be made on the impact of environment to LSA tool use. The variability in LSA tool industries across Zimbabwe may be reflecting social differences rather than differences in economic strategies influenced by ecological characteristics of the physical environment.

7.5 Chronology and the climatic models

Fig. 7.2 below is the climatic model reconstructed from the fluctuations of oxygen and carbon isotope signatures in the T7 and T8 stalagmites from the Cold Air Cave of Makapansgat valley, South Africa (Holmgren *et al.* 1999, 2003). The figure shows climatic changes as reflected by oxygen (the top graphs) and carbon isotopes (the bottom graphs) for the 25 kya (Fig. 7.2a) and the last 2000 years before present (Fig. 7.2b). Fig. 7.2a shows a major break in the climatic reading just before the onset of the Holocene. The two sets of graphs in Fig. 7.2b show similar trends for the larger part of the late Holocene, the only difference being time lags on the onset or end of particular events.



a).



b).

Fig. 7. 2. Palaeo-climatic fluctuations in southern Africa; a). since 25 000 years ago, b).in the last 2000 years ago. (Adapted from Holmgren et al. 1999 and Holmgren et al. 2003).

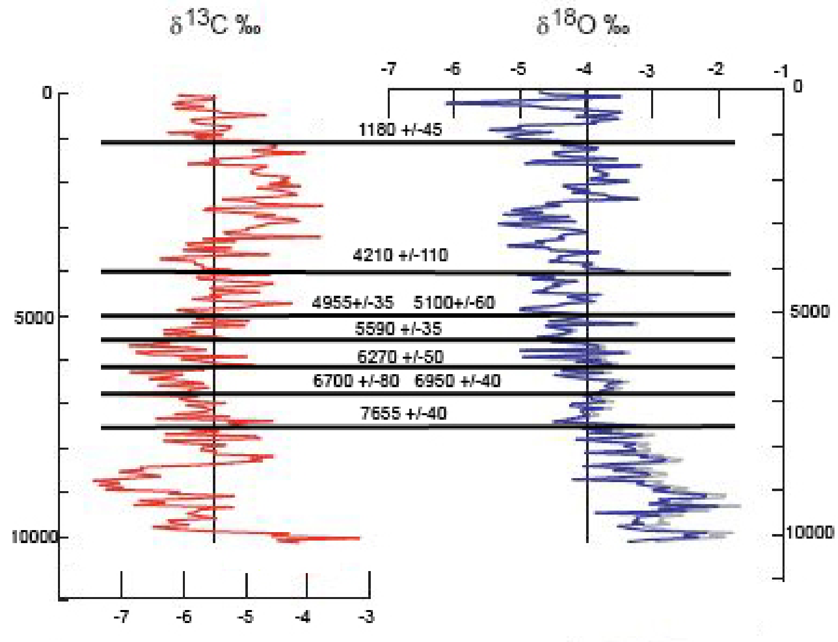


Fig. 7. 3. Holocene Carbon and Oxygen isotope fluctuations in the Cold Air Cave of Makapansgat (Modified from Holmgren et al 2003)

Fig. 7.3 shows climatic fluctuations at Makapansgat during the Holocene modified from Holmgren *et al* (2003) and corresponding dates from Zimunya. The left side of either the carbon or oxygen isotope reading indicates cooler and drier conditions while the right sides indicates warmer and wetter conditions. The cross relation with the dates from Zimunya suggests that the period before 5000 years ago was cooler and likely drier. However, the carbon isotope reading suggests warmer conditions at 7655 +/-40 and after 5000 years before present.

The climatic fluctuations depicted in Fig. 7.3 are not clear during the last 2000 years show the conditions during the period of Farming Communities. Fig. 7.4 compares the climatic model produced for eastern Zimbabwe by Wild (1958) to that of oxygen isotope from South Africa during these last 2 000 years (Holmgren *et al.* 1999). The figure also relates the radio carbon dates from Zimunya to the models in order to infer on the climatic situation during the periods indicated. As in Fig. 7.3, the left side of the figure represents decreasing temperatures and consequently drier conditions. The values at the middle of the figure are the approximate calibrated dates recorded in Zimunya. The right side of the vertical divides of both models show increasing temperatures and thus increasing precipitation.

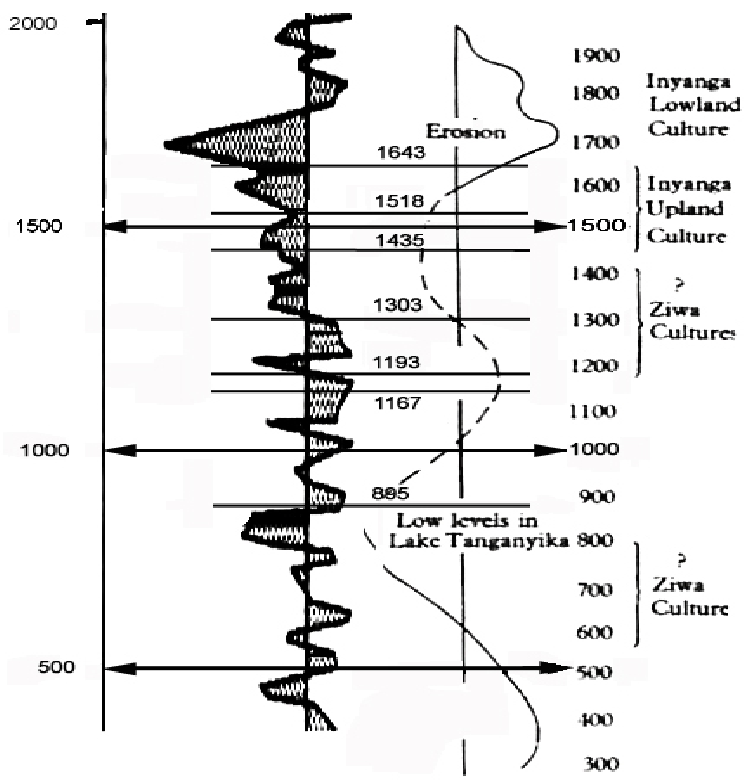


Fig. 7. 4. Comparison of Holmgren et al. (1999) and Wild's (1958) climatic models of the last 2000 years

According to the Holmgren *et al* (1999) and Tyson and Lindesay (1992) models of prehistoric climate in southern Africa, the 9th century AD date for the Ziwa culture at Murahwa's Hill coincides with a wetter period in southern Africa. However, according to the recent evidence, the 9th century coincides with a cold phase (Holmgren *et al* (2003). The other date associated with this period is the 12th century date from TP 6 at Gwenzi. In contrast, all the other dates falling between the 15th and 17th century AD from Gwenzi, Manjowe and Murahwa's Hill are in the generally cold and dry phase of the Little Ice Age.

The two models differ significantly, even if we take into consideration the fact that the one by Wild (1958) is smoothened. There are several rises and troughs on the South African model (Holmgren *et. al.* 1999) which do not appear on Wild's (1958) model. The difference is partly explained by the fact that Wild's model relied heavily on lake levels in east Africa which, according to the evidence now available, did not accurately match climatic conditions in southern Africa. There is also a marked difference in the models after 1500 AD, when the Nyanga model shows increasing precipitation while the Makapansgat model shows cooler temperatures.

I concur with other researchers, e.g. Manyanga (2006), that human populations do not always respond to climate change by migrating to other areas. Instead, they may adapt to the changing climatic conditions. Thus, instead of discussing migration in response to climate change, researchers have begun to focus on the concept of resilience (Manyanga 2001, 2006). I regard resilience as the ability to develop short and long term adaptive strategies which include technological, social and ideological transformation to endure and adapt to the change in climate (Redman and Kinzig. 2003). In other words, the social and cultural system reorganises itself to return to the comfort of a former state (Redman and Kinzig 2003), or to achieve stability at a different level (Dincauze 2000). According to Dincauze (2000), short term responses to environmental change are often conservative and reversible because they seek a minor adjustment in behaviour to afford returning to the former state of stability once the phenomenon is over. However, inappropriate strategies to deal with long term environmental change may lead to the dislocation and degeneration of economic, political, ideological and social structures that used to keep communities together (Dincauze 2000). It can be argued therefore, that there is a critical point when resilience or the effort to adapt becomes impossible and communities may experience rapid social and cultural transformation. Dincauze (2000) observes that long term responses to environmental change may require the redefinition of resources, innovation and the reorganisation of the technological toolkit or change of settlement patterns. Social and economic dysfunction may ultimately force people to migrate to other areas. The period between the 13^{th} and 19^{th} centuries AD (the Little Ice Age) might have been such a period in southern Africa as there is the decline of state systems and the emergence of others in different parts of the region. Thomas *et al.* (2003) have postulated that the rainfall fluctuations in the equatorial region of Angola were the opposite of the conditions in southern Africa. It is possible that since the Zambezi river originates in Angola, it could have been flowing at the time when southern Africa was experiencing drier conditions during the Little Ice Age. This could have facilitated the establishment of such states as the Mutapa in northern Zimbabwe.

7.6 Implications of the climatic models on the archaeology of eastern Zimbabwe

There are several works that have related prehistoric cultures to palaeo-climates in southern Africa (Deacon and Deacon 1999; Huffman 1996b). In eastern Zimbabwe, Soper (2002) suggested a probable encroachment of human populations into the upland areas of Nyanga during the cooler and drier period of the Little Ice Age. The thinking is that people moved into the upland mountains which could have remained as one of the few “islands” with suitable climate for human settlement. This may be correct but how long the mountainous uplands remained wetter when everywhere else the environment was drying is difficult to say. In the absence of detailed local evidence for such climatic indications and until such evidence is available from the research area, using the regional climatic models is unavoidable.

7.6.1 The Stone Age

According to the surface evidence Zimunya has been inhabited since the Early Stone Age. However, evidence from excavations in the rock shelters has produced occupation dates of as early as 6700 +/- 80 (Pta-9307) for Manjowe Main Site, 6950 +/- 40 BP (GrA-26837) for Manjowe 1 and 7655+/-40 (GrA-26884) for Gwenzi shelter. All these dates are in the cool and dry 8.2 kyr event which lasted until 6500 years before present (Holmgren *et. al.* 1999; Deacon and Deacon 1999; Tyson and Lindesay 1992). Later dates ranging from 4210+/-110 to 6270+/- 50 BP fall outside this cool phase. The Stone Age evidence shows no indication of long term settlement despite the wide range in the dates. The shelters have a shallow stratigraphy compared to other sites with the same stone tool tradition in Manyikaland (Soper 2005). The distribution pattern noted for the Stone Age settlement sites indicated that the availability of water was not a problem. There are no apparent insinuations of cultural changes within the LSA of eastern Zimbabwe despite the regional climatic fluctuations during the Holocene period.

One can speculate that the absence of a strong presence of Stone Age cultural material in Zimunya might be the only evidence suggesting climatic problems. The evidence is thus giving conflicting signals regarding the role of climatic change and human adaptation. Although there is no direct indication of cold climate during this period, the few settlement sites suggest a generally low population in the Stone Age period. It is not clear if this can be attributed to unsuitable climatic conditions during this period. It could be a phenomenon arising from a general sparse human population in the sub region, but the fact that there is ESA and MSA evidence points to a longer period of human presence in Zimunya. There are only 13 large sites which I presume were periodically used for settlement in the Later Stone Age. Estimates on hunter-gatherer band sizes in southern Africa vary but a range of 15 to 75 individuals has been suggested (Walker 1995 and references cited). According to Walker (1995), the size of the bands depends on seasons as this has implications on the availability of food resources and water. Large groups are found in arid regions where there are limited water resources and where subsistence is assured through food sharing (Lee 1976; Walker 1995; Yellen 1976). The lower range of the band size corresponds to periods when food would be less scarce. Assuming band size range of 13 to 75 adult people at each settlement site, all the settlement sites recorded in Zimunya would result in between 169 to 975 individuals if the sites were all to be occupied at the same time. Although the excavated evidence shows that the shelters could have been occupied repeatedly, there was not much material evidence recovered that would be consistent with the 13-75 people for the duration indicated by the data. All the three shelters show the same trend. The implication is that these shelters were not inhabited by large groups and probably were occupied during particular seasons.

Summers (1960) associated the increase in precipitation during the LSA period with the occupation of rock shelters for protection against the rains. Summers also interpreted the direct sequence of MSA and LSA material in rock shelters as signifying similar environmental conditions for the two periods. The dates in Zimunya do not all relate to the wetter climatic phases. Instead, some occur in periods when it must have been cold. The environmental implication of the 8.2 kyr event is that there could have been a further expansion of grasslands because of the subdued temperatures. This would mean an expansion of the range lands for grassland faunal species such as zebra. The association between cooler climatic conditions and reduced rainfall would mean that human communities had to settle at points that had reliable supplies of drinking water. Contrary to the assumptions above, the LSA settlement pattern in Zimunya does not show such a strong inclination to water sources. The dates thus suggest the occupation of the shelters at various periods with different climatic conditions. The association between increased precipitation and the occupation of rock shelters as suggested by Summers (1960) is therefore questionable. The occupants of the shelters could have occupied the shelters for various reasons, and not necessarily for protection against the rains.

The faunal remains in the rock shelters are similar to what has been recovered from other sites in the country such as the Matopo hills where no large mammals were identified (Walker 1995). The environment suggested is that of savannah grassland or sparse bush. The distribution of the clusters of the LSA sites is consistent with such an environment, although there is no ethnography to test the dispersion of hunter gatherers into non arid environments. The location of the LSA settlements in the hills could have been an adaptation to grasslands during the cold period of the 8.2 kyr event. Rock shelters could have been more easily defended against predatory animals compared to the plains. From the locations, it is also possible to have a wide view of the landscape below, thereby reducing the energy costs in hunting.

7.6.2 The Farming Communities

Using the Holmgren *et al.* (1999) climatic series and the dates from eastern Zimbabwe, it can be observed that the Ziwa EFC communities were in the Zimunya area during the warm and wet phase before the end of the 1st millennium AD. The earliest date at Murahwa's Hill associated with the EFC is in the late 9th century AD while the contexts associated with EFC sherds recovered from Gwenzi and Manjowe rock shelters were dated to between the 11th and 14th centuries. The sherds from the rock shelters were recovered in association with SA material. The fact that the EFC sherds were recovered in contexts with such dates and in association with SA material shows a late survival of the LSA tradition into this period. Similar cases have been documented in the southeast and southern Zimbabwe (Manyanga 2006; Thorp 2005). There is no continuity of the EFC cultures into the LFC period. The hiatus that separates the LFC from the EFC at Murahwa's hill suggests that the LFC in the area did not directly develop from the EFC Ziwa tradition (Mupira 2007). The 9th and 11th century dates associated with the EFC material coincide with the wet phase of the regional climate which stretched from 9th to 13th century AD (Holmgren *et al* 2003; Ekblom 2004). All the other dates correspond to the cold phase of the Little Ice Age.

Unlike the Zambezi valley where recent results are indicating the development of some LFC cultures from the EFC (Katsamudanga and Pwiti 2006; Pwiti 1996), the evidence in Zimunya is suggesting otherwise. The evidence is however inconclusive due to limited research on sites of the farming communities in the area. The occupation of eastern Zimbabwe in the LFC period therefore, might represent an expansion of communities from the Zimbabwe plateau or from the east. The post 14th century AD dates coincide with the decline of the Zimbabwe state at Great Zimbabwe, and the development of new states west and north of the country (Pikirayi 2001). What happened to the EFC in eastern Zimbabwe is not clear, but the presence of the Zimbabwe tradition in the area might be an indication of the expansion of the state at the time when environment was deteriorating on the plateau. Hunter gatherers who had continued to live in the area up to the second millennium seem to have disappeared at the same time as the EFC.

In many parts of Zimbabwe the transformation from EFC to LFC occurred around the 10th century AD. In north-eastern Zimbabwe no other LFC culture is known other than the Nyanga tradition, which emerged around the 14th century (Soper 2002). According to Soper (2002) the Nyanga culture is contemporary with other LFC cultures such as the Zimbabwe, Musengezi and Mutapa traditions in Zimbabwe. The Nyanga culture seems to occupy a small and specific geographic area to the north east of the country. In Zimunya however, the first LFC tradition is the Zimbabwe Tradition, with both phases of the culture occurring. There are a few sherds at Murahwa's hill that Bernhard (1968) described as Umtali Cordoned ware which may belong to the Nyanga culture. However, recent excavations at Murahwa's hill revealed that there is no hiatus that separates the Khami tradition from Murahwa/Refuge or Manyika material culture of the 19th century AD. While the evidence of the Nyanga culture is not clear from the excavated data, it occurs in the form of pit structures in the Vumba mountains. This evidence has expanded the area that is now known to have been occupied by the Khami phase of the Zimbabwe culture. The sequence of the cultures in this area, especially the position of the Nyanga culture in relation to the Zimbabwe tradition, cannot be determined at the moment without the excavation of the pit structures in the area. It appears therefore that the Zimunya area represents a significant region of the interaction of the Zimbabwe and Nyanga LFC cultures.

In spite of the possible interaction, the material evidence recovered from surveys and excavations reflects limited occupation of the area for a considerable period until after the Khami phase. There is apparent population increase during the Refuge period as seen from the site distribution maps. It is possible that the settlement history of Zimunya after the 1st millennium AD can be explained by understanding the effect of the Little Ice Age phenomenon. The disintegration of the Mutapa state system in the 19th century may not necessarily be a mere coincidence with the Little Ice Age, but probably a consequence of it. It is also important to realise that the Little Ice Age had its troughs and increases in precipitation. The severity or the amelioration of the environment could have followed similar patterns, although the general outlook is that rainfall was low. Although Portuguese activities are considered to have contributed to the social strife and political instability in the Mutapa state (Beach 1980; Pikirayi 1993, 2001, 2003; Pwiti 1996) it is important to understand the nature of the environmental conditions of that period. Consequently, the response to these changes could have been varied. There could have been reduced food resources for some communities during this time, leading to the emergence of marauding bands of communities such as the so-called Zimba in the Zambezi valley (Summers 1958; Ekblom 2004). Other communities could have been spared these problems by virtue of settling in circumscribed environments (Manyanga 2006). Pikirayi (2003) has presented the social problems that haunted the Mutapa state as a consequence of environmental deterioration. The extreme cold conditions towards the end of the Little Ice Age can be related to the droughts that were experienced in southern Africa during the 19th century (Ekblom 2004; Pikirayi 2003). These were exacerbated by environmental degradation and political problems which inhibited farming, leading to famine (Pikirayi 2003). Thus, while understanding of regional climates is useful, it is of paramount importance to investigate the local climate to check for its conformity to or deviation from the regional outlook.

7.7 Conclusion

In this chapter the significance of palaeo-climates in understanding prehistoric settlement behaviour has been demonstrated. It has been observed that the need to have detailed data that illuminates the role of localized climates on cultural developments and settlement patterning cannot be overstated. Determining environmental conditions by interpolating evidence from places that are distant from the target areas would obviously introduce bias. Synchronization of climatic datasets from different areas would be most useful when they have similar resolution. Although I have tried to use local palaeo-climatic evidence to reconstruct the climatic conditions at the various cultural stages represented in the research area, there is need to for more research in this field. A diachronic analysis of cultural developments in particular regions requires that reliable samples of data be collected from the same area. The research in Zimunya relied upon inferring climatic data from faunal remains and from observing anomalous relationships between archaeological sites and the contemporary climatic conditions. However, that strategy has its limitations. For example, correlating animal species recovered from excavation data and their habitat preferences is not always a reliable way to derive climatic conditions. This is especially so if there are no habitat sensitive species in the faunal assemblage. In addition, some of these animals adapt to changing environmental conditions. Thus the resultant inferred climatic record has limitations. This has been the case with most of the data from Zimunya.

The palaeo-climate of Zimunya still needs to be reconstructed in detail to understand the settlement patterns. It is also imperative that the changes in climatic elements, such as rainfall and temperature, be put into figures to enable estimating the effect on human populations. High resolution data in terms of the current environment are necessary to prevent generalisations that are inherent in the regional climatic models. The indications from the inferred local palaeo-climatic evidence seem to contradict the regional reconstructions. The local data and settlement patterns suggest no significant fluctuating patterns. The problem however, could be that the cultural data do not have similar levels of resolution in terms of visible time segments. The reconstruction of a high resolution palaeo-climatic record for eastern Zimbabwe should be a subject for future research.

CHAPTER 8

The prehistoric settlement of Zimunya: summary and conclusions

"With the entry of Zimbabwean archaeology into the mainstream of global computer applications, it can be claimed with justification that Zimbabwean spatial archaeology has come of age" (Pwiti 1997, p. 66)

8.1 Introduction

The research has made an assessment of the culture history of the Zimunya landscape since the Stone Age times. The influence of the physical environment in shaping settlement patterns and the settlement history of the area has been investigated. The use of spatial analytical techniques was aimed at understanding how the prehistoric communities that lived in area engaged with their environment. The research has also enlightened us, subject the limitations of the available evidence, on the nature of the prehistoric environments that were associated with the various archaeological cultures identified.

The research regarded technological developments in spatial analyses as significant aids in the investigation of such relationships. The importance of information technology in the development of archaeology as a discipline can not be disputed. Its potential to offer interesting avenues of enquiry has been attested in many parts of the world (Aldenderfer 1996; Allen 2000; Anselin and Getis 1992; Boaz and Uleberg 2000; Brandt *et al* 1992; Dalla Bona 2000; Gaffney, Stancic and Watson 1995; Stancic and Watson 1996; Gary and Guertin 1996; Kuiper and Wescott 1999; Lock and Harris 2000; Llobera 1996; Lloyd and Atkinson 2004; Sinclair and Lundmark 1984; Sinclair *et al*. 1992; Shennan 1999; Wescott 2000). It can be observed that the use of Information Technology (IT) in Zimbabwean archaeology through GIS applications has expanded the research horizons of the discipline (Pwiti 1996, 1997; Katsamudanga 2001; Manyanga 2006). The combined use of GIS and statistical software has continued to improve the analysis of archaeological data. Through the use of GIS techniques, this research has demonstrated the importance of IT in spatial archaeology.

It is noted however, that the availability of suitable data is vital in the use of GIS technology. Taylor and Overton (1991, cited in Lock and Harris 2000) chided that Africa has "so little data and little geography" such that GIS cannot be used. It can be argued that while these researchers were chiding Africa, the technology finds ready use in data rich countries because these have access to the relevant data. For many developing countries the data are currently lying latent, waiting to be processed for GIS use. The research in Zimunya has revealed the need for the development of a sound archaeological and environmental database.

8.2 The significance of using GIS

As one of the aims of the research was to demonstrate the potential of GIS in spatial archaeology in Zimbabwe, the results have shown how the system can be exploited for archaeological purposes. The use of GIS in this research shows that indeed Zimbabwean archaeology has come of age. Although the system has not taken us far with regards to social issues, the results demonstrate that the settlement patterns observed for Zimunya were not a result of the influence of environmental conditions only. The statistical analysis did not show much significance in the association between the environmental variables and prehistoric settlements. The problem that remains is that of identifying and mapping the social processes that could also have been influential. This is a problem which archaeologists have been grappling with since the 1990s (Aldenderfer 1996; Gaffney, Stancic and Watson 1996; Boaz and Uleberg 2000). There is need to derive high resolution climatic data from the research area. The correlation of cultural developments to climatic sequences developed elsewhere has apparent limitations. Free data available on the internet comes with its limitations, especially on resolution, and for that reason may not be suitable for analysis at high resolution scales. Despite these limitations, there are some deductions that can be made on the spatial behaviour of the archaeological evidence in Zimunya. In addition, even though the dataset used in this research cannot be considered to be as large as implied in conventional definitions of GIS, the demonstration of the potential of the technology raises confidence to enable its application in future research.

8.3 The archaeological evidence

It has been noted that the existing archaeological information prior to this research was not adequate to provide a culture history of Zimunya area. The current research has demonstrated that the area has evidence of the entire range of human history, from the ESA to the LFC. Although the ESA and MSA could not be firmly established from the excavated material, the surface evidence is indisputable. The distribution maps show that these sites are confined to the western slopes of the mountains of the eastern highlands. It has been difficult to relate this evidence to any climatic sequence because of the absence of absolute dates for these periods and the lack of other associated material culture. It may be suggested however, that the ESA and MSA communities had similar environmental preferences to the LSA since evidence of all the three cultural periods was discovered in similar areas. Future research should be able to enlighten us on the status of the ESA and the MSA in Zimbabwean archaeology in general and eastern Zimbabwe in particular.

The distribution of rock art sites shows a pattern which suggests the existence of structure that was probably governed by kinship ties. I have argued that the pattern does not reflect itself as an economic strategy because the analysis of space allocated to each LSA settlement site using thiessen polygons is not large enough to sustain a band size of 13 individuals for a considerable period. The settlement sites are similar in the limited amount of material culture recovered from the excavations. It is suggested that the sites could have been occupied contemporaneously by people of a similar culture. First, the shelters were not as deep as other sites with similar LSA artefacts of the *Pfupi* tradition excavated in the northern areas of Manicaland (Soper 2005). Second, the excavated sites show that the earliest dates of the occupation of the shelter are 6700 +/- 80 (Pta-9307) for Manjowe Main Site, 6950 +/- 40 BP (GrA-26837) for Manjowe 1 and 7655+/-40 (GrA-26884) for Gwenzi shelter. All these dates can be considered to be broadly contemporaneous.

The LSA settlement sites were located near quartz outcrops and near sources of water. Walker (1995) noted a similar relationship between site location and quartz quarries in the Matopo Hills, in south western Zimbabwe. Elsewhere in the region, in Namibia for example, major LSA sites are usually located near sources of water (Lindholm 2006). While the sites in the research area are located near potential water sources the pattern shows no significant influence from this variable. In fact, with respect to the pattern of archaeological sites and water availability, the pattern seems to suggest favourable climatic conditions. In addition, the hunter gatherers of Zimunya could have been well positioned to exploit the two vegetation biomes of rainforests and the savannah areas. The climate of the higher mountains ensured that there was always water for people and animals while the savannah woodlands and forests provided animal and plant resources which flourished in such environments.

The analysis of the clusters of the rock art sites using motif combinations shows that some sites could have been specialised areas. Nyarupara and Gwenzi clusters suggest a strong ritual orientation. Gwenzi site in particular, could have been an area for ritual activities as shown by the art which reflects ritual dances (Nhamo and Katsamudanga 2006). The Nyarupara cluster seems to emphasise transformations as reflected by the conflated images in this cluster. Other smaller sites like Mundoma, Muromo 2 and Guta raJehovha seem to be exclusive to the presentation of activities associated with women (Nhamo and Katsamudanga 2006). The practice of painting could have been a controlled activity if the ratio of painted sites per cluster is anything to go by. With a total of 86 painted sites and only thirteen habitation sites recorded from the surveys, this would give an average of 6.5 sites per cluster. Even allowing for repeated painting at some of the sites the density is small considering the duration of occupation implied by the dates.

Compared to other parts of southern Africa, there are no ethnographic records of hunter gatherers in Zimbabwe. However, ethnographic studies elsewhere in the region show that such communities live in bands of about 13 people or more. Although each band occupied a defined territory demarcated by visible landmarks, the boundaries of these areas were not sharply defined and were not always defended (Lee 1976). The investigation of territoriality using thiessen polygons and cluster analysis techniques did not produce satisfactory results. While the proximity of one LSA settlement site to another can be explained by social factors, the spatial extent of the "territories" indicated by the buffers and thiessen polygons appears too small for hunting and gathering subsistence strategies over a considerable period.

For the farming communities, the limited availability of sites of the early period raises several questions, one of which is whether or not this low visibility is a result of survey bias. The population density of 70 people per km² in recent years as presented by Whitlow and Zinyama (1988) somehow implies a significant potential for the destruction of archaeological evidence through farming and other activities in modern Zimbabwe. On the contrary however, the fact that some sites were recorded in these cultural areas suggests that farming could not have been that destructive of the archaeological evidence to the extent implied by the archaeological evidence. The greatest impact of ploughing is spreading the evidence horizontally rather than destroying it completely.

It was assumed that higher levels of moisture in the eastern highlands could have led to the decay of some archaeological evidence, especially organic material. However, much of the area is in region 3 and 4 where rainfall is seasonal and has a mean of less than 1000 mm per year. The fact that pit structures and ceramic material were recorded in the Vumba mountains disputes the significance of excessive moisture as a cause for the limited evidence of the farming communities. The conclusion that can be drawn is that, except for the effect of vegetation, there is no other significant factor that affected site visibility. The results of the survey therefore reflect a phenomenon whereby the area was not intensively settled for the greater part of the prehistoric period.

The research however did not resolve the issue of the relationship of the Zimbabwe culture, the Nyanga tradition and the Refuge period. This issue would require further excavation, especially of the sites with pit structures to assess how the evidence would relate to the Zimbabwe culture. The Zimbabwe culture has been demonstrated to extend into coastal Mozambique (Macamo 2005; Macamo and Madiquida 2004; Sinclair 1987; Saetersdal 2006, *pers comm*.). It would be useful to investigate Soper's (2002) hypothesis that the two cultures were contemporaneous. Assuming that they were contemporaneous, the spatial relationship between the two cultures would also require clarification. At present, and due to the fact that no Nyanga type site has been excavated in the research area, there is no clear evidence that the Zimbabwe sites were elite settlements as they seem to be elsewhere in the sub-region.

The other issue which needs further research is the association of LSA material with EFC sherds in contexts which have been dated to between the 11^{th} and 14^{th} centuries AD. Evidence from south eastern Zimbabwe shows a similar trend where the LSA communities are thought to have persisted until the 15^{th} century AD (Thorp 2005). There is no break in the occurrence of stone artefacts up to the top layers in the excavated shelters in Zimunya. In addition to this LSA problem, the fact that EFC material was recovered in contexts that were dated to the 14^{th} century also indicates a late survival of the EFC tradition. The trends in the cultural developments are obscured by the limited evidence of intensive settlement until after the Khami phase during the 15^{th} AD.

8.4 Environment, culture and prehistory in Zimunya

This research has demonstrated the potential of GIS to show the relationship between culture and environment. The ability of GIS to relate data from various sources makes it possible to investigate how the physical environment could have influenced cultural developments. The evidence so far points to the significance of cooler climates in inhibiting the intensive settlement of Zimunya, especially during the farming communities period, for these temperatures could have been associated with drier conditions. Thus the limited evidence of settlement in the lower areas of the current Zimunya Communal Lands could have been a result of reduced rainfall, although demographic and sociological factors cannot be ruled out. Increased aridity during the Little Ice Age saw the encroachment into the uplands of the eastern highlands, the Vumba mountains included. One would expect intensive settlement of Vumba during this period, if this was one of the few wetter areas in eastern Zimbabwe. However, the evidence so far does not show that this was the case.

Judging by the number of prehistoric settlement sites recorded in the area, the results suggest that there has always been a low population in Zimunya until the middle of the second millennium AD. I have interpreted this as an expression of the influence of the cool climate that occurred at some of the periods represented in the cultural sequence. The hypothesis was that periods of abundant rainfall were expected to lead to significant population increase in Zimunya. However, the results show no noticeable increase in population in the warmer periods of the Holocene until well into the historical period when oral traditions and written sources begin to suggest movements of people into the area. These population movements can be associated with the severe cold and dry conditions of the 18^{th} – 19^{th} centuries, the later period of the Little Ice Age. These conditions could have led to the widespread droughts that triggered political conflicts and population movements in the early states of southern Africa during the 18^{th} - 19^{th} centuries (Ekblom 2004; Pikirayi 2003; Holmgren and Öberg 2006).

It has long been realised in archaeology that environment played a significant part in influencing human behaviour. Today the population of the research area is of mixed backgrounds due to colonial and post colonial land tenure systems whose landuse designations were partly influenced by climate considerations. The heavily populated area of Zimunya Communal Lands with an estimated population density of 60-70 people per km^2 in 1988 was maintained as a rural reserve in the colonial period to supply labour to Mutare city and the surrounding farms (Whitlow and Zinyama 1988). The farm demarcations in the colonial period displaced indigenous communities to various parts of Zimbabwe. This displacement, coupled with the liberation war which forced many people to flee the border zone with Mozambique and settle in the surrounding communal areas, partly explains the dense population in Zimunya communal lands. Although some of the farms were later acquired for resettlement in the 1980s and in the recent land reform exercise, the pressure for agricultural land is still evident. Thus colonial and post colonial land policy reflected, among other factors, the role of the environment on human settlement.

There is limited literature that specifically discusses Zimunya and Vumba areas in the historical period. Even Portuguese documents have limited information about these areas. Much of the history of eastern Zimbabwe is about the Manyika kingdom (Bhila 1982). In published maps by Beach (1984) and maps developed from Selous' surveys (Ravenstein 1895), Vumba and Zimunya are presented as independent polities or chiefdoms. Beach (1984) and Bannerman (1993) have also given the same impression that Vumba was an independent polity inhabited by the Jindwi or Zimunya dynasty.

Historical records say that the earliest known people to settle in the Vumba and Zimunya were the Nengomasha but their identity is not clear. Oral sources regarded the early inhabitants to be the Ngweme people who are regarded as having originated from Chipinge, south eastern Zimbabwe (Chigodora 2004 *pers comm*.). It is not clear if these two groups of people are the same. There is also the possibility of the Remba who were once linked with the stone structures of the Zimbabwe culture, although the boundaries indicating their distribution are not clearly defined (Ruwita 1995). The oral traditions suggest that the Jindwi or Zimunya people originated from Wedza or Mbire in the middle of the 18th century to establish the Zimunya dynasty (Chigodora 2004 *pers comm*.; Musabayana 2002 *pers comm*.; Kaswa 2004 *pers comm*.; Munyoro 2005 *pers comm.*). This period is associated with the decline of the Mutapa state in the 19th century which led to various population groupings migrating from the Zambezi valley. It is plausible to relate the settlement of the Zimunya dynasty in the Vumba mountains to the environmental deterioration on the plateau. It may also suggest that the higher mountains of the eastern highlands had a favourable environment at the time when the Zimunya dynasty occupied it. A similar suggestion had been offered to explain the settlement of the Nyanga uplands in the 14th to 15th centuries (Soper 2006).

The oral traditions and historical records also refer to the Nguni invasions and attacks from the Gaza state (Beach 1984; Liesegang 1970), but these incursions did not lead to Nguni settlement in the research area. Although the Jindwi of Zimunya emerged in the middle of the 18th century, it is not clear whether they were still an independent polity in the Vumba mountains when the Europeans came and demarcated the present political boundaries. Their status in relation to the Manyika kingdom is not clear. As has been mentioned the Jindwi and Bvumba have been presented as independent polities from Manyika during the 19th century (Beach 1984;

Ravenstein 1895; Bannerman 1993). The limited visibility of these polities in Portuguese documents probably shows their insignificance in terms of Portuguese needs and aspirations at the time. It may also be the result of the confusion that they are usually discussed as part of the Manyika kingdom. Bhila (1982) shows this confusion as on one hand he writes of a powerful Jindwi (Zimunya) dynasty that forestalled the expansion of the Manyika kingdom to the south, and on the other he mentions the Mupudzi as a major river in Manyika when in fact it is in Zimunya. There are reports that a Portuguese *feira* was established in the Vumba mountains when the Portuguese shifted from Chipangura / Masekesa and that there was a gold mine in the mountains (Bhila 1982; Mudenge 1988). However, there is limited information regarding this market place or *feira* and relations between the Jindwi and the Portuguese to show that they were a kingdom in their own right.

One would be interested to know more about the relationship of these communities to their surroundings during this period. There are very few sites which indicate how communities in Zimunya responded to the conditions of the Refuge period. Defence strategies during the unstable periods of the Mutapa state, during the Nguni raids and in the early years of colonial establishment in the interior of southern Africa (Mazarire 2005; Pikirayi 1993), are not apparent. The historical perception of the Refuge period reflects the complex response of indigenous communities to the political upheavals of the period, but it does not show the cultural adaptation of general society to this state of affairs. To understand the adaptation of general society would require the employment of archaeological techniques. The cultural process of adaptation is reflected in the spatial distribution of settlement sites of the various prehistoric communities.

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APPENDICES

Appendix A

Archaeological sites recorded during surveys in Zimunya, 2002-2006

SURVEY	SITE	SITE_NAME	PERIOD	TRADITION	X COORDINATE	Y COORDINATE	DESCRIPTION OF FINDS
0	0	Mutare Altar	LFC	GZ/Khami	465800	7898500	GZ style of walling
0	0	Muromo Main Site	LSA/FC	Refuge	455000	7851000	Rock Art
0	0	Murahwa's Hill	E/LFC	Ziwa/Khami	462300	7904700	Khami pottery, stone walls
1	1	Rowa	LFC	Refuge	458990	7888120	Plain potsherds
1	2	Munyama	LSA		459090	7888090	Rock Art
1	3	Rowa	LFC?	Refuge	458990	7888420	Plain potsherds
1	4	Muranda Manjowe	LSA		459300	7851900	Rock Art
1	5	Dzimbabwe Hill	LSA		454040	7851570	Rock Art
1	6	Manjowe	LSA		461310	7850630	Rock Art
1	7	Gwenzi 2	LSA		449330	7872350	Rock Art
1	8	Gwenzi 1	LSA		449410	7872400	Rock Art
1	9	Maruru	LSA		449260	7871050	Rock Art
1	10	Dzobo Pry School	LSA/LFC	Khami	453300	7866100	Rock Art
1	11	Chisikitira	LSA		451760	7866470	Rock Art
1	12	Masvinga	LSA/LFC	Refuge	451300	7867580	Rock Art
1	13	Madzimbabwe	LSA/LFC	Khami	449890	7865150	Rock Art
1	14	Mataringa	LSA/LFC	Khami	450050	7865530	Rock Art
1	15	Chinyauhera	LSA		455950	7872070	Rock Art
1	16	Chinyauhera 2	LSA/LFC	Refuge	456100	7865900	Rock Art
1	17	Mafuta	LSA		450500	7866910	Rock Art
1	18	Chitora	LSA		460580	7863430	Rock Art
1	19	Chitora Turn-Off Mt	LFC	Refuge	460960	7860950	Rock Art
1	20	Muzarawetu	LSA		462160	7865630	Rock Art
1	21	Munyama 2	FC	Refuge	458900	7888100	Rock Art
1	25	Munyama 3	FC	Refuge	459030	7888000	Rock Art
2	1	Mafuke 1	LSA		460400	7885000	Rock Art
2	2	Mafuke 2	LSA/LFC	GZ?	460400	7885000	Pottery, stone artefacts, *dhaka*, shell bead
2	3	Chemukuti 1	LFC	Refuge	461670	7889650	Grain bins, pole impressed *dhaka*,
2	4	Chemukuti 2	LSA		461710	7889640	Rock Art
2	5	Chemukuti 3	LSA		461300	7888600	Rock Art
2	6	Nyamauya	LSA		461080	7884660	Rock Art
2	7	Mafuke 4	LSA		461940	7885760	Rock Art
2	8	Mafuke 5	LSA		461430	7885130	Rock Art
2	9	Mafuke 6	LFC	Refuge	461300	7885130	*Dhaka*, pottery and slag, glass bead
2	10	Mafuke 7	LFC?	Refuge	461240	7885170	*Dhaka*, pottery
2	11	Pickie 1	LFC	Ziwa	462820	7885220	Slag, pottery with graphite, grinding stone.
2	12	Pickie 2	LFC	Ziwa	462510	7885580	Pottery, comb-stamped and bands of FLI
2	13	Gombakomba Sch	FC	Refuge	464560	7887610	Slag scatter
2	14	Gombakomba 1	LSA		464650	7888760	Rock Art
2	15	Museta	LSA		462740	7888620	Rock Art
2	16	Museta's Field	FC	Refuge	462810	7888580	Undecorated pottery
2	17	Guta Rajehovah 1	LSA		462750	7887300	Rock Art
2	18	Guta raJehovah 2	LSA		462750	7887290	Rock Art
2	19	Chiuya 1	LSA		464790	7878460	Rock Art
2	20	Chiuya 2	LSA		464020	7877550	Rock Art

SURVEY	SITE	SITE_NAME	PERIOD	TRADITION	X COORDINATE	Y COORDINATE	DESCRIPTION OF FINDS
2	21	Chiuya 3	LSA		464170	7878210	Rock Art
2	22	Pickie 3	LFC	Refuge	462980	7885240	Scatter of slag in an open field
2	23	Mvududu's Field	LFC	Refuge	463370	7888650	Slag, tuyere, furnace fragments.
2	24	Gombakomba 2	LFC?	Khami	463150	7889020	Pottery ,some with polychrome decoration
2	25	Nereunze	LFC	Refuge	463850	7889980	Slag, furnace and tuyere fragments
2	26	Hwangura 1	LFC	Refuge	469020	7883080	Scatter of slag and pottery. Hut floors
2	27	Hwangura 2	LFC	Refuge	469430	7882930	Slag , pottery with fine lines of incision
2	28	Gombakomba 3	LSA		464690	7888310	Rock Art
2	29	Guta Rajehovah 3	LSA		463182	7886977	Rock Art
3	1	Chitsanza Mtn	LFC	Refuge	460420	7883950	Thin well fired pottery, *dhaka*
3	2	Chitsanza mtn	LSA		460170	7882960	Rock Art
3	3	Mafuke	LSA/LFC	Refuge	461060	7884580	Pottery
3	4	Chinyamureza1	LSA/LFC	Refuge	459300	7882230	Rock Art, plain pottery
3	5	Chinyamureza2	LSA/'LFC	Refuge	459590	7881890	Rock Art, plain potsherds
3	6	Chinyamazanda	LSA/LFC	Refuge	460090	7882080	Rock Art, plain potsherds
3	7	Chitiyo	LFC	Refuge	458990	7883000	Slag and tuyere fragments
3	8	Marovambira	LSA		464800	7865660	Rock Art
3	9	Mabushmen mtn1	LSA		465160	7866820	Rock Art
3	10	Mabushmen mtn2	LSA/FC	Refuge	464900	7866950	Rock Art, pottery
3	11	Matsika field	LFC	Refuge	464130	7867220	*Dhaka*, tuyere frags, slag, potsherds
3	12	Chinyamutupwi	LSA/FC	Refuge	460600	7880060	Rock Art, plain sherds
3	12	Chinyamutupwi	E/LFC	Ziwa/Refuge	460600	7880060	Rock Art, EFC & plain sherds
3	14	Chikwira	LSA		463440	7874480	Rock Art
3	15	Chikwira	LSA		463310	7874200	Rock Art
3	16	Chikwira	LFC	Refuge	462750	7875840	*Dhaka* and pottery
3	17	Chikwira	LFC	Refuge	462740	7875838	Shelter with potsherds and dhaka.
3	18	Chikwira	LSA/LFC	Refuge	462730	7874670	Grinding grooves and tsoro boards.
3	19	Nyarupara1	LSA		462980	7875020	Rock Art
3	20	Nyarupara2	LSA		463270	7875360	Rock Art
3	21	Mundoma1	LSA		459030	7879180	Rock Art
3	22	Mundoma2	LSA/LFC	Refuge	458960	7878480	26 grinding grooves, plain potsherds
3	23	Nyadombwe	LFC	Refuge	459050	7878340	large clay pot, Dhaka, potsherds
3	24	Mt Gandai	LSA/FC	Refuge	457740	7879340	Rock Art, potsherds
3	25	Rowa Mtn	LSA		458880	7887230	Rock Art
3	26	Rowa Mtn	LSA		457370	7887770	Rock Art
3	27	Rowa Range	LSA		456790	7887680	Rock Art
3	28	Rowa Mtn	LSA		456770	7887020	Rock Art
3	29	Rowa Mtn	LSA		456840	7886900	Rock Art
4	1	Munyu village	LFC	Refuge	472094	7878145	Plain pottery
4	2	Munyu village	LFC	Khami	472536	7878495	Khami pottery
4	4	Munyu village	LFC	Refuge	471800	7878300	Plain potsherds
4	5	Munyu village	LFC	Refuge	471500	7878430	Pottery in a very low cave
4	6	Munyu village	LFC	Refuge	471450	7879450	Pottery
4	7	Munyu village	LFC	Refuge	471500	7879500	Plain potsherds
4	8	Makondo	LFC	Refuge	472250	7879900	Groove on a boulder
4	9	Tasiyenyika	LFC	Refuge	473300	7878450	Plain potsherds
4	10	Tasiyenyika	LFC	Refuge	472623	7877279	Plain potsherds
4	11	Tasiyenyika	LFC	Refuge	472365	7877320	Dolly holes, pottery
4	12	Tasiyenyika	LFC	Refuge	471683	7877043	Plain potsherds
4	13	Tasiyenyika	LFC	Refuge	470994	7877135	Plain potsherds
4	14	Tasiyenyika	LFC	Refuge	471966	7876923	Plain potsherds
4	15	Kaswa	LFC	Refuge	470995	7874581	Plain potsherds
4	16	Ndorwi hill	LFC	Refuge	470640	7873917	Plain potsherds
4	17	Ndorwi hill	LFC	Refuge	470811	7873913	Plain potsherds

SURVEY	SITE	SITE_NAME	PERIOD	TRADITION	X COORDINATE	Y COORDINATE	DESCRIPTION OF FINDS
4	18	Gomoravadzimba	LFC	Refuge	474191	7875310	Plain potsherds
4	19	Gomoravadzimba	LSA/LFC	Refuge	474267	7875382	Rock Art, plain pottery
4	20	Gomoravadzimba	SA/LFC	Refuge	474227	7875445	Rock Art, plain pottery
4	21	Gomoravadzimba	LFC	Refuge	474273	7874737	Plain potsherds
4	22	Gomoravadzimba	LFC	Refuge	474382	7874406	Scattered burnt *dhaka*
4	23	Chipedzambwa	LSA		476486	7878901	Rock Art
4	24	Chipedzambwa	LFC	Refuge	476621	7879288	Scattered potsherds
4	25	Chipedzambwa	LFC	Refuge	476616	7879836	Plain potsherds
4	26	Chipedzambwa	LSA/LFC	Refuge	476771	7878997	Rock Art, pottery
4	27	Alvern Farm	LFC	Refuge	477645	7876349	Pottery on flat top of a hill
4	28	Alvern Farm	LSA/LFC	Refuge	477684	7876093	Rock Art, pottery
4	29	Alvern Farm	LSA		477623	7875572	Rock Art
4	30	Musapa	LFC?	Refuge	477949	7875218	Plain potsherds
4	31	Musapa	LSA/LFC	Refuge	478103	7877098	Rock Art. pottery
4	32	Msapa farm	LFC	Refuge	483231	7877074	R-type of walls against boulders
4	33	Msapa Farm2	LSA		483251	7877174	Rock Art
4	34	Matura?	LFC	Khami	485149	7877212	Iron slag, furnace remains, tuyeres, potsherds, *dhaka*
4	35	Matura?	LFC?	Refuge	485318	7877830	Plain potsherds
4	36	Chinyauhera 3	LSA		453400	7866100	Rock Art
4	37	Chinyauhera 4	LSA		453450	7866100	Rock Art
4	38	Madzimbabwe 2	LSA		449890	7865150	Rock Art
4	39	Mafuta hill	LSA		450500	7866910	Rock Art
5	1	Falling waters	LFC	Refuge	469492	7894360	*Dhaka*, lower G/stone
5	2	Falling waters	LFC	Refuge	469304	7893922	Hut platforms and dhaka remains
5	3	Falling waters	LFC	Refuge	468967	7893818	Small enclosure
5	4	Leopard Rock	LFC	Refuge	468875	7893963	Stone wall between boulders (Roughly built)
5	5	Leopard Rock	LFC	Refuge	477062	7883191	*Dhaka*, pots with hatching, red ochre
5	6	Leopard Rock	LFC	Refuge	477273	7883492	Mounds, grinding stones, potsherds
5	7	Green Croft Farm	LFC	Refuge	471592	7883451	Pottery
5	8	Green Croft Farm	LFC	Refuge	471209	7882796	Pottery and hut platforms
5	9	Green Croft Farm	LFC	Refuge	471168	7882656	Potsherds with incisions on neck, roughly finished, hut platforms
5	10	Green Croft Farm	LFC?	Refuge	471486	7882625	Six dolly holes, pottery
5	11	Green Croft Farm	LFC	Refuge	471592	7882984	Remains of *dhaka* structure
5	12	Green Croft Farm	LFC	Refuge	472608	7884288	Platforms, grinding stone.
5	13	Green Croft Farm	LFC	Refuge	472258	7883631	Platform with three upright stones.
5	14	Green Croft Farm	LFC	Refuge	472819	7882073	Very crudely built stone wall.
5	15	Mureyani	LFC	Refuge	471991	7885901	Potsherds in cave disturbed by burrowing animals.
5	16	Mureyani	LFC	Refuge	471851	7885972	Pottery
5	17	Mureyani	LFC	Refuge	471709	7885870	Pot below a boulder. Double punctates/finger impressions
5	18	Mureyani	LFC	Refuge	471496	7885801	Plain potsherds
5	19	Mureyani	LFC	Refuge	471436	7885780	Potsherds, some with out turned lips, some very thick.
5	20	Redfern Farm	LFC	Nyanga	475047	7887913	A stone-lined pit structure
5	21	Nyamheni	LFC	Nyanga	472901	7888036	Pit about 8m diameter. Potsherds. 1 sherd with punctates.
5	22	Nyamheni	LFC	Nyanga	472702	7888319	Large pit. Potsherds, grinding stones.
5	23	Nyamheni	LFC	Refuge	473912	7888348	Single dhaka wall about 1,5m high
5	24	Vumba National Park	LFC	Nyanga	478049	7886198	4 stone lined pit structures and a fifth enclosure.
5	25	Chinamata farm	LFC	Refuge	475165	7888425	Single pit. 10m in diameter. Potsherds. G/ stone
5	26	Chinamata farm	LFC	Refuge	474941	7888820	Potsherds with no decorations

SURVEY	SITE	SITE_NAME	PERIOD	TRADITION	X COORDINATE	Y COORDINATE	DESCRIPTION OF FINDS
5	27	Vumba Agric co-op	LFC	Refuge	478147	7887756	2 hut platforms, complete pot and a grinding stone.
5	28	Vumba Agric co-op	LFC	Refuge	479754	7887665	More than 11 dolly holes.. Numerous potsherds
5	29	Vumba Castle Beacon	LFC	Refuge	472997	7886706	Enclosure
6	1	Muromo	LFC	Refuge	456493	7855656	Rock Art
6	1	Muromo	LSA	Refuge	456493	7855656	Rock Art
6	2	Vumba Wattle Co. Estate	LFC	Refuge	479007	7894731	Potsherds, burnt dhaka, grinding stones.
6	3	Mabwe Machena	LFC	Refuge	478609	7894761	Scatter of potsherds at the top of a knoll
6	4	Mupudzi River	LFC	Refuge	463942	7884404	terracing along the river on either side of the river
6	5	Mupudzi River	LFC	Refuge	463011	7881604	Some potsherds and pole impressed dhaka
6	6	Mupudzi River	LFC	Refuge	461526	7876392	Pole impressed dhaka, potsherds and some iron pieces
6	7	Chisango Beacon	LFC	Refuge	481094	7897630	There is what appears to be a grave. Broken bottles
6	8	Chisango Beacon	LFC	Refuge	481264	7897587	Hut platforms, stone cairns
6	9	Jekwa	LFC	Refuge	481326	7897315	Evidence of structures (huts), pottery and grinding stones
6	10	Jekwa	LFC	Refuge	482537	7897400	An old church, remnants of *dhaka* and brick structures
6	11	Chitora	LFC	Refuge	461298	7863457	Pottery, G/stones, dhaka, dolly holes and rough walling
6	12	Chitora	LSA		461606	7863686	Rock Art
6	13	Chitora	LSA/FC	Refuge	461862	7863022	Rock Art
6	13	Chitora	LSA		461862	7863022	Rock Art
6	14	Nyambeya Forestry	LFC	Nyanga	473276	7845975	Stone wall roughly constructed. G/stones, wall
6	15	Chisamba/Muranda	LSA		460059	7852359	Rock Art
6	16	Chisamba/Muranda	LFC	Refuge	460214	7852640	Pottery with punctates, hatches, & BLI, midden, iron frag
6	17	Tsvimbanwa	LSA/FC	Refuge	449596	7876878	Rock Art
6	18	Dzobo Pry school	LSA/FC	Khami	451297	7867296	Pottery, G/stones, 5 dhaka mounds (huts). Rock art
6	19	Dzobo	LFC	Khami	450897	7867329	Several potsherds some with polychrome like Khami
6	20	Bopwe Hill	LSA/LFC	Refuge	466486	7862970	Rock Art, potsherds
6	21	Bopwe Hill	LSA/E/LFC	Ziwa	466298	7862829	Rock Art, few EFC sherds
6	22	Bopwe Hill	LSA/FC	Refuge	465968	7862793	Rock Art. . Potsherds no decorations
6	23	Bopwe Hill	LFC	Refuge	465968	7862793	Iron slag, tuyere plug, several potsherds
6	24	Manyoreke Hill	M/LSA/LFC	Khami	464610	7861726	Rock Art, Khami potsherds
6	25	Manyoreke Hill	LSA/FC	Refuge	464467	7861952	Rock Art, potsherds with punctates, a small flake.
6	26	Manyoreke Hill D	LSA/FC	Refuge	464112	7861321	Rock Art
6	27	Binga	EFC	Ziwa	469078	7865599	EFC potsherds & plain others
6	28	Binga	LFC	Refuge	469486	7865391	Ten grooves,. G/stone, stone cairns
6	29	Maenjeni/Tsetsera	LFC	Refuge	472805	7854471	Low stone enclosures, furnace walls, iron slag, G/stones,
6	30	Ngoya	LSA/LFC	Refuge	464752	7863632	Rock Art, plain potsherds
6	31	Nyamidzi hill	LSA/EFC	Ziwa	462901	7863754	Rock Art, few EFC sherds
6	32	Tsetsera	LFC	GZ	473441	7856653	A stone wall, mounds, *dhaka*.
6	33	Gomo RavaRozvi	LFC	Refuge	474054	7857576	Dhaka, iron slag, tuyere fragment.
6	34	Muromo	LSA		456493	7855656	Rock Art
6	35	Muromo	LSA		456493	7855656	Rock Art

Appendix B

Radio Carbon Dates from Zimunya

Site Name	Lab Number	Sample context	C14 Age, BP	Calibrated date	Date received
Gwenzi 2	GrA-26883	Test pit 2A/15cm	685 +/-30	AD 1294 (1303) 1314, 1355-1388	2004
Gwenzi 2	Pta-9309	Test pit 4/15cm	320 +/-70	AD1509-1598, 1616 (1643) 1664	2004
Gwenzi 2	GrA-26884	Test pit 4/80cm	7655 +/-40	6465 (6449) 6432 BC	2004
Gwenzi 2	GrA-26882	Test pit 6/25cm	930 +/-30	AD 1055-1086, 1151 (1167) 1193	2004
Manjowe MS	Pta-9307	Test pit 2/65cm	6700 +/-80	5644 (5614) 5509 BC	2004
Manjowe MS	Pta-9308	Test pit 2A/50cm	6270 +/-50	5287 (5233) 5199, 5178-5076 BC	2004
Manjowe MS	Pta-9311	Test pit 2B/10-20cm	900 +/-50	AD 1157 (1193) 1236	2004
Manjowe MS	GrA-26832	Test pit 5A/46cm	375 +/-30	AD 1492 (1518) 1538, 1540 (1584, 1624) 1635	2004
Manjowe MS	GrA-26834	Test pit 5A/54cm	4955 +/-35	3707 (3678) 3655 BC	2004
Manjowe MS	GrA-26836	Test pit 6/47cm	5590 +/-35	4436-4412, 4388 (4361) 4349 BC	2004
Manjowe 1	GrA-26837	Test pit 1/70cm	6950 +/-40	5815 (5763) 5735 BC	2004
Manjowe 1	Pta-9313	Test pit 2/40-49cm	5100 +/-60	3955 (3925, 3871, 3807) 3780 BC	2004
Manjowe 1	Pta-9314	Test pit 2/65cm	4210 +/-110	2896 (2864, 2802, 2762) 2580 BC	2004
Murahwa's Hill	Pta- 9478	Tren2/55cm	110 +/-5	AD 1899-1906, (1954)	2005
Murahwa's Hill	Pta- 9454	Tren1/92cm	1180 +/-45	AD 873, (895), 974	2005
Murahwa's Hill	GrA- 29534	Tren1/30cm	370 +/-35	AD 1492, (1521, 1576, 1627), 1638	2005
Murahwa's Hill	GrA- 29578	Tren4/42cm	465 +/-35	AD 1436, (1449), 1469	2005
Murahwa's Hill	GrA- 29531	Tren3/132cm	505 +/-35	AD 1424, (1435), 1447	2005
Murahwa's Hill	GrA-29577	Tren3/32cm	195 +/-35	AD 1670, (1680, 1692, 1726, (1742), 1780, 1795, (1805)	2005

Appendix C

Faunal Remains from Gwenzi2, Manjowe Main Site, Manjowe1 and Murahwa's Hill Site

NISP/MNI COUNTS

With the exception of Murahwa's Hill, the range of species represented in the various Trenches/Test Pits excludes the *Achatina* that was recovered in many of the excavation units. The (x) denotes species or situations where it was not possible to make accurate NISP/MNI counts. The astericks (*) in the tables was used where the faunal fragments were not counted such as carpals or skull fragments and as such it was not possible to determine an accurate MNI count. Most of the units are presented against the total range of species recovered at the site.

Gwenzi 2

	TP1 Layers				TP2 Layers							
Species represented	**L1**	**L2**	**L3**	**TOTAL**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**TOTAL**
Orycteropus afer												
Equus burchelli												
Bovidae 1 indet	1/1			1/1		1/1						1/1
Bovidae 2 indet					1/1	2/1	1/1					4/3
Bovidae 2 non domestic						1/1						1/1
Bovidae 3 indet						3/2	1/1	1/1				5/4
Manis temminckii												
Thryonomys swinderianus						2/1						2/1
Geochelone pardalis												
Rodent cf. ratus ratus												
Lepus saxatilis						1/1						1/1
Aves (medium)					2/1							2/1
Aves (small)					2/1							2/1
Reptile cf. snake					1/1		1/1					1/1
Total Species Range	**1**			**1**	**4**	**6**	**3**	**1**				**9**

Gwenzi (*continued*)

	TP2A Layers									TP2B Layers							
Species represented	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**TOTAL**
Orycteropus afer																	
Equus burchelli																	
Bovidae 1 indet	2/1								2/1	1/1							**1/1**
Bovidae 2 indet																	
Bovidae 2 non domestic																	
Bovidae 3 indet											2/1						**2/1**
Manis temminckii																	
Thryonomys swinderianus										1/1							**1/1**
Geochelone pardalis																	
Rodent cf. ratus ratus																	
Lepus saxatilis			1/1						1/1								
Aves (medium)																	
Aves (small)																	
Reptile cf. snake		1/1	2/1						3/2								
cf. Ovis capra			1/1						1/1								
Total Species Represented	**1**	**1**	**3**						**4**	**2**	**1**						**3**

Gwenzi *(continued)*

	TP2C Layers									TP3 Layers							
Species represented	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**TOTAL**
Orycteropus afer				1/1	4/1				**5/2**								
Equus burchelli	3/1								**3/1**	1/1							**1/1**
Bovidae 1 indet	3/1	3/1	1/1						**7/3**								
Bovidae 2 indet		1/1			2/1				**3/2**								
Bovidae 2 non domestic																	
Bovidae 3 indet				1/1	1/1				**2/2**								
Manis temminckii		1/1							**1/1**								
Thryonomys swinderianus																	
Geochelone pardalis		1/1	1/1						**2/2**								
Rodent cf. ratus ratus	2/1				1/1				**3/2**								
Lepus saxatilis				3/1					**3/1**								
Aves (medium)				1/1					**1/1**								
Aves (small)																	
Reptile cf. snake						x*/1*			**x*/1***								
Asphatharia				1/1					**1/1**								
Total Species represented	**3**	**4**	**2**	**4**	**4**	**1**			**12**	**1**							**1**

Gwenzi (*continued*)

	TP4 Layers								
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**
Orycteropus afer									
Equus burchelli			1/1						1/1
Bovidae 1 indet									
Bovidae 2 indet									
Bovidae 2 non domestic									
Bovidae 3 indet									
Manis temminckii									
Thryonomys swinderianus									
Geochelone pardalis									
Rodent cf. ratus ratus									
Lepus saxatilis hare									
Aves (medium)									
Aves (small)									
Reptile cf. snake									
Species represented			**1**						**1**

Manjowe main site

	TP1 Layers									TP2A Layers								
Species represented	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**
cf. Homo sapiens sapiens																		
Equus burchelli		2/1							2/1									
Heterohyrax brucei																		
Bovidae 3 cf. Bos Taurus																		
Bovidae 1 indet	1/1								1/1		1/1							**1/1**
Bovidae 2 indet										1/1								**1/1**
Bovidae 2 non domestic																		
Bovidae 3 indet	2/1								2/1	1/1	1/1							**2/2**
Bovidae 3 non domestic																		
Sylvicapra grimmia																		
Thryonomys swinderianus																		
cf. ratus ratus																		
Geochelone pardalis																		
Lepus saxatilis																		
Total Species represented	**2**	**1**							**3**	**2**	**2**							**3**

Manjowe Main site *(continued)*

	TP2B Layers									TP3 Layers								
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**
cf. Homo sapiens sapiens																		
Equus burchelli																		
Heterohyrax brucei																		
Bovidae 3 cf. Bos Taurus																		
Bovidae 1																		
Bovidae 2										5*/2*								**5*/2***
Bovidae 3 indet			3/1						**3/1**	1/1								**1/1**
Bovidae 3 non domestic																		
Sylvicapra grimmia																		
Thryonomys swinderianus	1/1								**1/1**									
Rodent cf. ratus ratus																		
Geochelone pardalis		2/1							**2/1**									
Lepus saxatilis										8/8								**8/8**
Total Species represented	**1**	**1**	**1**						**3**	**3**								**3**

Manjowe main site *(continued)*

	TP4 Layers									TP5 Layers								
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**
cf. Homo sapiens sapiens																		
Equus burchelli																		
Heterohyrax brucei																		
Bovidae 3 cf. Bos Taurus				2/1					**2/1**									
Bovidae 1 indet												1/1						**1/1**
Bovidae 2 indet												2/1						**2/1**
Bovidae 3 indet																		
Bovidae 3 non domestic																		
Sylvicapra grimmia												2/2						**2/2**
Thryonomys swinderianus																		
Rodent cf. ratus ratus																		
Geochelone pardalis												4/1						**3/1**
Lepus saxatilis											1/1	1/1						**2/2**
Total Species represented				**1**					**1**		**1**	**5**						**5**

Manjowe Main site *(continued)*

	TP5A Layers									TP6 Layers								
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**TOTAL**
cf. Homo sapiens sapiens											1/1							**1/1**
Equus burchelli		2*/1							**2/1**									
Heterohyrax brucei hyrax		2/1				1/1			**3/2**									
Bovidae 3 cf. Bos Taurus																		
Bovidae 1 indet					1/1				**1/1**		2/1							**2/1**
Bovidae 2 indet			1/1						**1/1**		1/1							**1/1**
Bovidae 3																		
Bovidae 3 non domestic					1/1				**1/1**									
Sylvicapra grimmia																		
Thryonomys swinderianus																		
Rodent cf. ratus ratus		x*/1*	2/1		1/1				**3/3**	1/1								**1/1**
Geochelone pardalis												1/1						**1/1**
Lepus saxatilis																		
Total Species represented		**3**	**2**		**3**	**1**			**6**	**1**	**3**	**1**						**5**

Manjowe 1

Species	TR1 Layers								TP2 Layers							
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**TOTAL**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**TOTAL**
cf. Homo sapiens sapiens		1/1						**1/1**								
Otolemur crassicaudatus												1/1				**1/1**
Equus burchelli			1/1	2/1	1/1			**4/3**				1/1		x/1*		**2/2***
Bovidae 1 indet	3/1	3/2	1/1					**7/4**			1/1	1/1				**2/2**
Bovidae 2 indet		1/1	1/1		1/1	1/1		**4/4**		1/1		2/1			1/1	**4/3**
Bovidae 2 non domestic										2/1						**2/1**
Bovidae 3 indet		1/1	1/1		3/1			**5/3**						1/1		**1/1**
cf. ratus ratus	3/1	5/1*	3/1					**11/3***				2/1				**2/1**
Lepus saxatilis	2/1	2/1			2/1			**6/3**		1/1		1/1				**2/2**
Aves (large)		1/1*						**1/1***			1/1					**1/1**
Geochelone pardalis	1/1							**1/1**		5/1*		3/1	1/1	1/1		**10/4***
Reptile cf. snake											1/1*		1/1			**2/2***
Total Species represented	**4**	**7**	**5**	**1**	**4**	**1**		**9**		**4**	**3**	**7**	**2**	**3**	**1**	**10**

MURAHWA'S HILL

Trench 1

Species	**TRENCH 1 LAYERS**							
	L1	**L2**	**L3**	**Pits**	**L4**	**L5**	**L6**	**Total**
Achatina	3/1	1/1						**4/2**
Sylvicapra grimmia	1/1			29/8		1/1		**31/10**
Bos taurus		2/1	3/1					**5/2**
Cf. Bos Taurus		1/1						**1/1**
Bov 3 indet.			3/1		1/1	1/1		**5/3**
Lepus saxatilis			1/1					**1/1**
Tragelaphus stepsiceros			1/1					**1/1**
Cf. Potamochoerus porcus						1/1		**1/1**
Procavia capensis							1/1	**1/1**
Aves (medium)				3/1				**3/1**
Aves (small)				1/1				**1/1**
Osteinchthyes				1/1				**1/1**
Bov 11 indet.				2/1				**2/1**
Cf. Capra hircus				3/2				**3/2**
Cf. Sylvicapra grimmia				1/1				**1/1**
Bov 1 indet.				2/2				**2/2**
Total Species Represented	**2**	**3**	**4**	**8**	**1**	**3**	**1**	**16**

Trench 2

Species	**TRENCH 2 LAYERS**					
	L1	**L2**	**L3**	**L4**	**L5**	**Total**
Bos taurus	2/1	6/1	2/1	6/2		**16/5**
Bov 3 indet.	5/1	9/3	4/1	4/1		**22/6**
Bov 2 indet.	2/1	1/1	1/1			**4/3**
Aves (medium)		1/1	1/1			**2/2**
Cf. Capra hircus		1/1				**1/1**
Redunca arundinum		1/1	2/1	1/1		**4/3**
Sylvicapra grimmia		2/2				**2/2**
Lepus saxatilis			1/1	2/1		**3/2**
Carnivore				3/1		**3/1**
Cf. Ovis aries				1/1		**1/1**
Ovis aries				1/1	1/1	**2/2**
Procavia capensis				1/1		**1/1**
Rodent				1/1		**1/1**
Total Species Represented	**3**	**7**	**6**	**9**	**1**	**13**

Murahwa's Hill species

Trench 3

Species	LAYERS										
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**L9**	**section**	**Total**
Achatina	1/1	1/1	1/1	2/1		1/1					6/5
Aves (medium)	4/1		3/1	6/1	1/1	2/1					16/5
Bos taurus	8/1	23/3	6/2	13/2	8/2	27/2	16/4			1/1	102/16
Carnivore	1/1										1/1
Cypraeidae	2/2										2/2
Bov 3 domestic	1/1										1/1
Bov 3 indet.	3/1	7/2	7/2	18/2	3/1	35/3	11/3			2/1	86/15
Bov 2 indet	2/1	1/1	3/2	4/1							10/5
Bov 1 indet.	1/1										1/1
Mammal	1/1					1/1			1/1		3/3
Ovis aries	2/1	1/1	1/1			1/1				1/1	6/5
Procavia capensis	1/1	1/1	1/1	2/2	1/1						6/6
Rodent (small)	1/1	5/1		6/1	3/1	3/1					18/5
Rodent (medium)	4/1	3/1	2/1	4/1	4/1	2/1	1/1				20/7
Rodent (large)	1/1	1/1				1/1					3/3
Struthio camelus	1/1										1/1
Sylvicapra grimmia	1/1		1/1	2/1							4/3
Viverridae	4/1	3/1	1/1	1/1							9/4
Cf. Lepus saxatilis		1/1									1/1
Cf. Sylvicapra grimmia		1/1	1/1								2/2

Trench 3 species (*continued*)	**LAYERS**										
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**L9**	**section**	**Total**
Felis caracal		1/1									1/1
Bov 1 indet.		6/1	1/1	1/1							8/3
Lepus saxatilis		1/1				1/1					2/2
Potamochoerus porcus		1/1	1/1		1/1						3/3
Redunca arundinum		1/1									1/1
Thryonomys swinderianus		3/1									3/1
Tragelaphus stepsiceros		1/1									1/1
Lagomorph		1/1									1/1
Cf. Bos taurus		1/1	2/1			1/1	3/2				7/5
Reptile			1/1			1/1					2/2
Suid			1/1								1/1
Taurotragus oryx			1/1								1/1
Canis			1/1	1/1							2/2
Aepyceros melampus			1/1								1/1
Bov 2 domestic				1/1							1/1
Gennetta				1/1							1/1
Cf. Capra hircus					1/1						1/1
Cf. Ovis aries					1/1						1/1
Cf. Tragelaphus stepsiceros					1/1						1/1
Ovis/Capra					1/1						1/1
Total Species Represented	**18**	**21**	**19**	**14**	**11**	**12**	**4**		**1**	**3**	**41**

Murahwa's Hill species

Trench 4

Species	**TRENCH 4 LAYERS**					
	L1	**L2**	**L3**	**L4**	**5**	**Total**
Achatina	2/1		1/1			3/2
Bos taurus	7/1			3/1		10/2
Capra hircus	1/1					1/1
Bov 3 indet.	8/2			3/1	1/1	12/4
Bov 2 indet.	1/1		1/1	1/1		3/3
Bov 4 indet.	1/1					1/1
Lagomorph	1/1					1/1
Lepus saxatilis	1/1					1/1
Procavia capensis	2/1					2/1
Sylvicapra grimmia	1/1					1/1
Thryonomys swinderianus	1/1					1/1
Bov 2 domestic			1/1			1/1
Cf. Bos taurus				1/1		1/1
Rodent (large)				1/1		1/1
Total species represented	**11**		**2**	**5**	**1**	**14**

Trench 5

Species	**TRENCH 5 LAYERS**					
	L1	**L2**	**L3**	**L4**	**L5**	**Total**
Bov 3 indet.	1/1	3/1	2/1	11/2	3/1	20/6
Aves (medium)					1/1	1/1
Bos taurus				1/1	5/1	6/2
Achatina	2/1	1/1				3/2
Bov 1 indet.	1/1					1/1
Viveridae	1/1					1/1
Cf. Bos taurus		1/1				1/1
Rodent (small)		1/1				1/1
Bov 2 indet.		2/1				2/1
Total Species Represented	**4**	**5**	**1**	**2**	**3**	**9**