THE ROLE OF AFRICAN CULTURAL ASTRONOMY IN DISASTER MANAGEMENT AMONG BAROLONG BOORA – TSHIDI, MAHIKENG IN THE NORTH WEST PROVINCE

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DECLARATION

I hereby state that:

Cultural astronomy and natural disaster management is my own work, and that all sources used or quoted have been indicated and acknowledged by means of referencing, and that this mini- dissertation has been text-edited, and has not been previously submitted by me to any other university.

Makgosi Loretta Kgotleng

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DEDICATION

This work is dedicated to my late mother Masetswana Magdeline Kgotleng and my late daughter Refilwe Letlhogonolo Kgotleng, who believed in me and taught me that 'poifo Modimo ke tshimologo ya botlhale' and that patience is concentrated strength.

May they rest in peace.

ABSTRACT

The purpose of this research activity is to determine how cultural astronomy manages natural disasters in the local communities. Study Area: Mahikeng in North West Province among the Barolong boora Tshidi.

Indigenous people have contributed the least to world greenhouse gas emission and have the smallest ecological footprints on Earth. Yet they suffer the worst impacts not only of climate change, but also from some of the international mitigation measures being taken. Impacts on climate change affect people negatively, these may include droughts, floods, increased diseases in people, plants as well as animals, biodiversity extinct, high mortality rate, increased food insecurity to mention a few.

This study aims to describe how knowledge of cultural astronomy manages natural disasters within our local communities. In this dissertation the history of Barolong using their knowledge of cultural astronomy to manage natural disasters is gradually fading away because of non-recognition of our knowledge custodians as they do not hold any formal education and those who have it only ended at primary level.

Democracy brought a sense of mental decolonization unto us as South Africans. This brought light to some of our village members to acknowledge their identity which includes their customs and beliefs. This study unearthed that local communities have the rich indigenous knowledge to sustain their lives that is how some villages are able to prepare and manage natural disasters without the knowledge of cultural astronomy only. They practice other measures which also sustain them and are also easy to be passed on orally from generation to generation. In Barolong communities the knowledge

of sky readers is regarded to be very important, it is information that can be relied on because sky readers are always correct. In addition, African traditional religious nature and structure endorses the practice to be acknowledged and be taken as African identity.

In the light of the above, and after taking comments by the members of the communities, recommendations are made for an integrated study framework between the local knowledge and modern technologies or information of astronomy. It is also recommended that there should be proper documentation which is not distorted before it can be totally extinct.

Key words: indigenous knowledge, cultural astronomy, natural disasters, disaster preparedness, mitigation, disaster management, religious cultural beliefs and practices.

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CHAPTER ONE

1. Background

General issues of cultural astronomy

The study of the sky was a vital part of the theological foundation of early civilization. Its obvious effects on earth led to the view of the intense connection between celestial events and human affairs. Welser-Sherill (2007) alludes that, the science of archaeo-astronomy combines the fields of astronomy and archaeology with the goal of uncovering clues to the importance of astronomy in ancient cultures. It is apparent that these cultures had one thing in common astronomy, which was the backbone of their social, political, and religious systems.

Bakich (2004) mentioned that astronomy has traditionally been regarded as the oldest of all sciences. It is defined as the science of studying the sky using telescope and light collectors such as photographic plates. However, people studied the sky and do continue to study without the aid from instruments, this is the realm of cultural astronomy. Since the beginning of humankind, the fascination with the sky has been an important element in human life and history (Bakich, 2004).

He further adds that, the regularity of the motions of celestial objects enabled peoples around the world to create worldviews that is culturally organized systems of knowledge and generations of sky watchers, carefully tracking the positions of the heavenly bodies in order to understand how to conduct the human life on the earth. From the sky, and from the naked eye astronomical observations, they gained practical knowledge of their natural environment (Bakich, 2004).

In view of Nicholas Campion (2004) cultural astronomy is a recent discipline, defined only in the 1990s. It emerged out of the slightly less recent discipline of archaeo-astronomy, the study of the astronomical alignment, orientation or symbolism embodied

in (usually ancient) buildings and monuments. Its antecedents maybe traced back to the handful of enthusiasts who were fascinated by the Stonehenge's possible astronomical function. According to Allen (1993) it was customary for the ancient people to align their sacred monuments with precise solar, lunar and stellar positions.

Further-more he states that over a few generations patterns were noted in the sky and the people began to assign a mythical value to certain patterns. The cyclical occurrence of the sun, constellations and to a lesser extent the planets, gave the impression of a cosmic order. Everyday observations, such as the rising and setting of the sun, and seasonal observations, such as the summer and winter solcities were carefully noted and often coincided with festivals (Allen, 1993).

Cultural astronomy is more than the science of the stars. It is intimately connected to our ideas of ourselves, our purpose and place in the universe. In most parts of Africa, there is little or no awareness about modern astronomy. However like ancient people everywhere, Africans wondered at the sky and struggled to make sense of it (Holbrook, 2008). He continues to mention that, humans continued to watch and learn about the sky to better their lives throughout their history, resulting in an aspect of environmental adaptation that is often overlooked by scholars today.

An example cited by Holbrook (2008) is that African women studied the phases of the moon to keep track of their menses and fertility cycles, while modern astronomy is quite new and unpopular in most parts of the continent. The above mentioned example clearly shows that, cultural astronomy had a long and rich tradition in Africa and a far more extensive cultural impact (Holbrook, 2008). Cultural astronomy is also rich with mythical figures, cosmology and cosmogony, and divination methods that use observations of celestial bodies.

In view of Mcmillan (2000) Batswana communities in parts of Southern African continent have prominent phonological markers that signal the change of the seasons. These can be seen in the different movements and shapes of constellation. There are also atmospheric indicators used by community elders to determine weather conditions. For

example, hot weather, especially at night, during the months of September to November, signals the advent of good rains and long growing season.

He further articulates that, on the other hand, low night temperature during the above mentioned months are indicating late rains.

Batswana communities, alternate the use of their natural grassland according to seasons. They predict droughts as well as weather related diseases by watching the movements of celestial bodies in combination with observing the date of emergence of certain plant species. Such early warning signals of an approaching environmental disaster are used to determine any preventive measures, prepare for mitigation and decide on the course of the community in using natural resources (Asker, 2010).

Definition of natural disasters

Salim (2002) defines disasters as severe, relatively sudden, and unexpected disruption of normal structural arrangements within a social or natural system over which the system has no firm control. In view of Wikipedia (2013) natural disaster, is a sudden event that causes widespread destruction, lots of collateral damage or loss of life, brought about by forces other than the acts of human beings. A natural disaster might be caused by earthquakes, tsunamis, volcanic eruptions, floods, and other geologic processes. In order to be classified as a disaster it will have profound environmental effect and or human loss frequently incurs financial loss (Wikipedia, 2013).

Definition of disaster management

According to Rivermede (2013), disaster management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters. There is no country that is immune to disaster, though vulnerability to disaster varies. Rivermede (2013) explains the four main types of disasters as follows:

- **Natural disasters ;** these disasters include floods, hurricanes, earthquakes and volcanic eruptions that can have immediate impacts on human health as well as secondary impacts, further causing death and suffering. From floods landslides are caused, earthquakes resulting in fires, tsunamis cause a widespread flooding and typhoons sinking ferries (Rivermede, 2013).

- **Environmental emergencies;** these include technological or industrial accidents, usually involving hazardous material, and occur where these materials are produced, used or transported. Large forest fires are generally included in this definition because they tend to be caused by humans (Rivermede, 2013).

- **Complex emergencies;** these emergencies involve a break-down of authority, looting and attacks on strategic installations. Complex emergencies include conflict situations and war (Rivermede, 2013).

- **Pandemic emergencies;** they involve a sudden onset of a contagious disease that affects health but also disrupts services and businesses, bringing economic and social costs (Rivermede, 2013).

Rivermede (2013) further adds that any disaster can interrupt essential services, such as the provision of health care, electricity, water, sewage or garbage removal, transportation and communications. The interruption can seriously affect the health, social and economic networks of local communities and countries. Disasters have a major and long lasting impact on people long after the immediate effect has been mitigated (Rivermede, 2013).

Poorly planned relief activities can have a significant negative impact not only on the disaster victims but also on donors and relief agencies. So it is important that physical therapists join established programs rather than attempting individual efforts. Local, regional, national, and international organizations are all involved in mounting a humanitarian response to disasters. Each will have a prepared disaster management plan. These plans cover prevention, preparedness, relief and recovery (Rivermede, 2013).

Role of African cultural astronomy in disaster management

African communities used their local knowledge to address and manage disasters within their communities, like observing birds, animals and celestial bodies. They had a vast fund of knowledge on prediction and early warnings, time tested coping mechanisms, food production and storage techniques, and an impressive plant-based pharmacopoeia for both human and animal health.

Belmonte (2003) says that communities have powerful structures that exercise authority to ensure smooth compliance with the observances and rules of indigenous knowledge. Batswana community elders accurately observed and recorded even the most in conspicuous fourth magnitude stars, both in oral and visual diagrams. They have over the years devised mechanisms of natural disaster preparedness against heavy rains or floods, hail, cyclones and thunderstorms.

In addition, Batswana have their way of looking at and relating to the world, the universe, and to each other. Further still, Ascher and Eglash (2000) mention that the Batswana traditional education processes were carefully constructed around observing natural processes, adapting modes of survival, obtaining sustenance from the plant and animal world, and using natural materials to make their tools and implements.

The above was made understandable through demonstration and observation accompanied by thoughtful stories in which the lessons were imbedded (Cajete, 2000).For instance, they can alert in timely manner to enable the community members adjust and cope with the coming of a disaster.

According to Clarke (2007) Batswana traditionally, relied on an intimate knowledge of seasonal patterns to secure an ongoing supply of food, medicines and other resources. They interpreted the stars, weather, and other physical and biological indicators to predict biological events and signal when to pursue cultural activities.

They further believe that the sign of thunder and storms are clouds which resemble mountains in the sky. When this happens, they know that they have to prepare to control and stop the severity of the pending storm. Also when a cyclone rise

"setsokotsane" and is in the shape of a cow's tail, the community predicts danger and destruction of houses and the environment (Cajete, 2000).

Paul (2000) alludes that basic component of Batswana knowledge is their indigenous knowledge. Indigenous knowledge (IK) refers to the unique, traditional local knowledge existing within and developed around the specific conditions of a community indigenous to a particular geographical area, covering all aspects of life including management of the natural environment upon which their livelihoods and survival depend.

World Bank (2004) states that, indigenous knowledge is based on, and is deeply embedded in local experience and historical reality of a community. It developed over centuries of observation on how to adapt to local conditions. It therefore represents all the skills and innovations of a people, and embodies the collective wisdom and resourcefulness of a community. Indigenous knowledge is unique to a specific culture and plays an important role in defining the identity of a community.

Local communities in different parts of the world have over the course of history relied heavily on indigenous knowledge systems (IKS) to conserve the environment and deal with disasters. It encompasses local people's skills, experiences and insights, applied to maintain or improve their livelihood (World Bank, 2004).

According to Clarke (2007) Batswana traditionally, relied on an intimate knowledge of seasonal patterns to secure an ongoing supply of food, medicines and other resources. They interpreted the stars, weather, and other physical and biological indicators to predict biological events and signal when to pursue cultural activities (Clarke, 2007).

INTRODUCTION

The heavens have always fascinated humanity, and evidence of quite sophisticated understanding of movement of stars and planets, including the alignment of sacred sites with particular heavenly bodies or astronomical events. Such observations and analyses were not undertaken for anything remotely like modern science but for religious and ritual purposes, and determining the change of seasons. Africans have used the stars for centuries, be it for navigation, agriculture, even story telling (Campbell 2002).

Baki (2006) argues that, knowledge of the sky was once part of everyday life in most of African societies. It was therefore a fundamental core of the measurement of time in relation to the daily cycle of work as well as the annual round of agricultural activities. Celestial bodies are also used for practical purposes such as to observe the sun and moon for timekeeping and creating and accurate calendar.

Further-more, he mentions that predictable patterns of stars and moon had implications for ordinary people. The moon controlled the tides and certain agricultural activities, and patterns of stars in the sky, especially the zodiac which regulated the annual round of production. Knowing the color of clouds that may carry hailstorms enabled people to run for cover. Similarly, knowing that prolonged drought was followed by storm, thunder and lightning during the first few rains enabled people to prepare or expect a disaster (Baki, 2006).

Although people see the same sky, their perceptions and conceptualizations of what they perceive in the sky are culture dependent. The sky our common and universal heritage, forms an integral part of the total environment that is perceived by humankind. Including the interpretation of the sky as a theme in disaster management, it is a logical step towards taking into consideration the relationship between mankind and his environment (Badri, 2000).

He further still mentions that, properties relating to astronomy stand as a tribute to the complexity and diversity of ways in which people rationalized the cosmos and framed their actions in accordance with that understanding. Astronomy, as a cultural product is

at the same time integrated with a particular culture. Because world views and time concepts are always socially determined, the study of indigenous systems of knowledge may offer us important insights into cultural diversity and different ways of perceiving the world (Berkes, 2001).

Cultural astronomy weaves together astronomy and anthropology. Since years back Africans looked up the sky and used the constellation for addressing local challenges such as food insecurity and periodic natural weather phenomena like drought and floods. In view of Campion (2004), cultural astronomy uses astronomical knowledge beliefs or theories, inspire and inform or influence social forms and ideologies, or any aspect of human behavior. Cultural astronomy also includes the modern disciplines of ethno astronomy.

Urama (2002) states that, in the Andean cosmology, celestial bodies played a very important role because it was a star cluster whose careful observation was useful in predicting the quantity of pluvial precipitation and the climate change which were to be seen during seasons. That role is still being played today in some high-plateau Andean communities.

He further contends that history of astronomy, like the history of science, is closely related to the history of mankind. Though modern tools and methods much differ from naked eye observations, today's astronomers are asking questions already asked for centuries. Understanding how the world was created is just as important to indigenous stargazers as to modern astronomers. All are attempting to comprehend and interpret the world in which they live (Urama, 2002).

In Africa, local communities had well-developed indigenous knowledge systems for environmental management and coping strategies, making them more resilient to natural environmental change. Indigenous knowledge systems enabled African communities to live in harmony with their natural environment for generations, and the systems were important tools in environmental conservation and natural disaster management. This knowledge was particularly valuable in communities that

experienced recurring disasters such as drought, famine, disease, floods to name a few (Kamara, 2008).

From time in memorial, natural disaster management in Africa has been deeply rooted in local communities which apply and use indigenous knowledge and innovations to master and monitor climate and other natural systems and establish early warning indicators for their own benefit and future generations. In Africa, local communities had well-developed indigenous knowledge systems for environmental management and coping strategies, making them more resilient to natural environment.

In view of Salim (2002) disasters are defined as severe, relatively sudden, and unexpected disruption of normal structural arrangements within a social or natural system over which the system has no firm control. Sustainable development and disaster reduction are essential preconditions for each other. In addition, he states that disasters spell misery for hundreds to sometimes millions of victims who suffer death, injury and loss of livelihoods. For instance, the east African floods of 1998 and the Mozambique floods in early 2000 and 2001 caused considerable damage to property and infrastructure. The major infrastructure damage was road and rail network damage. Communications among human settlements in Kenya, Uganda, Rwanda and Tanzania were seriously disrupted, impending movements of goods and persons in the region (Magadza, 2000).

He further adds that, these events often negatively affected people in the rural communities. However, these communities had valuable information on preparing for and managing disasters successfully. Their local knowledge assisted them highly during these occurrences as they were poor and had to rely on themselves when they lacked technology (Magadza, 2000). These African local communities could easily identify with their indigenous knowledge of cultural astronomy and managing natural disasters therefore facilitating their understanding of certain modern scientific conceptualizations for environmental management including disaster preparedness, mitigation and management (Kamara, 2008).

According to (George,2000) disaster preparedness, as a tool towards disaster management, includes all of the activities that are carried out prior to the advance notice of a catastrophe in order to facilitate the use of available resources, relief, and rehabilitation in the best possible way. Disaster preparedness starts at the local community level. For instance, the Maasai community alternated the use of their grassland according to seasons. This required a timely decision on where and when to move next. They predicted droughts as well as weather related diseases by watching the movements of celestial bodies in combination with observing the date of emergence of certain plant species (George, 2000).

Marsella (2002) alludes that globally, there is an increasing acknowledgement of the relevance of indigenous knowledge as an invaluable and underused knowledge reservoir, which present developing countries, particularly Africa, with a powerful asset in environment conservation and natural disaster management. Brokensha,et al (2000) also adds that African communities had a vast fund of knowledge on prediction and early warning, time tested coping mechanisms, food production and storage techniques, and an impressive plant-based pharmacopoeia for both human and animal health.

In the field of prediction and early warning of disasters, UNEP (2005) shows that African communities had an array of early warning indicators and well-developed through which the wisdom of the community was applied to deal quickly and efficiently with disasters. For instance, in the field of prediction and early warning of disasters, the Luo community in the Lake Victoria basin had a large number of climate monitoring indicators that enabled them to tell such things as the right time to start planting in anticipation of rains or to preserve and store food in anticipation of a dry season. Correlation of terrestrial and celestial phenomena enabled them to move in space and time (UNEP, 2005).

In South Africa, different ethnic communities have practiced knowledge of cultural astronomy in managing natural disasters. For instance, the Batswana had a wide knowledge of climate monitoring indicators such as birds, plants, animals as well as celestial bodies. They used the knowledge of heavenly bodies which enabled them to

tell the right time for planting in anticipation of the rains or to preserve and store food. This would assist during times of natural disasters, such as floods, drought to mention a few, effects of a natural hazard (Svensen, 2007).

It should be noted that, cultural complements modern meteorological forecasting and it is the major source of weather and climate information for farm management in rural areas of Batswana. Their knowledge of ecological systems includes the description of different components and processes associated with particular ecosystems, their interrelationships, and short-and-long term dynamics. This type of information establishes a base from which to monitor, predict and respond to change (Hounde, 2007).

Usher (2003) articulates that the ecological systems show basic environmental knowledge elements with an emphasis on links among physical phenomena such as astronomy, weather landscape and biological phenomena like plants and animals. The heavenly indicators for example 'dark dust clouds' and the Pleiades 'seven sisters' are linked with broad seasonal shifts. Prober (2010) says that, a range of other astronomical indicators provide basic weather knowledge.

He also mentions that, today the astronomical elements contained within monuments, sites and landscapes are regarded as valuable and important to our universal heritage. Not only do they hold significance and meaning for traditional groups and Batswana communities, but also for the heritage of all peoples. The desire for the preservation of ancient, indigenous or modern systems of astronomical knowledge is therefore justified by the wider public interest (Prober, 2010).

Furthermore, Verma (2000) notes that out of various factors which control agricultural production, weather is the only factor over which man has no control. Virtually, weather conditions determine the failure or success of crops. It affects plant growth, influences development and spread of plant diseases, as well as soil integrity. Thus, in managing farm activities, weather forecasting is an indispensable tool. Knowledge of the onset of

rainy or dry season as well as adverse weather conditions helps farmers prepare thereby minimizing crop destruction and loss.

Batswana farmers have, since time in memorial, relied more on environmental, plant and animal behavior, rather than on astronomical factors, in making critical decisions concerning agricultural tasks. Activities related to terrace construction, maintenance, and crop cultivation depends heavily on the recognition of successions of observable environmental changes (Prober, 2010).

By carefully observing weather and climate patterns as well as plant and animal behavior, adaptive measures were made to appropriately cope with changing conditions that are otherwise detrimental to their crops. Through many decades of observation and experience, the wisdom gained became a significant body in the people's indigenous knowledge and valuable heritage.

1.1 The Profile of the Batswana in the North West Province

The Barolong is an ethnic group in Botswana and South Africa. The two sections of the Barolong are under one Paramount Chief who is based in Mochudi, Botswana. Currently the Barolong are led by Kgosi Kgolo Montshioa. Chieftaincy among the Barolong is hereditary as it is inherited by the eldest son of the chief. Those found in South Africa are in the North West province.

Barolong cultural information systems are dynamic and are continually influenced by internal creativity and experimentation as well as by contact with external systems (Forno, 2002). Barolong communities can easily identity their systems of knowledge and facilitate their understanding of certain natural hazards for environmental management, including disaster prevention, preparedness, response and mitigation.

This society is heavily dependent on livestock for their day- to-day needs like milk, meat, transport, draught power and culturally important ceremonies such as weddings and funerals. They also depend on natural resources for their livelihood for example; trees which they make firewood. Alverson (2002) alludes that the importance of

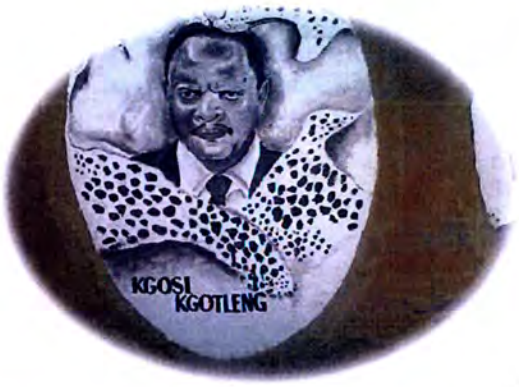
livestock, especially cattle, to the life of Barolong goes beyond their economic value to the farmers. Cattle among the Barolong symbolize permanence, stability and life itself.

1.2 Pictures of some chiefs who ruled in Barolong Boo Ratshidi in Mahikeng


TACKLEO TAWANA
JOSHUA MOLEMA
1850-1919
SERU
SOL PLAATJIE
1876-1932


LOTLAMORENG
1896-1954
KEBALEPILE
1933-1972
BADIRILE
1873-1911
LEKOKO
1849-1915
BESELE
1854-1903


TIEGO (1880)
CAXTON MONTSHIOA
1910-1984
DR.MODIRI MOLEMA



1.3 Statement of the Problem

Like in other African traditional societies, the Barolong had a wide and rich knowledge of using cultural astronomy to adapt to and mitigate natural disasters such as flood, drought and other aspects of community livelihood. However, with the introduction and dominance of western knowledge systems in Africa such as the use of telescope and other forms of technologies to read the sky, indigenous knowledge is slowly fading away. This marginalizes the indigenous knowledge of African cultural astronomy and its uses in the community.

Batswana community members are rarely considered in academic policies and public discourse on climate change, despite the impact by impending changes. Their livelihoods depend on natural resources that are directly affected by climate change. They are perceived as primary actors in terms of global climate change monitoring, adaptation and innovation. Indigenous seasonal knowledge, which involves knowledge

of weather, seasonal cycles of plants and animals and their links with Batswana culture and land uses, is one form of traditional ecological knowledge (Cajete,2000).

Presently, Barolong community does not hold a vast knowledge of cultural astronomy and its effects in managing natural disasters. This is because younger generations of this community do not recognize this knowledge as important and of benefit to them. They see it as backward and untrue information. The custodians of this knowledge are elders, who with their age are dying. As a result the knowledge of cultural astronomy among the Barolong is slowly fading away. Another reason for the knowledge of cultural astronomy to fade away is that most of these knowledge holders did not receive formal education. With the result whatever knowledge they have is not recorded.

The implications of this marginalization among our farmers and community members, is that they cannot prepare, mitigate and thus manage natural disasters when they strike their land. In the area of Mahikeng the type of natural disasters which happened before was drought. It therefore pushed the villagers to always depend on western intervention or assistance to alleviate the situation. Managing natural disasters is a serious challenge within the community members of this area.

Limited knowledge of cultural astronomy which they have, in using indigenous skills and knowledge affects them negatively, this kind of lack makes them to always wait for natural disasters to strike and also for the intervention of government aid. The knowledge of cultural astronomy in this society is not fully used because the custodians are not seen or recognized as members who can add value of sustainability of the community.

Knowledge holders of cultural astronomy share or impart their knowledge to the farmers as they are the ones who become mostly affected when disasters strike. Even if the chief has given orders that farmers be alerted of the natural disasters coming, there are still those farmers who do not take heed of the information. They do this because they believe in western knowledge for survival and sustainability of their lives. The fact that Barolong elders who are custodians of cultural astronomy did not undergo official

education impedes negatively to them among the community and this inhibits the knowledge as it is only kept to them.

1.4 Rationale and Motivation of the study

Batswana depend on agriculture and livestock to sustain their lives. The level of climate in these areas has resulted in economic instability which has affected the communities negatively as they incurred natural hazards like drought and floods. Disaster preparedness and management is an undisputed significance to disaster reduction. Limited study of cultural astronomy has been documented and applied as one of the indicators to mitigate and manage natural disasters within the affected communities. It is therefore of importance that cultural astronomy be merged with scientific astronomy in addressing natural disasters.

1.5 The Aim of the Study

To investigate the role of African cultural astronomy in disaster management, among Batswana with special reference to the Barolong (North West Province, South Africa).

1.6 Specific Objectives

The study investigated the following aspects:

- The existing knowledge of African cultural astronomy among the Barolong
- The way Barolong use the knowledge of cultural astronomy in managing natural disasters
- The challenges facing the knowledge and use of cultural astronomy among the Barolong in natural disasters management and other aspects of community livelihood.

1.7 Hypothesis

The Barolong have a wide knowledge of African cultural astronomy and use this knowledge in mitigating natural disasters.

1.8 Organization of the study

Chapter One is the introduction. It provides the background, introduction, aim and objectives of the study

Chapter Two provides the literature review and theoretical discussion

Chapter Three is the methodology of the study

Chapter Four provides the research findings

Chapter Five is the discussion and recommendation of the study

Chapter Six is recommendations and conclusion

CHAPTER TWO

2. LITERATURE REVIEW ON CULTURAL ASTRONOMY AND DISASTER MANAGEMENT

Fikes (2000) says, it is clear from preindustrial societies from one end of the African continent to the other, Africans relied on the stars to determine seasonal cycles, timing of festivals and rituals, crop planting and harvesting as well as mating intervals. Marsella (2008) adds that, many cultures have long histories of indigenous astronomy that offer an easy route for introducing a modern understanding of the universe.

Further-more George (2000) states that astronomical knowledge was reflected in the massive architectural monuments seen in Mexico, Guatemala, Honduras and other areas of Central America. Mayans created ancient observatories to measure, track and predict the motion of the planets, the sun, the moon and the stars (George, 2000).

George (2000) adds that the Mayans observed the motions of celestial bodies in the sky for the purpose of planning and celebrating key dates in their ritual calendar including agriculture. Many of these astronomical traditions are still practiced today by the Maya of the Yucatan peninsula.

Further still he mentions that, Africans used their local knowledge to address and manage disasters within their communities, like, observing birds, animals and celestial bodies. Similarly, estimates of animal fertility could be drawn from such forecasts with implication on stocking rates and density (George, 2000).

In view of Verma (2000) it is said that out of various factors which control agricultural production, weather is the only factor over which man has no control. Virtually, weather condition determines the failure or success of crops. It affects plant growth, influences development and spread of plant diseases, as well as soil integrity. Thus in managing farming activities, weather forecasting is an indispensable tool. Knowledge of the onset of rainy or dry season as well as adverse weather conditions helps farmers prepare thereby minimizing crop destruction and loss (Verma, 2000).

In addition Verma (2000) alludes that, by carefully observing weather and climate patterns as well as plant and animal behavior, adaptive measures were made to appropriately cope with changing conditions that are otherwise detrimental to their crops. Through many decades of observation and experience, the wisdom gained became a significant body in the people's indigenous knowledge and valuable heritage.

African communities also depended on rain-fed subsistence agriculture for their livelihood. Forno (2002) further shows that in the African traditional worldview, environmental resource such as land, water, animals and plants are not just production factors with economic significance but also have within the sanity of nature.

In view of Ramsay (2002), many developing countries are very skeptical about investment in space, arguing that the money spent on such programs could be better spent directly in improving the human condition on earth, forgetting that space offers a unique opportunity to balance consumption and production, and therefore ensure sustainability of our resources and environment.

He further adds that, in the spirit of Nepad, African governments should play active roles in the provision of enabling environment and political will, to support the development and implementation of policies on science and technology, particularly cultural space science and technology and geo-information that have become indispensable tools in any sustainable development effort (Ramsay, 2002).

Astronomy is a field that challenges the limits of human understanding and yet never ceases to expand on it. It is also a spark that triggers the curiosity and wonders, which are so often suppressed in a world of distractions, a curiosity that is so effective for the development of a person and thus the development of a people. Astronomy can play a key role in addressing this often sensitive relationship between traditional and scientific knowledge systems. Astronomy, as mentioned earlier, is something that virtually every culture already has a relationship with (Byrne, 2004).

Hosbawn (2000) states that indigenous knowledge forms part of the global knowledge. It has value and relevance in itself. This knowledge can be preserved, transferred or

adopted and adapted elsewhere. It must be acknowledged that astronomy belongs to us all. Virtually every culture in the world had already established a relationship with the Stars, Moon and Sun hundreds if not thousands of years ago (Hosbawn, 2000).

In fact, for as long as people have walked the earth they have looked up at the night sky and wondered about the objects they saw. Crindle (2000) states that in Africa, people have used the stars for navigation, agriculture, predict food production, even story-telling. Today, astronomy as a field of study has developed into something that attempts to answer some of the biggest questions imaginable. Indigenous European, Arabic, American, and Polynesian astronomies have been the focus of many scholars over the last century. These works have revealed a surprisingly intimate knowledge and understanding of the night sky and its phenomena (Crindle, 2000).

In view of Snedegar (2007) two African sites of astronomy have been studied in great detail in Egypt and the Dogon region of Mali, West Africa. In other parts of Africa where various forms of astronomy still exist, astronomy has been and in some cases is still being practiced today. Several astronomical sites exist but detailed astronomical analysis has not been conducted. Examples of celestial bodies mentioned in the study are (1) Star Lore, which refers to the myths and legends surrounding celestial bodies. Examples of star lore include the names of the planets, stars, and constellations along with the stories created about them (Snedegar, 2007).

Furthermore Snedegar (2007) adds that, star lore often incorporates origin and creation myths of people as well as insightful tales that reflect important aspects of their culture. For example, in Greek/Indo-European culture, the constellation Canis is the faithful dog of the hunter, the constellation Orion, reflecting an idealized and permanent relationship between man and dog. While in Egypt star lore Orion becomes Osiris, the Lord of everything, while Sirius, the brightest star in Canis Major, becomes Isis his female companion. The star lore of Africans spanning the continent focuses on the constellations visible in the sky. As one travels from North Africa to South Africa Polaris, the Big Dipper and the Pleiades give way to Orion, Sirius, Canopus, the Magellanic Clouds, and the Southern Cross.

The star lore of North Africa differs from the star lore of southern Africa. In that Pleiades and Sirius figure largely in the star lore of the peoples of Mali and Ethiopia and Sirius, while Canopus appear in the star lore of South Africa and Botswana (Snedegar, 2007). Physically Sirius, Canopus, the constellation Orion, and the star cluster the Pleiades are bright distinctive objects in the night sky. This is most likely the reason for their distinction in African star lore. The Milky Way which spans the sky and Venus which is bright and remains close to the Sun are focused on all over Africa (Senkintu, 2000). The Southern Cross is important to the Zulu, Sotho, and Tswana of southern Africa and is recognized as a navigation constellation (Cuff, 2005).

In continents such as Africa, Zimbabwe, Togo, and Benin people built physical structures aligned to the positions of the solstices and equinoxes. In the Great Zimbabwe stone city, a chevron pattern is bisected by the solstice Sun (Doyle, 2006). Great Zimbabwe was built around 400 AD and a finished city around 1350 AD. It is credited to the Karanga people. In Togo and Benin, the Batamalimba people have designed their houses such that their crossbeams are aligned to the equinox sunrise and sunset. Finally, there are over 1600 stone circles in Senegal, the Gambia, and Togo which has yet to be astronomically analyzed in great detail however in East Africa, the stone circle, Namorotunga II, has been shown to be an astronomical calendar (Lynch, 2004).

Badri (2000) notes that, there seems to be enormous scope for studying ancient sciences in the greater depth. Unfortunately, with the advent of scientific technologies over the past century or so, cultural knowledge which is holistic and multidimensional in nature, has often been sidelined. The modern meteorologists should take advantage of the astrological lore available in local and from traditional knowledge systems and combine it with their studies, so that more reliable forecasts could be offered for the benefit of the people.

2.1 Batswana Culture and Identity

Davis (2002) states that, Batswana are Southern African people who migrated into central Africa in the 14th century. This is a group of African origin, making up a

significant part of the population of the country of Botswana. Motswana or Batswana is the name of these people. The total population of Batswana stood at about four million at the turn of the 21st century.

According to Chigwedere (2010) Batswana are divided into 11 sub-groups and make up about 60% of the population of Botswana. These 11 groups are; Batlhaping, Barolong, Bakwena,Bakgatla, Makgalagadi, Batawana, Bahurutshe, Bangwaketse, Bangwato, Batlokwa and ba-Malete. Today there are 59 different sub-groups in South Africa who now accept the overall name of Batswana. About three-fourths of the Batswana people live in South Africa.

Only about one-fourth live in Botswana, the country named after them. Seven of the country's eight major communities, the only exception being the baMalete or Balete are Batswana, still have a traditional Paramount Chief named kgosikgolo and entitled to a seat in the House of chiefs. Due to this traditional manner of self-identification, the registry of peoples lists each of these groups under a separate code as a separate ethnicity (Thompson, 2003).

Davis (2002) adds that, ancestors of the Batswana were living on the Highveld that is the western, northern and northeast Witwatersrand area from at least the 17th century. Up to the 19th century, junior members of chiefdoms would often break away and form chiefdoms, splitting the Batswana nation into numerous small chiefdoms and overlapping states. Historical evidence suggests that the Batswana states developed on the basis of royal control of cattle and on the profits of mining, manufacture and trade.

As herders and cultivators the Batswana found the high plains to their liking, because the grass was excellent for cattle, there were no serious endemic livestock diseases and the soil was deep and easy to cultivate. Sorghum, beans, pumpkins, sweet melons and gourds were planted. They also found that maize, introduced by the Portuguese into the country, was also highly productive (Marquad, 2008).

The origin of the name Batswana is a mystery. It is applied to a number of groups who all speak the same African language, have similar customs, but separate names. None ever

knew themselves as the Batswana. As with several other people in South Africa, their name was given by foreigners. The meaning is unknown. In view of James (2000) history of the Batswana is one of continual dissension and fission where disputes, sometimes over chieftain ascendancy, resulted in a section of the tribe breaking away from the main tribe, under the leadership of dissatisfied chief's relative settling elsewhere.

Jenkins (2009) argues that Setswana is one of the national languages of Botswana, where it is spoken by over 1,000,000 people. It is also spoken by nearly 3,000,000 people in South Africa, Namibia and Zimbabwe. In addition, there is the larger Kgalagadi community whose language is different enough to be classified as a separate language. They are classified as a separate people in the broader Basotho-Batswana family. All the Basotho and Batswana languages are inherently intelligible, but for political and historical reasons, they have generally been considered as three languages.

Furthermore, Jenkins (2009) adds that, before South Africa became a multi-racial democracy, the Africans of Bophuthatswana were set up to cover the Batswana speakers of South Africa. Lehurutshe, Mahikeng and Mmabatho are major cities on the South African side. Gaborone and Lobatse are major Batswana cities in Botswana.

According to James (2000), the Batswana community is divided into autonomous chiefdoms thus mange affairs differently, that is, their customs and cultural life. Totemism has long been a feature of the Batswana culture and it's referred to the veneration of an animal, plant or object. Association with a particular totem carried with certain responsibilities and traditions, for instance Motswana does not think in terms of individual rights, but of the responsibilities to his family and community. Often the name of the man who led the splinter group was taken as the new tribe's name (James, 2000).

Morton (2003) alludes that all dynasties are related, some have known splits in two or three competing lines. In Botswana, communities such as khoisans are regarded as Batswana, and Batswana are closely related to those in South Africa and Basotho in Lesotho. The Basotho and Batswana are bonded in language and customs. They claim a

common ancestor, Mogale and share agrarian culture, social structures, political organization, religious and magical beliefs and also a family life (Morton, 2003).

He further notes that, ancestors of the Basotho entered the area to the south of the Limpopo River in several separate migrations. In the course of time, they were dispersed over the vast interior plateau between the eastern escarpment and the arid western regions to form subgroups (Morton, 2003).

2.2 Cultural Astronomy and Batswana Indigenous Knowledge Systems

Allen (1999) defines astronomy as the science of studying the sky using telescope and light collectors such as photographic plates. However, people studied the sky and do continue to study without the aid from instruments, this is the realm of cultural astronomy.

Correlation of terrestrial and celestial phenomena enabled them to move in space and time. Regularities formed by the motions of celestial objects provided the necessary context upon which many structural symbolic patterns were built to regulate human activities. The celestial bodies have been associated with calendar making and homogeneous time reckoning. On the other hand, the order perceived and imposed by the sky gave form to the ways with which peoples perceived their world, conceptually organizing the universe (Campbell, 2002).

According to Asker (2010) Batswana used warning signals to determine any preventive measures, prepare for mitigation and decide on the course of the community in using the natural resources. He further alludes that disaster mitigation is an ongoing effort to lessen the impact disasters have on people and property. Fewer people and communities would be affected by natural disasters with the use of this process. Batswana used their local knowledge to address and manage disasters within their communities like, observing birds, animals and celestial bodies (Asker, 2010).

In view of Campion (2004) Batswana cultural astronomy weaves together astronomy and anthropology. Since years back Batswana looked up the sky and used the

constellation for addressing local challenges such as food insecurity and periodic natural weather phenomena like drought and floods. Furthermore he adds that, cultural astronomy uses astronomical knowledge beliefs or theories, inspire and inform or influence social forms and ideologies, or any aspect of human behavior. Cultural astronomy also includes the modern disciplines of ethno astronomy.

The Batswana indigenous knowledge is local and unique to given culture or society. It is basic for local level decision making in agriculture, health care, food preparation, education, natural resource management and celestial bodies. They also interpret and react to climate change impacts in creative ways, drawing on traditional knowledge as well as new technologies to find solutions, which may help societies to cope with the impending changes.

Traditionally, Batswana rely on their intimate knowledge of seasonal weather patterns to secure the ongoing supply of food, medicines and other resources. They read the stars, weather, and other physical and biological indicators to predict the events and signals. The Batswana are carriers of ancestral knowledge and wisdom about biodiversity and natural resources. Their effective participation in biodiversity programs as experts in protecting and managing natural resources can result in more comprehensive and cost effective conservation and management of biodiversity (Stanley 2001).

Although the range of questions reflects the specific needs and methods of Batswana societies, the knowledge of the heavens required particular kinds of techniques designed for observing, recording and transmitting this knowledge over larger periods of time. These techniques and methods, invented, designed, selected, and maintained by generations of cultural astronomers today attest for their knowledge and experience gained from systematic observations of the sky. However, we observe that with an increased number of people migrating to urban areas, all information about how

Batswana societies conceptualized their environment including their environment may definitely be lost (Prober, 2010).

2.3 Cultural Astronomy and its Effects on Local Communities

Badri (2000) articulates that cultural astronomy can often be used as an easy way to start a gradual process of introducing a modern understanding of the universe. By bringing to the public the things we know about the universe and more importantly, how we know them, cultural technologies merged with scientific methods can spread knowledge of science and technology. Indigenous astronomical knowledge in Batswana such as the constellation isiLimela (aka Pleiades) which indicated the planting season, serves as proof of the advanced thinking and observations of our ancestors.

Further still, he mentions that, today the astronomical elements contained within monuments, sites and landscapes are regarded as valuable and important to our universal heritage. Not only do they hold significance and meaning for traditional groups and Batswana communities, but also for the heritage of all peoples. The desire for the preservation of ancient, indigenous or modern systems of astronomical knowledge is therefore justified by the wider public interest (Badri, 2000).

2.4 Cultural Astronomy Practices and Beliefs among the Batswana

Badri (2000) adds that cultural astronomy refers to the astronomical beliefs, artifacts, and practices of indigenous African peoples. The night sky is the heritage of all peoples and each took countless generations to watch, justify and map the heavens in addition to defining their relationship with it.

According to Baki (2006) cultural astronomy of Batswana is rich with mythical figures, cosmology and cosmogony, and divination methods that use observations of celestial bodies. These celestial bodies are also used for practical purposes such as to observe the sun and the moon for timekeeping and creating an accurate calendar. He further argues that, knowledge of the sky was once part of everyday life in most of African societies. It was therefore a fundamental core of the measurement of time in relation to the daily cycle of work as well as the annual round of agricultural activities.

2.5 Importance of Cultural Astronomy in Agriculture

In view of Cuff (2005) Calendrical Systems deal with agricultural calendars, migration calendars, and rain schedules which are all important to African people. Possibly the oldest lunar calendar is the Ishango bone dated at 6500bc. The Ishango bone was found at the site of a fishing village on the shores of Lake Edward which border the Congo and Uganda. The lunar cycles regulate the tides and marine activity, thus it is not unexpected to find a lunar calendar along the shores of a lake.

In the DRC, the Milky Way is called God's clock and is orientated east-west during the wet season and oriented north-south during the middle of the dry season. In Mali, the Bozo people migrate along the delta of the Niger River when the Pleiades transit overhead and begin their fishing season when the Pleiades leave the night sky (Bass, 2003). The equinoxes, solstices, and stars all follow the solar cycle, thus observing these phenomena establishes a more exact year than following a lunar calendar.

Doyle (2006) alludes that stellar navigation is a method of using the stars to determine directions when traveling at night. African astronomy reveals a continent rich in astronomical traditions. They overlap in interesting and unexpected ways. Such as stars being named for their use in navigation or being named for the season which begins with their appearance. A star cluster, the Pleiades were the digging stars whose appearance in southern Africa warned of the coming need to begin hoeing the ground.

All over Africa, these stars were used as a marker of the growing season. When we say isiLimela is renewed, the year is renewed and so communities begin to dig. For the Batswana, the stars of Orion's sword were "dintsa le dikolobe" that is three dogs chasing the three pigs of Orion's belt. The Milky Way seemed like the raised bristles on the back of an angry dog. Basotho and Batswana saw it as Molalatladi, the place where lightning rests. It also kept the sky from collapsing, and showed the movement of time.

In view of Cameroon (2008), farmers, fishermen and hunters are very astute weather watchers. They are quick to recognize weather conditions, whether they are favorable or not to their production systems. He adds that local forecasting often combines empirical observations and weather predictions through the phenological patterns of

plants and the behavior of birds and other animals. The production and application of local forecasts are deeply localized, derived from an intimate interaction with a micro environment whose rhythms are intertwined with the cycles of seasonal changes.

Pokhrel (2011) articulates that the vulnerability caused by vagaries of the weather creates a knowledge base among farmers in the form of Indigenous Technical Knowledge (ITK) that helps people to overcome uncertainty and prepare for possible adverse or favorable events. Local indicators and local knowledge systems are holistic and specific to local situations. They provide farmers and other community members with decisions to prepare for the coming agricultural year. For the traditional weather forecasters, the phenology of certain plants and animals and celestial bodies is a reliable indicator of a wet or dry year, or for the onset of the rainy season or adverse weather conditions.

Farmers often use such indicators in planning for their cropping activities. There is a tendency for western educated individuals to dismiss such traditional weather lore as simply a set of beliefs designed to explain the steries of nature that people could not explain in any other way.

Curry (2003) however argues that despite the presence of modern technology to predict weather conditions over the next day or month in a specific location, and can serve to supplement public meteorological information and weather prediction. For instance, people have been attempting to predict the weather for a very long time and have used a number of different methods, some of which have proven very effective and successful. There is an urgent need to authenticate the various traditional methods of weather prediction, especially rainfall forecasting, and ways to predict other natural weather phenomena such as floods, cyclones, drought to name a few (Curry,2003).

Out of various factors which control agricultural production, weather is the only factor over which man has no control (Verma, 2005). Virtually, weather conditions determine the failure or success of crops. It affects plant growth, influences development and spread of plant diseases, as well as soil integrity. Thus in managing farming activities, weather forecasting is an indispensable tool. Knowledge of the onset of rainy or dry

season as well as adverse weather conditions helps farmers prepare thereby minimizing crop destruction and loss (Verma, 2005).

Verma (2005) adds that, most of indigenous communities where modern technology is unavailable, farmers base their weather forecast on various indicators such as astronomical, environmental, biological, and socio-cultural phenomena including religious beliefs and practices. By inferring relationship between these indicators and weather conditions, farmers are guided in planning agricultural activities and devising adaptive coping mechanisms best suited to the anticipated climatic conditions. For example, in Ifugao, farmers have since time of in memorial, relied more on environmental, plant and animal behavior, rather than on astronomical factors, in making critical decisions concerning agricultural tasks.

Activities related to terrace construction, maintenance, and rice cultivation depends heavily on the recognition for successions of observable environmental changes. By careful observing weather and climate patterns as well as plant and animal behavior, adaptive measures were made to appropriately cope with changing conditions that are otherwise detrimental to their crops (Cordone, 2009).

He further suggests that through many decades of observation and experience, the wisdom gained became a significant body in the people's indigenous knowledge and valuable heritage. Currently, however, much of the knowledge has vanished because of the effect of education, modernity, cash, economy, and Christianity. At present, there are very few IFUGAOs who are knowledgeable on these weather indicators (Cordone, 2009).

The Batswana society is heavily dependent on livestock for their day-to-day needs like milk, meat, transport, draught power and culturally important ceremonies such as weddings and funerals. They also depend on natural resources such as farming to mention a few, for their livelihood. Alverson (2002) alludes that the importance of livestock, especially cattle, to the life of Barolong goes beyond their economic value to the farmers. Cattle among the Barolong symbolize permanence, wealth, stability and life itself.

2.6 Cultural Astronomy in African Disaster Management

Globally, there is increasing acknowledgement of the relevance of indigenous knowledge as an invaluable and underused knowledge reservoir, which presents developing countries, particularly Africa, with a powerful asset in environmental conservation and natural disaster management. Specifically, from time in memorial, natural disaster management in Africa has been deeply rooted in local communities which apply and use indigenous knowledge to master and monitor climate and other natural systems and establish early warning indicators for their own benefit and future generations (Berkes and Jolly, 2001).

Kamara (2011) states that in Africa, local communities of Batswana had well-developed traditional indigenous knowledge systems for environmental management and coping strategies, making them more resilient to environmental change. This knowledge had, and still has, a high degree of acceptability amongst the majority of populations in which it has been preserved. These communities can easily identify with this knowledge and it facilitates their understanding of certain modern scientific concepts for environmental management including disaster prevention, preparedness, response and mitigation.

He further adds that, indigenous knowledge is a precious national resource that can facilitate the process of disaster prevention, preparedness and response in cost-effective, participatory and sustainable ways. Hence a blend of approaches and methods from science and technology and from traditional knowledge opens avenues towards better disaster prevention, preparedness, response and mitigation (Kamara, 2011).

Acharya (2011) argues that, in the traditional African worldview, environmental resources for example, celestial bodies such as stars, moon and the sun also land, water, animals and plants are not just production factors with economic significance but also have their place within the sanctity of nature. He further states that certain places have a special spiritual significance and are used as locations for rituals and sacrifices, for example, sacred grooves, shrines, mountains and rivers (Acharya, 2011).

In addition, he mentions that these locations are quite often patches of high biodiversity which are well conserved and protected by the community. For example, the traditional people of Northern Ghana, gods, spirits, shrines, ritual crops and animals, food items and cash crops. Indigenous knowledge is therefore an essential element in the development process and the livelihoods of many local communities (Acharya, 2011).

Shaw (2003) articulates that, a major challenge that African countries continue to face is how to reconcile indigenous knowledge and modern science without substituting each other, respecting the two sets of values, and building on their respective strengths. He continues that recent studies in Kenya on the application and use of traditional knowledge in environmental conservation and natural disaster management cited examples of areas where such knowledge is still prevalent and harnessed and inter-related.

Regarding land-use conservation, shifting cultivation was a traditional practice in which land was never over used or repeatedly cultivated season after season and year after year. Land was left to rest and covered again with plants and leaves to enable it to accumulate vegetable manure. Mixed crop cultivation practice enables leguminous crops to restore nitrogen in the soil for other food plants (Shaw, 2003).

Pastoralist communities such as the Maasai across East Africa are living with the reality of climate change, adapting as they can to successive poor rains, increases in drought related shocks and more unpredictable and sometimes heavy rainfall events. Their resource management systems have always included a strong adaptive element, but today these systems need a boost from new technologies to cope with the quick pace and unpredictability of change (Kevin, 2000).

Kevin (2000) adds that, traditionally the Maasai predicted rainfall and managed their rangelands using various systems, including the deciphering of animal voices, astronomy and the observation of flowering tree behavior. A First Peoples Worldwide grant, helped establish a radio-based system for collecting observations and weather predictions from Maasai herders scattered across hundreds of hectares, documenting

and verifying these observations, and mapping them with geographic information systems (Cameroon, 2008).

In view of Mearns (2007) the aggregated information helped the Council of the Maasai elders make key decisions on communities and livestock movements, based on where rainfall is expected. Migratory pastoral is at its core an adaptive production strategy and a way of life that can contribute to the sustainable management of natural resources in a changing climate. Modern information and communication technology can help the Maasai people sustainably manage their rangelands in the face of a changing climate.

Knowledge of when to expect long or short rainy seasons enabled the farmers to plan appropriately which crop is suited for a particular season. Traditional indigenous knowledge terminologies of types of soil and their reaction to water enabled the people to use each type of soil appropriately by planting the correct crops. As for coping with changes in the weather, traditional indigenous knowledge of storm routes and wind patterns enabled people to design their disaster management long in advance by constructing types of shelter, wind break structures, walls, and homestead fences appropriately (Miller,2000).

Cathleen (2005) articulates that, hydrological disaster is obviously unmanageable when it starts. Similarly, knowledge of local rain corridors enables them to prepare for storms. Knowing the color of clouds that may carry hailstones enabled people to run for cover. Knowing that prolonged drought is followed by storm, thunder and lightning during the first few rains enabled people to prepare or expect a disaster. A change in birds' cries or the onset of their mating period indicated a change of season.

Further still, Cathleen (2005) mentions that similar application and use of indigenous knowledge for disaster management is also prevalent in Swaziland. Floods can be predicted from the height of birds' nests near rivers. Moth numbers can predict drought. The position of the sun and the cry of a specific bird on trees near rivers may predict onset of the rainy season for farming. The presence of certain plant species for example, ascolepis capensis indicates low water. These examples underscore the importance of harnessing indigenous knowledge not only as a precious national

resource but also as a vital element in environmental conservation and natural disaster prevention, preparedness and response.

Disasters in essence are events that have a huge impact on humans and environment. They require government intervention. Disasters are not always unpredictable, for instance, floods take place in valleys and flood plains, while droughts take place in areas with unstable and low rainfall. Oil spills happen in shipping lanes. This predictability provides opportunities to plan for, prevent and lessen the impact of disasters (Rhodes, 2000).

According to Trenberth (2005) disasters are inevitable although we do not always know when and where they will happen. But their worst effects can be partially or completely prevented by preparation, early warning, and swift, decisive responses. However, despite the prevalent application and use of indigenous knowledge by local communities, it has not been harnessed to fit into the current scientific framework for environmental conservation and natural disaster management in Africa (Trenberth, 2005). As a result, there is a general lack of information and understanding of the need to integrate or mainstream indigenous knowledge into scientific knowledge systems for sustainable development in the continent.

In view of Dilley (2000) despite the technological advancements made in climatic forecasts over the years, the still remain great uncertainty. Climate variability is an inherent characteristic of the world's climate system and thus cannot simply be wished away. Climatic forecasting is particularly important to the agricultural sector in southern Africa, from which the region draws the bulk of its food supply.

Rural agro pastoral communities of the Kalahari, who are heavily dependent on their environment for subsistence, have inhabited and managed the often harsh and highly dynamic ecological systems for centuries and have, at times as a matter of necessity, developed multiple adaptive livelihoods (Meinke,2005). With annual rainfall ranging from below 20 mm along the western coastal areas of Namibia to over 3000 mm in some highland areas of Malawi such extremes as droughts and floods and the disruption of livelihoods associated with them, are well known to these communities.

King and Skipper (2004) alludes that recognition of the value of Indigenous knowledge about environmental management in Australia has been fairly slow in comparison to other regions of the world, such as the Arctic communities. Globally, led by the Arctic and Small Island States, the role of Indigenous knowledge in sustainably managing ecosystems and natural resources has been internationally recognized for at least a decade.

For scientists, one of the values of indigenous knowledge is multiple observation methods, especially in areas with few scientific observations, which can increase confidence in individual observations and broaden the scope of information available about environmental change (Huntington et al, 2004). For example, USAID/OFDA (2010) estimated that over 100 disastrous droughts, floods, related epidemics and pest infestations had affected 70 million people in southern Africa over the past thirty years.

Despite efforts to minimize risk, communities' resilience is gradually being eroded with subsequent extreme events, which are generally expected to increase in frequency in future (Batisani, 2009). Considering the limitation in precision and timelines of weather forecasts in southern Africa, communities are stressed even further and have to revert back to the traditional agro-ecological knowledge base they have relied on over the years to predict climatic conditions (Unganai, 2006).

The use of traditional knowledge in dealing with current challenges has often been on the receiving end of many a debate, with Scott (2010) attributing this to scientists' skepticism of its value unless it has been recast in scientific terms, and may dismiss it as superstition and a form of irrationalism. Nonetheless, agro-ecological knowledge of communities is increasingly gaining recognition (UNEP, 2000). Mogotsi (2007) alludes that, in Botswana, agriculture is the backbone of rural economies. Using Botswana as a case study, an effort was made therefore to determine how rural agro-pastoral communities of the Kalahari have predicted seasonal precipitation patterns over the years, the reliability of such indicators in the face of increasing rainfall variability as well as the perceptions towards scientific climate forecasts.

Mogotsi (2007) adds that this could lead to greater understanding of the value of traditional agro-ecological knowledge, which could be enhanced and used concurrently with scientific knowledge in what Thomas and Twyman (2004) termed hybrid knowledge, thereby enabling better rainfall predictions, farm management decisions and secure livelihoods for Kalahari's rural communities. Most households in Kgalagadi North and Bobonong areas professed they could predict weather conditions using traditional indicators.

A number of indicators were used to make seasonal precipitation forecasts. Agro-pastoral communities of southern Africa have always used traditional indicators to predict weather conditions (Chang'a et al., 2010), and Botswana agro-pastoral communities are no exception. The most widely used indicators in the study areas were astronomical stars, atmospheric clouds and biological vegetation characteristics.

In view of Shumba (2009) multiple indicators were used at the same time for better rainfall prediction. This agro-ecological knowledge was more pronounced among the older members of the community, indicating accumulated experience over the years. Younger members did not readily reflect this agro ecological knowledge, hence unless this apparent gap is filled. The knowledge could be lost as older members do not pass on their experiences to younger generations, neither orally nor written literature.

Slegers (2008) states that farmers' perception to drought in Tanzania noted that the natural environment provides a wide source of knowledge about weather conditions to those who have learned to read and interpret its signs, or who can draw from experience of previous encounters. Because of the limited amount and uneven distribution of rainfall in time and geographic scope, rainfall represents the most limiting factor for agricultural and livestock production in Botswana (Chipanshi et al., 2003).

Yarnal (2009) notes that sometimes vegetation does sprout in late August just before start of the rainy season but no rain falls until deep into October. Clouds gather but may be blown away by wind and thus no rain falls. Because of the unreliability of indicators, it is thus not surprising that fewer households in Bobonong and Kgalagadi North respectively actually used traditional precipitation indicators to make serious farm

management decisions like clearing new fields, setting planting dates and selling part of the livestock herd.

The above is important because resources, which are often limited in subsistence rain-fed agriculture have to be mobilized only when some level of uncertainty has been removed from the farmers' mind (Green and Raygorodetsky, 2010). That is, in addition to environmental variability, the economics have to also be considered. Speranza et al. (2009) also discovered that few agro pastoralists in Kenya adapted their practices in response to traditional knowledge based forecasts partly due to limited resources.

Bule (2011) alludes that the importance of livestock, especially cattle, to the life of Batswana goes beyond their economic value to the farmers. They underpin the economy of the country. At a personal level, people obtain cash from cattle sales to be able to perform social obligations such as the payment of school fees and other family needs. Not only are cattle a safety net for vulnerable groups such as women and the rural elderly, they can be a ladder out of the abyss of poverty. Cattle manure is crucial for subsistence farmers who can barely afford fertilizers

Kogan (2006) mentions that in Botswana cattle diseases which result from natural disasters inevitably have a multi impact on the poor. In the first instance, the disease exposes the poor farmer as he or she lacks the resources to control the movement of his or her cattle. The poor are usually the most vulnerable in this respect. The of people majority among the rural poor depend entirely on their livestock for their livelihood as they have not been able to diversify their personal economies with anything else (Kogan, 2006).

Ingram et al (2002) articulates that disasters arise from both natural and human causes, and the responses needed could stretch community and government capacity to the limit. For example, during the year 2000, a series of disasters in South Africa occurred, that is; huge floods devastated the Limpopo Province, Mpumalanga and nearby countries. Massive fires and an oil spill threatened Cape Town whilst separate floods hit rural communities in KwaZulu-Natal and the Eastern Cape. In 2004, Cape Town experienced a drought disaster attributed to global warming. From April 2004 to January 2005, the province experiences 376 disasters, mostly fire and flood.

An article below is an illustrative example of natural disasters in South Africa, cited Smith (2011).

South Africa flood death toll rises as government declares 33 disaster zones Warnings of humanitarian crises after flooding claims more than 100 lives and threatens rest of southern Africa.

The Vaal dam overflows near Johannesburg earlier this month. Seven of South Africa's nine provinces have been affected by flooding. Photograph: Jon Hrusa/EPA

Flooding in South Africa has killed more than 100 people, forced at least 8,400 from their homes and prompted the government to declare 33 disaster areas, with unusually heavy rainfall forecast until the month March, the UN has warned that almost every country in southern Africa is on alert for potentially disastrous flooding.

The government said that 88 deaths in the rising toll were in the eastern KwaZulu-Natal province. The cost of damage to the infrastructure in the seven of the country's nine provinces affected is estimated at 160bn rand (£14bn). The Johannesburg area and northern and eastern provinces have experienced some of their greatest rainfall in 20 years. Flimsy houses in townships where drainage systems are sometimes poor, are particularly vulnerable to the deluge.

Bathabile Dlamini, the social development minister, warned that 20,000 people, or about 5,000 families, have been affected in provinces that are running out of money for flood relief.

Dlamini admitted the government is in a race against time to avert a humanitarian crisis and said the health department was on alert for a possible cholera outbreak. Farms have also been saturated in Africa's biggest food producer, but farmers will not receive government compensation. The logistics firm Transnet said this month that heavy rains had disrupted its freight rail operations, affecting South Africa's coal and maize exports.

The UN warned last week that flooding poses a threat in most southern African countries. Some of the biggest rivers in the region, the Zambezi and the Okavango, have risen to double their normal levels.

Elisabeth Byrs, a spokeswoman for the UN's Office for the Co-ordination of Humanitarian Affairs, said: "We fear flash floods. It's rather common in the region and this time we are seeing heavier rainfall than in previous years. Five countries are on alert for flooding – Botswana, Mozambique, Namibia, Zimbabwe and Zambia – and South Africa will now declare a disaster."

She added: "All nearby countries including Madagascar are on alert ... We could have an extremely major disaster if prevention measures are not stepped up over the next six weeks."

Mozambique has been hit hard, with at least 10 people killed and more than 13,000 people seeing their homes lost or damaged owing to high waters. There are fears of a repeat of the country's devastating floods in 2000 that left 800 people dead. Meteorologists believe the floods are caused by a natural weather cycle known as La Niña and the Southern Oscillation mechanism, which has been linked to recent flooding in Australia and the Philippines.

The article above indicates the importance of cultural astronomical knowledge and its practice which should be used as a means of natural disaster management in our

societies. Below is an article of illustrating animal welfare input on natural disaster management on livestock

Article: Meat Trade News Daily 8/11/2011 illustrating Animal Welfare input on natural disaster management on livestock

Animal Welfare (2011) states that, in a side-event and at the charity conference stand, delegates heard how WSPA's education and emergency work with veterinarians shows how the profession is interlinked with the ecosystem and human and animal health in the quest for global sustainability. About one billion of the world's poorest people depend on animals for food, income, social status or cultural identification while nearly half the world's population is involved in agriculture.

In a speech, WSPA's Chief Veterinary Officer, dr David Wilkins, explained that vets are uniquely placed to improve animal health and welfare, which impact on humans and the environment but that welfare must be seen as an academic discipline before it integral to the veterinary profession globally.

To this end, WSPA designed its Concepts in Animal Welfare (CAW) teaching tool, with modules specially designed for vet and animal health students. To date, some 296 veterinary faculties in over 20 developing countries have received training in WSPA's ACAW program with 215 having incorporated it into their program for veterinary students. The tool is especially important in East Africa and is taught at many Agriculture and Livestock Training Institutes.

Dr Wilkins also showcased WSPA's Disaster Management work, which benefits the welfare of animals and community livelihoods, outlining several significant recent WSPA interventions worldwide. The vet described how, since 2005, WSPA has recruited and trained teams of veterinarians from around the world to respond effectively to disasters to meet the current gap in Animal Welfare provision during emergencies. The model for these teams is the same as that used by humanitarian organization in disaster relief work.

WSPA is currently assisting animals in disasters across Latin America, Asia and in Africa. Just last year, WSPA assisted more than 150,000 animals in 19 countries, and has intervened in the aftermath of Japan's tsunami, Haiti's earthquake and Australia's floods, as well as many other disasters attracting little or no coverage in international media.

Over the last two years, VERUs have been established in Costa Rica, Nicaragua, Colombia, India, Thailand, Kenya and Myanmar and have all been active in responding to disasters requiring animal assistance. The work of these teams is integrated into their country's national emergency management infrastructure.

In these times of changing world order, with prosperity on one hand and economic turmoil on another, it is hard to predict the future. As we become more concerned about the damage to the environment arising from human and natural activities, we look more

to space technology for solutions to the global problem of environmental degradation and attainment of sustainable development.

Sustainable development and disaster reduction are essential preconditions for each other. From the perspectives of environmental degradation, human intervention, and security aspects, disaster management is a pressing issue for all of us and should be undertaken on a comprehensive basis. The approach seeks communities at risk to participate across all phases. That is, prevention, mitigation, preparedness response and recovery.

It is important for any government to manage disasters. Government provides legislation, allocates resources and does rational planning and sustainable development. Disaster management and planning is a key part of government work. Communities experiencing disasters should be encouraged to focus on informed, self-reliant and resilient local knowledge elders have. Government should not, attempt to teach cultural knowledge. In the same way that any other complex and vast body of knowledge, methods, belief systems, and assumptions requires context, language, and skilled interpreters to be used effectively in planning or implementation, so it is with local knowledge.

Legitimate holders of indigenous knowledge range from highly skilled and experienced elders to hunters and trappers, gatherers of herbs and practitioners of many kinds. Men and women reach equivalent levels of wisdom and understanding in indigenous ways. Often, however, there are important gender differences in the knowledge content and in the assumptions for its use. It is therefore important that weather indicators are properly followed to prevent and manage natural disasters. The Batswana knowledge of celestial bodies serves as the road map to the attainment of self-reliance and sustainability, particularly in the areas of their locality.

Forno (2002) states that, Batswana communities can easily identify their systems of knowledge and facilitate their understanding of certain natural hazards for environmental management, including disaster prevention, preparedness, response and mitigation. Their cultural information systems are dynamic and are continually

influenced by internal creativity and experimentation as well as by contact with external systems (Forno, 2002).

Further still McMilllan (2000) contends that most of these communities have prominent phonological markers that signal the change of the seasons. These can be seen in the different movements and shapes of constellation. There are also atmospheric indicators used by community elders to determine weather conditions. For example, hot weather, especially at night, during the months of September to November, signals the advent of good rains and a long growing season (McMillan, 2000).

On the other hand, low night temperatures during the same months are indicative of late rain. Batswana community, alternate the use of their natural grassland according to seasons. They predict droughts as well as weather related diseases by watching the movements of celestial bodies in combination with observing the date of emergence of certain plant species. Such early warning signals of an approaching environmental disaster are used to determine any preventive measures, prepare for mitigation and decide on the course of the community in using natural resources.

CHAPTER THREE

METHODOLOGY

Study area: Mahikeng in the North West Province

The study area is in Mahikeng, the North West Province of South Africa. The researcher followed a participatory approach. The sources of data are members of the community, who almost all of them are elders. The study to be investigated is the role of African cultural astronomy in disaster management among the Batswana with special reference to the Barolong ba Mahikeng. The researcher saw the importance of this investigation within this community or communities because not much information has been documented on the knowledge of cultural astronomy and disaster management about the Batswana or the Barolong.

Mahikeng previously and still commonly, known as Mafikeng and historically Mafikeng in English is the capital city of the North West Province of South Africa. Located close to South Africa's border with Botswana, Mafikeng is 1,400km northeast of Cape Town and 260 km west of Johannesburg. In 2001, it had a population of 49,300. In 2007, Mafikeng was reported to have a population of 250, 000 of which the CBD constitutes between 69,000 and 75,000. It is built on the open field at an elevation of 1,5000m by the banks of the Upper Molopo River.

Mafikeng is best known internationally for the Siege of Mafikeng, the most famous engagement of Second Boer War. Mafikeng is the headquarters of the Barolong Boo Ratshidi people. The town was founded by Molema Tawana. He was born in Khunwana during the difaqane period. Molema was the son of kgosi Tawana of the Tshidi Barolong.

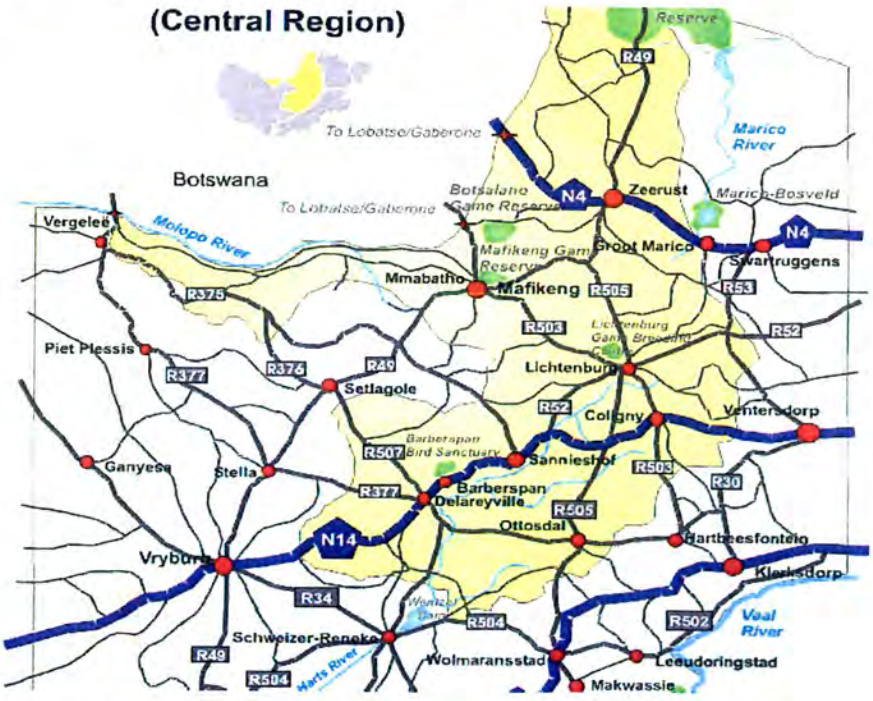
In 1857 Molema led an advanced guard to scout out the area along the Molopo River. This was a familiar area as they had previously lived in nearby Khunwana. He settled in Mafikeng (known in its early years as "Molematown") while the main body of the Barolong under Montshiwa followed. Montshiwa did not feel safe at Mafikeng, due to the close presence and encroachment of the Boers in the Transvaal. He led his followers to

Moshaneng in the territory of Bangwaketse in present-day Botswana. He remained in Mafikeng to ensure that the Barolong retained a presence there.

At the outbreak of the Second Boer War in 1899, the town was besieged. The siege lasted 217 days from October 1899 to May 1990, and turned Robert Baden-Powell into a national hero.

Although it was outside the protectorate's borders, Mafikeng served as capital of the Bechuanaland Protectorate from 1894 until 1965 when Gaborone was made the capital of what was to become Botswana. Mafikeng also briefly served as capital of the pre-independence Bantustan of Bophuthatswana in the 1970s, before the adjoining town of Mmabatho was established as capital. Following a local referendum on the issue, Mafikeng joined Bophuthatswana in 1980, three years after Bophuthatswana was awarded independence, and was renamed Mafikeng and treated as a suburb of Mmabatho.

The map of Mafikeng in the North West Province



(Source: http://www.tourismnorthwest.co.za/maps/central.html)

3.1 Methods of Data Collection

Park (2006) defines participatory research as a research activity in which ordinary people address common needs arising in their daily lives and, in the process generate knowledge. He further explains participatory research as different from basic and applied social science research in terms of people's involvement in the research process, integration of action with research and the practice-based nature of the knowledge that is entailed. It sets itself apart even from other forms of action-oriented research because of the central role that the community practitioners play. Participatory action-minded researchers with technical background often get involved in the process, but mainly as facilitators (Park, 2006).

According to Babbie (2004:296) participatory research is important in an indigenous knowledge investigation because the knowledge is community and cultural based. Therefore, the knowledge holders should be central to the whole research process to achieve the objectives of the study. This is based on the argument that in a participatory research paradigm, conventional research is perceived to be an "elitist model" that reduces the "subjects" of research to "objects" of research.

In this research study, most of the aspects studied including the socio- economic and demographic characteristics of the key informants were investigated from the perspective of the community rather than the perspective of the researcher. The informants were provided with the opportunity to express their views on the issues under investigation and their opinions were taken into account during the interpretation of the findings (Babbie, 2004: 296).

Yin (2003) and Stake (1995) explain that a case study research bringing us to an understanding of a complex issue or object, can extend experience or add strength to what is already known through previous research. Case studies emphasize detailed contextual analysis of a limited number of events or conditions and their relationships. Researchers have used the case study research method for many years across a variety of disciplines. Social scientists, in particular, have made wide use of this qualitative research method to examine contemporary real-life situations and provide

the basis for the application of ideas and extension of methods (Yin, 2003 and Stake, 1995).

In this study of the Barolong communities in Mahikeng area, community knowledge holders such as sky readers and other key informants including tribal chiefs, headmen, and community elders, amongst others, will be actively involved in the research process, i.e. from the planning, selection of the study cases (key informants and study sites), data collection and data analysis and validation of the research findings.

Qualitative research methods such as in-depth interviews will form the core of data collection methods and techniques. It is of vital importance to use interviews because sky readers are custodians of this knowledge. According to the targeted people in this study, they always watch the sky to read if it has any information for them. They also observe the wind direction every morning to predict the weather.

Cooke and Kothari (2001) explain that qualitative research seeks the 'why', not the 'how' of its topic through the analysis of unstructured information – things like interview transcripts, open ended survey responses, emails, notes, feedback forms, photos and videos. It doesn't just rely on statistics or numbers, which are the domain of quantitative researchers. Qualitative research is used to gain insight into people's attitudes, behaviors, value systems, concerns, motivations, aspirations, culture and/or lifestyles.

Qualitative research is often regarded as a precursor to quantitative research, in that it is often used to generate possible leads and ideas which can formulate a realistic and testable hypothesis. This method is often closely allied with interviews, survey design techniques and individual case study, as a way to reinforce and evaluate findings over a broader scale (Shuttleworth, 2008).

The study will use both qualitative and quantitative approaches. In most cases primary data would be obtained through a qualitative approach whereas quantitative data would be for statistical analysis and to support the main arguments in the study.

3.2 Study Sites and Units of Analysis

The Barolong of Mahikeng (North West Province, South Africa) formed the units of study. In 2001, it had a population of 49,300 and in 2007 the population was reported to be 250,000. The above community was selected due to their proximity to one another. The community members are within the radius of 20 to more or less 30 km from one another. The researcher chose Mafikeng as a study area because of language understanding "Setswana" and that she originates from the area. She fully understands the local cultural beliefs which are regarded important in this society. It therefore made it easy to interact with some elders who have the indigenous knowledge of cultural astronomy yet did not receive official education.

3.3 Study Sample and Selection Procedures

Consultations were made with the community chief and community elders in tribal communities. The respondents used in this study are knowledge holders of cultural astronomy and how it manages natural disasters. As the knowledge of indigenous cultural astronomy is known by few members of the community, the researcher managed to only use not more than ten respondents in the study. The respondents used were mainly men, it is because in Mahikeng community, only men have the knowledge of cultural astronomy and its uses for example "preparing and managing natural disasters". It is the responsibility of men to know the weather prediction for farming purposes, also as heads of their families.

Knowledge holders of cultural astronomy are very limited in this area and those that have the information also die with age for they are old. This includes the elderly and sky readers. It is said that sky readers are members of the community who have an intense knowledge of celestial bodies. In most cases they are chief's men or traditional healers. These men are used or directed by the chief to enlighten the chief and the community of weather prediction. The chief does this to protect his people from being negatively affected by the natural disasters. Women who have the knowledge about cultural astronomy were not found because from early days men were mostly the ones who could be healers and therefore could work closer to the chief. Probability sampling was used for this study.

3.4 Method of Data Collection

A questionnaire was administered to the research sample in an effort to collect supportive quantitative data. Yin (2003; 116) defines a questionnaire as a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents. He elaborates that although they are often designed for statistical analysis of the responses, this is not always the case.

Group interaction is used in this type of research to generate data, and as a source of data analysis. The assumption is that there is an interaction that is productive in widening the range of responses, in activating forgotten details of cultural experience or knowledge and in releasing inhibitions that are part and parcel of interviews with individuals.

Key-informants were interviewed at all levels of the research project as a means to gain in-depth qualitative information on the research problem. This approach is a traditional method of social scientists, including anthropologists, for extracting cultural knowledge through well-placed individuals in the society. It is part of the ethnographic approach, often used in situations where access to official records of data is weak or non-existent. Where official records do exist, it is used as a means to get further insight by questioning key people about their modes of life or specific social problems.

The study collected narratives in the language (setswana) from key-informants in order to present their views in the original form. The english translation was later done to explain the original context to readers who are not familiar with the setswana language of the study communities. Focus group discussions were conducted with randomly selected groups of 6-10 community members.

Park (2006) explains that in a focus group discussion, people from similar backgrounds or experiences are brought together to discuss a specific topic of interest to the investigator(s). The purpose is to explore the range of opinions or views on a topic of interest; to collect a wide variety of local terms and expressions used to describe a specific social and cultural phenomenon; and to explore meanings of study findings that cannot be explained statistically.

Focus group discussions are different from other types of group interviews in that they focus on a particular topic and they rely on group dynamics in order to generate data. The interaction is mainly between group members themselves and not between the members of the group and the interviewer.

Group interaction is used in this type of research to generate data, and as a source of data analysis. The assumption is that there is an interaction that is productive in widening the range of responses, in activating forgotten details of cultural experience/knowledge and in releasing inhibitions that are part and parcel of interviews with individuals.

3.5 Data Analysis

Qualitative data in the form of audio taped interviews were transcribed and translated from Setswana into English. Interview and participant observation notes were typed and a content analysis was conducted. Berelson (2002) explains that in content analysis researchers classify key ideas in a written communication, such as a report or an article. Evaluators can do content analysis of video, film, and other forms of recorded information, but in this paper, we focus on analyzing words. It is a systematic, research method for analyzing textual information in a standardized way that allows evaluators to make inferences about that information.

The central idea in content analysis is that the many words of the text are classified into much fewer content categories. The classification process, called 'coding', consists of marking text passages with short alphanumeric codes. This creates 'categorical variables' that represent the original, verbal information and then can be analyzed by standard statistical methods. The passages can come from structured interviews, focus group discussions, open- ended questions on survey instruments, work papers, agency documents, and previous evaluations of the large quantity of written material that researchers typically collect during a project, especially when it comes from diverse and unstructured sources.

Whenever possible the site research assistant was the person who transcribed and translated audio tapes for the site to ensure data accuracy. Quantitative data from the questionnaires were checked and coded. Vestra (2003) defines quantitative data as information based on numbers or statistics that describes programs, activities and populations. The data come from closed-ended questions, random samples, counting, etc. In this research study quantitative data from the questionnaires were checked, coded and were analyzed using SPSS/PC+.

Validation checks were conducted through all phases of research to ensure the highest level of data accuracy. Information which was unclear or missing was clarified or collected by returning to informants and reviewing issues and concepts.

3.6 Ethical Considerations

The research assured the respondents that their information would be kept confidential. The integrity and anonymity of the informants was respected. The researcher also avoided plagiarism by acknowledging all primary and secondary sources used in this study. Participation in the study was strictly voluntary.

3.7 Limitations of the Study

The methodology used in this study might have left out some informants with rich knowledge on the research problem. For instance, the purposive sampling model concentrated on community members from the age of twenty-five to eighty. It might therefore have also left out some younger members, informants with valuable information on the research problem. The data collection process was compounded with some challenges.

Difficulties were also experienced in getting in touch with the respondents. Some of them were only available during weekends while with others it would take more than a week to get hold of them. Elders who hold this kind knowledge are mostly farmers so

they are most of the time at their farmsteads. Cultural astronomy and how it manages natural disasters is a very scarce knowledge within this community.

The reason for this scarcity is because most of knowledge did not receive formal education as a result when they impart their knowledge to the community members it is not regarded as valid especially to the young generation. Another reason may be that their knowledge was never documented thus it leaves the community with no references. There was also the problem of interpreting the questionnaire to those respondents who were illiterate. As most of these people are elders there was also a problem of health which was very unstable, so the researcher had to wait until their health has stabilized that they can answer questions posed to them.

This is a case study of cultural astronomy and natural disaster management with special reference to Barolong of Mahikeng in North West Province. Participatory method was used in the study, due to the fact that indigenous knowledge system is community based in nature. The approach provided the researcher with a deeper understanding of the research problem in the specific study. It involved members of the community as they are knowledge custodians of things around them and their way of life is of vital importance.

Macaulay (2007) states that in the past, researchers used to distort the information as they never included knowledge of the local community. In this study the participatory research approach will then allude and promote positive findings between the researcher and information from the community. The goals of participatory research are to undertake high quality research to benefit the group where research is occurring also to develop knowledge applicable to other settings.

Participatory approach encourages end- users to articulate demands, and therefore raises their expectations. This means that this approach is most appropriate to bring forth opportunities for long-term engagement with end-users so that these demands can be met. It is through this approach that we can better understand communities and therefore design and implement programs that not only have a more significant impact on those intended, but also are locally owned thereby enjoying stronger commitment from communities (Chambers, 2001).

In view of Wisner (2008) participatory methods are interactive and collaborative, providing a meaningful research experience that both promotes learning and generates research data through a process of guided discovery. Guided discovery is a constructive learning theory where learners draw on their past experiences and existing knowledge to discover facts, relationships and truth.

Abarques (2004) argues that within disaster risk reduction research, participatory techniques were used solely to establish and define a research problem or in facilitating social interaction and discussion with the aim of enhancing knowledge for possible future interventions. This method describes the principle of maximum diversity and richness of information. Participatory approach is more popular and its uses widely acceptable techniques for watershed planning and management including; rapid catchment assessment, soil and water conservation, degraded forest assessment, nurseries and planting and identification of trees uses.

This methodology is an effective tool in identifying and implementing natural disaster risk reductions (Rubin, 2008). According to Findley (2000) disaster impacts in developing communities are potentially severe as they affect agriculture, sanitation, livestock and food supplies, creating a semi-voluntary move to areas that are more sustainable for human life.

4 CHAPTER FOUR: RESEARCH FINDINGS

4.1 INTRODUCTION

This chapter presents the research findings and the biographic information of the respondents as well as the qualitative research findings on issues related to cultural astronomy.

Table 4.1: Biographic description of Respondents

Characteristics	Frequency	Percentage
Age		
60-69	4	25
70-79	10	63
80	2	12
Gender		
Male	13	81
Female	3	19
Education		
Informal	7	81
Formal	9	19
Marital Status		

Never married	2	13
Married/living together	12	72
Widowed	2	13

The above table presents the biographic information of the 16 respondents of the study, most of whom are males at 81 per cent. It is plausible that traditional norms dictate that males have the required information on cultural astronomy, as opposed to women. The majority of the respondents are over 70 years of age, have formal education (56 per cent) and are still married (72 per cent).

4.2 THE EXTENT TO WHICH THE BAROLONG BELIEVE IN THE USE OF KNOWLEDGE OF STARS IN THEIR DAILY LIVES

Respondent 1 related that previously members of the society believed in the use of celestial bodies to predict, prepare and manage natural disasters in their communities. Over the course of time community members have come to rely less on reading the sky to manage and sustain their living conditions. This has resulted therein that some older members as well as the present generation have stopped believing in the use of local knowledge is important for the community to sustain their lives. The abovementioned group of people has never shown any kind of interest in learning or applying cultural knowledge of the sky, which limits the use of their local indigenous knowledge to manage their life and be sustainable within their environment. Such limited knowledge

makes it difficult for them to predict the weather and determine the likelihood of famine, drought or flooding. This leaves the community without the necessary tools for disaster preparedness and management.

He added that in previous times local knowledge was common practice, where the Barolong elders knew how to read the sky and make accurate predictions. The chief had advisors or elders, known as the baroka, who possessed a wealth of knowledge on the sky and their predictions always proved to be correct, giving the chief full confidence in them.

Respondent 2 mentioned that although the community does not recognize the knowledge of heavenly bodies of sky readers, there are still those holding onto their past local knowledge of astronomy and continue to practice it. It is part and parcel of their lives, especially in their farming activities, and they depend on it for their daily life. The younger generations put no stock in this traditional way predicting the weather by reading the sky and to them the information the elders convey is primitive and outdated.

The above respondent added that most of the members of rural communities do believe knowledge of astronomy is of value for cultural practices, for example, there are still those community members of the Barolong who believe that they can call on thunder and lightning to strike their enemies dead. There are also Barolong communities who do not look to the sky to manage natural disasters, but employ other methods of managing famine, drought and floods in their area. For example: Setlagole village community members pray to their gods, which they believe have the power to provide for them in times of need.

Respondent 3 spoke of the sacred places in their area of Setlagole, named rra setlhatlhwe and mma setlhwatlwe, where they pray and communicate with their gods. The community has elders with certain ancestral powers and are the only ones permitted to communicate with their gods, on behalf of the community and the chief.

These gods choose the particular individuals through which they will communicate with the community and such information is normally conveyed in their sleep. A ritual is then performed; by those the gods have chosen, at mma setlhwatlhwe and rra setlhwatlhwe to appease them. Rituals are performed for different needs, like the need for rain, prosperity, resolving tribal or chiefs' disputes.

Kraaipan is another village in Mafikeng where community members practice indigenous or local knowledge to sustain their lives. This does not include astronomy or knowledge pertaining to celestial bodies to predict the weather, but other ways of rainmaking, preparing and managing natural disasters within their area. They observe a rainmaking ritual, every five years, to ward of drought, in which the chief, elders and diviners (baroka) call a meeting to discuss the processes that will take place and how it should be done.

Respondent 15, an elder from the abovementioned village, explained that their process of rainmaking includes all community members: the men, youth and the women. The chief invites the whole community to participate on the event. It is social custom for every household to prepare traditional beer (umqombothi) for the ceremony and each household is expected to provide five litres of the beer commonly known as serwalo. Part of this process is for young boys to go hunt wild animals, like "the hare",

accompanied by the elders of the community. The hunting is done three days in succession before the event and is known as regiments of the chief.

As respondent 16 further explained that before these boys and men can go to the veld to hunt, the chief asks all traditional healers (dingaka and baroka) of the community to perform a cleansing ceremony from dibeela. Dibeela is every object found in the veld considered to be unwanted or a natural part of that area. These unwanted objects are believed to bring bad luck to the community and lead to such events as natural disasters. The unwanted objects are taken to the lekgotla for burning and consist of any objects that are not bones or the remains of animals, such as an old dress found in the veld. The respondent added that the ritual is accompanied by slaughtering of a cow on the top of the mountain of the village. The mountain is still known as thaba ya badimo to this day and called that because this kind of a ceremony entails contact with the ancestors. The villagers believe that rainfall in the area depends on communication with their ancestors, because they hold the power to meet the needs of the community. The event is celebrated with traditional food and drink. The women ululate, whilst the men whistle and sing traditional songs in honor of their ancestors for bring rain.

4.3 THE NAMES OF THE STARS KNOWN TO THE BAROLONG

Respondents 2 and 3 indicated that it is their understanding that stars differ according to their inherent characteristics, their positions and their movement. They also differ in appearance, for example:

2a. Kopadilalelo: "...it is a very bright star which moves from south to north. This star has a tail. Kopadilalelo stays on the sky throughout the year".

2b. Kgogamasigo: "...that star that comes up very early in the morning and moves very slowly from east to west. This star does not set. It is also very bright".

2c. Selemela: "...this is a group of stars, they are three in number. They never set or go down. They stay on the sky until the sun rises".

2d. Kolobe: "...it appears during winter season, mostly in the month of April. This star also has other stars surrounding it".

4.4 HOW DO THEY USE KNOWLEDGE ON CELESTIAL BODIES?

Respondents 4 and 5 mentioned that Kopadilalelo serves to tell the time. The elders knew that when it sets, it is time for dinner and so the name of this star means "to ask for dinner". It moves from south to north and where it sets symbolizes the death of a chief in that particular community. The time of his death is not clear, but he will nonetheless die. They added that this star does not set at any particular cardinal point, but wherever it sets, signals the death of the chief in that community.

"Kgogamasigo": "fa e wela ko bophirima, go makuku. Leina lebe seromo- naledi e, e goga bosigo botlhe e bonisitse loapi. Ka mahube a naka tsa kgomo a banna eseng basadi, e tla be e phatsima, mme fa e pagame legodimo, tsatsi le a tlhaba, ke meso."

The above statement means that this is another star that refers to time. One respondent, a member of Barolong community, explained that this star moves very slowly and shines very bright. When it is in the west, it is the early hours of the morning and the sun rises with it to the middle of the sky.

"Selemela" is a group of stars that predict the weather, according to respondent 5, and is a signal to prepare for and manage natural disasters. Each year, on the 15th of May, these stars will appear in the sky and alert the community to prepare for harvesting their crops. It is also during this time that pumpkin seeds dry up, "di a katloga"

According to respondent 6, the wind starts to burn the fields on the 25th of the same month and time to reap the crops planted. This prevents the spoiling of crops and ensures food security.

One of the above respondents further added that on this particular day, "Selemela" sets. This signals the time for mealies to be harvested and enables farmers to protect their cane crops from the wind, by burying their harvest in the ground. Respondent 6 added that "Kolobe" is not a star any member of the community welcomes, because its appearance in the sky signals drought.

4.5 IS THIS KNOWLEDGE STILL BEING USED?

Respondents 6 and 7 asserted that this knowledge is no longer applied and regarded as myth, belonging to the past. They further stated that the knowledge on cultural astronomy used to determine impending natural disasters. In previous times the community would know that when the sky is filled with stars, heavy rainfall would be on the way and conversely if the stars only appeared in patches or not at all, they could expect drought.

This practice has died out with the ancestors in the Barolong community, they added, because many consider such purely oral knowledge as unproven. The disregard of this knowledge has resulted in its disappearance from the community and since its practice

is not welcomed, its holders no longer remember much of it. The youth perceive the information as superstitious and primitive, depending on modern technology to interpret and predict the weather. They do not have confidence in their elders' knowledge, because of their lack of formal education.

Respondent 6 related how the absence of "Kopadilalelo" among the other stars in the year 2011 signaled drought and it did indeed not rain. He would have been able to tell that rain was on its way if the sky looked to be lower. Despite his efforts to alert the community the coming weather conditions, they failed to prepare for possible hardship and show that they value the local knowledge of cultural astronomy that could serve to sustain their lives.

Rainbows also foretell natural disasters. Respondent 8 explained that in previous years the community knew that a slanted rainbow meant low rainfall and one displaying the colour grey signals plenty of rain. He added that the Barolong did not only depend on knowledge about the stars, to learn of coming natural disasters, they also observed the moon and wind direction.

He went on to say that the shape of the moon was of great significance to the local people in that they considered a full moon to indicate adequate rainfall levels and the time for farmers to prepare their fields to plough. A slanting shape to the moon would likewise signal rain to the community. One of the respondents, who still apply his knowledge of astronomy, related how the moon moving from the east to the north foretells of rain.

Another member of this community, respondent 9, said that as a young morolong man he believed in the richness and uniqueness of the local knowledge of astronomy and looked to the sky to predict the weather. He still checks the direction of the wind every day of his life and if the wind blows from the north, he knows it will rain. According to him, wind from the north is never dry, but humid, and when the wind blows from the west, it is not likely to rain and a south wind is a precursor to drought. One of the respondents, another holder of this rich knowledge of the sky, explained that an easterly wind would surely bring a cold spell and wind blowing from north to south brought clouds with it. Wind blowing in the opposite direction, i.e. from south to north, indicates rain.

The Barolong community also observed clouds as heavenly bodies to predict the weather, respondent 9 stated. When the clouds thinned out, it was a sign that the wind would blow the following day and measures would be taken to prevent any kind of disaster. Their belief in the wisdom of reading the sky has always proved accurate and of good guidance to sustain their lives.

4.6 HOW DO YOU PREPARE FOR NATURAL DISASTERS LIKE FLOODS, DROUGHT AND FAMINE, UPON EARLY WARNING FROM HEAVENLY BODIES?

Respondents 10 and 11 indicated that the lack interest in local knowledge of the sky kept any action from being taken. They further added that in the Borolong community the chief would often only act once a natural disaster has already occurred, while in earlier times of drought in the area, the chief would consult with the traditional healers and "moroka wa kgosi". "Moroka" or "baroka" are the chief's advisors and elders who

were considered to be accurate in predicting the weather, by means of cultural astronomy.

The above respondents explained that the sky was only read at nine o'clock at night, when all the stars are on the sky and then inform the chief of coming rain or drought. If drought struck the community, leading to the loss of livestock and leaving people destitute, the chief would call "pitso" as well as the community's traditional doctors and "baroka ba kgosi" for the necessary knowledge and skills. The healers and baroka would then perform their rituals to determine the cause of the drought, upon which the chief would instruct the king's men to burn the skins of dead animals found in the area beside the river. This practice served to cleanse the land and keep misfortune from recurring, where-after a member of the royal kraal or any community member called on by the chief would summon the rain by saying "pula barolong" and on their return it would rain.

In some Barolong regions the chief would simply use the "baroka" to make rain, but only when rainfall had been really low. The young virgin girls ("magammana") of the village would be told to fetch water from the river in their calabashes. The "moroka" would follow these girls to the river and fill their calabashes with water. Upon returning home, carrying these water pots on their heads, he would moroka would be walking behind them immediately order them to throw the pots on the ground and when the water from the calabashes touched the ground, it would begin to rain.

The Barolong communities not only applied their knowledge of stars and other heavenly bodies, but also depended or rather believed in other indigenous ways of sustaining

their lives like cultural healing and the associated beliefs and rituals. In Bodibe village, another Barolong community, the ruling chief at the time - Chief Tshidintle - employed cultural rituals to prepare for or prevent natural disasters in his village, because in his belief local knowledge benefited the community. The dam in Bodibe never dried up in those days and believed to contain a snake. Along the river different types of fruit trees (like peach and fig trees, to name a few) grew that kept the community fed and prevented any member of the village from ever going hungry.

The abovementioned chief appeased the gods or rather performed ritual practices, by letting a cow be driven into the river as a sacrifice, and having observed this ritual, the river never dried up. He would lie submerged in that particular river for the period of a month. Chiefs like Tshidintle other community elders never passed these practices onto the youth of the village and. In those days whenever the youth questioned the causes for any events, the elders harshly dismissed them and the knowledge died out with Tshidintle and others. Today this area is vastly different; the river and fruit trees have dried up.

Another method they invited rain to the Barolong community in previous times was for the chief and his men to take the skins of domestic animals and plant seeds up the mountain called "Thaba ya badimo" (meaning ancestral mountain), which was regarded as sacred. Once on the mountain, the chief would go on without his men with all plant seeds and animal skins. Upon his return, the rain would fall and the community would have plenty of food to feed their households.

Respondent 1, from Setlagole village in Mahikeng, indicated that they still observe and practice local knowledge, especially in managing natural disasters. The practice is called "dikgaela", whereby young girls and boys between the ages 7 to 11 call for rain. This age requirement stems from the belief that this ritual can only be performed by virgins, whose bodies are still pure and have not yet reached puberty. He added that in this practice, the abovementioned boys and girls go to the neighboring community or village, particularly to the chief's backyard, and pretend to be very thirsty, asking for water to quench their thirst. . Whoever gives them water does so in a big bowl to enable all of them to drink. Immediately upon receiving the water, they spill it on the ground and start running with the bowl to their community. The boys go to the kraal and take a yoke ("joko"/"jokwe"), which is a wooden crosspiece that is fastened over the necks of two animals and attached to a plough or cart that they pull in unison. Both the boys and girls then run as fast as their feet can carry them to their community, shouting and calling for rain to fall. As they run, they throw the empty bowl to one another that it reaches home before their opponents can take it back. The boys do the same with the yoke.

4.7 HOW SHOULD KNOWLEDGE OF THE SKY BE PROMOTED AMONG THE YOUTH?

It is in the interest of knowledge holders that the youth gain this indigenous knowledge, especially knowledge of the sky, in order to assist them to sustain their daily lives and the custodians of this knowledge are indeed prepared to teach the youth about the stars and other heavenly bodies. It is also imperative that this knowledge be documented, as it has always been oral.

The youth need to be shown the importance of applying the knowledge and be encouraged to listen to elders when they impart it. The government should realize and acknowledge indigenous knowledge as an important tool, especially in its benefit for sustaining rural communities with limited access to access modern technology.

The curricula of the department of education should include indigenous or local knowledge and encourage its practices within the schools, which can be introduced from a primary level of education. Such action could change the way the youth perceive and acknowledge local and traditional knowledge, showing them how indigenous or local education is the richest form of knowledge they could ever possess and that it is essential for them to acknowledge it as their identity and heritage. The education department should encourage schools to invite elders from their villages or neighboring villages, as the custodians of indigenous knowledge and especially that of celestial bodies. Workshops would serve to address particular learning areas and research. This exercise would benefit society for generations to come. The youth and community at large have this knowledge of reading the sky, to predict the weather, they will be in tune with the natural events of their environment to aid them in preparing for, mitigating and managing natural disasters.

4.8 WHAT CHALLENGES DOES INDIGENOUS KNOWLEDGE OF HEAVENLY BODIES FACE AMONG THE BAROLONG?

Respondents 14 and 15 indicated that the main challenge in terms of this knowledge is that it is dying out with the elders. While some members of the youth show an interest in this knowledge, others regard it as old fashioned. The traditional authority Modimola

village in Mahikeng is keen to uphold this kind of knowledge, but face the challenge of how to pass it on to the youth.

The above respondents, together with other village elders still upholding this knowledge, were summoned in January of 2012 by the chief to share their knowledge on child rearing – an area of local knowledge that prepares the young for adulthood. It is considered to be of great importance towards developing children into respectable adults within the community. It teaches both boys and girls the norms, values and beliefs of manhood and womanhood that prepare them holistically for adulthood.

4.9 SUMMARY

This chapter presented the findings from the selected respondents with regards to cultural astronomy among the Barolong community. Much of this information was used to predict weather patterns such as drought or famine and would enable the community in the past to take relevant action before the event occurred. However much of this knowledge has been left to the elderly men who are slowly passing away due to old age. The next chapter presents the discussion and recommendations

5 CHAPTER FIVE: DISCUSSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter discusses the key findings of the previous chapter and presents recommendations that may be used to maintain and preserve cultural astronomy amongst local communities.

This study investigated the role of African cultural astronomy in disaster management among the Barolong in the North West province. This study showed that the Barolong relied on their knowledge of the sky to predict weather patterns. This enabled the chief together with the communities take appropriate action through performing various cultural rituals to mitigate any adverse weather conditions.

However, the current challenges facing this knowledge are that most of those with this vital information are passing away as this information was in the hands of the elderly men and women. Most of the current generation, that is, the youth consider this as a myth or ideologies of the past.

5.2 IMPORTANCE OF CULTURAL ASTRONOMY

It is of importance that public awareness be raised by the different stakeholders as strategy to uphold indigenous knowledge. Conveying knowledge to remote communities requires strategies for effective communication. In this regard, stakeholders could include the government sectors, NGO's, civil society and community members at large. Cooperation among the above parties of a society is advantageous for managing natural disasters within communities.

The department of education can play a role in upholding the indigenous knowledge within our country. The syllabi should be designed to be flexible that it may accommodate a range of sectors, even the elders who never received formal education. For example: The elders could be invited to different workshops as the custodians of indigenous knowledge to impart their expertise to different educators. It is further recommended that the current syllabi be merged with indigenous knowledge, if only on an informal basis. Learners must be made aware of the fact that life sustainability is not only about modern technology, they need to know how people depended on their indigenous knowledge to live their lives, free of many of the radical concepts that modern science introduced that could destroy their lives.

It is clear from the research findings that the youth does not regard the indigenous or informal information of elders as important, even if it could be used to sustain their lives. If elders educated school teachers and allowed researchers to document their knowledge, our societies would be able to sustain their lives during any disaster and would as such keep this knowledge from becoming extinct.

If readers of the sky are acknowledged in communities for their expertise, they would be prepared for any disaster that may hit the area. They would be able to take the necessary measures in time that would mitigate the impact of a disaster. This action would greatly benefit community members, the government and other sectors affected by this practice and the mortality rate of disasters would be reduced.

In doing so community members could save their personal property and/or homes, enabling them to use the capital that would have been spent on alleviating the effects of

the disaster to improve their lives. It is imperative to consult with relevant sectors before engaging in the process of disaster management. The research findings show that there are still communities who recognize and apply indigenous knowledge to manage natural disasters. They may apply different skills to manage natural disasters, their aim is the same.

It is further recommended that local radio stations be contracted to disseminate the information. Elders or holders of the knowledge could be interviewed on issues related to cultural astronomy and natural disaster management.

Indigenous knowledge holders also need to be made aware of the danger of taking with rich knowledge like indigenous knowledge to the grave.

Civil society should contribute toward motivating the youth to develop an interest in learning about their cultural identity and roots, thereby encouraging them to acknowledge such indigenous knowledge and not simply regard it as myth. Programs such as these should be televised nationally and produced in a way that would address the relevant needs, i.e. to divest the youth and elders of the view that indigenous knowledge is untrue. This may be considered a tedious process, but if government invested in and put all the necessary structures in place according to a set timeframe, the results could be positive. Communities need to be encouraged to learn the meaning of the appearance of celestial bodies in the sky, including their shapes or patterns, to the benefit of their lives.

In conclusion, indigenous knowledge is a rich source of information that doesn't have to be eroded by modern technology. This knowledge is of much greater value than formal

education. A community member who integrates such knowledge into his/her life will be able to connect with all living organisms, from animals to plants and insects to birds. They will have the knowledge to foretell the future that will sustain and improve their lives.

The government needs to develop programs that focus on indigenous knowledge research and documentation, consulting with the relevant sectors to correct any information that may have been distorted. Students whose studies relate to the African Renaissance should be given the opportunity to undertake such research, since they already possess an understanding of the value of indigenous knowledge and its importance to the lives of Africans, especially in rural areas where modern technology is inaccessible.

5.3 SUMMARY

This chapter presented recommendations on the role of African cultural astronomy in disaster management and how relevant stakeholders can ensure that this culture is not laid to rest but is passed on to the current generation and used amongst communities to mitigate any natural disasters.

CHAPTER SIX

Recommendations and Conclusion

It is of importance that public awareness is implemented as strategy to uphold local knowledge by different stakeholders. Delivering knowledge to remote communities requires strategies for effective communication. In this regard, stakeholders may include the government sectors, NGO'S, civil societies and community members at large. Cooperation among the above sectors in a society is advantageous for managing natural disasters within our communities.

The department of education can play a role in upholding the indigenous knowledge within our country. The syllabi should be designed to be flexible that it accommodates other sectors even the elders who did not receive formal education. For example, they could be invited in different workshops as local knowledge custodians, whereby they would be imparting with their knowledge to different educators.

It is also recommended that the present syllabi be merged with old knowledge even if it is informal. Learners must be made aware of the fact that life sustainability is not only about modern technology, they should be told that people lived their lives before depending on their local knowledge and their lives were perfect even free from many radicals which science has introduced and it's destroying their lives.

It is clear from the research findings that our young generation does not regard local or informal information by elders as important, even as the information that can be used to sustain their lives. If elders educate teachers in schools and also allow researchers to

document their knowledge, our societies can be able to sustain their lives when faced with disasters. It would also assist that the knowledge is not extinct.

When readers of the sky are there, and are acknowledged in communities, societies will be prepared in case disasters hit their areas. They would be able to prepare and mitigate in time. This action will be of great benefit to community members, government and other sectors be affected by this practice. Mortality rate caused by disasters would be reduced.

It would also safe their household properties or their homes even the capital that were to be spent to alleviate the problem would then be used to improve their lives for sustainability. It is imperative to consult with relevant sectors before engaging in the process of disaster management. From the research findings, we learnt that there are some communities who still acknowledge and practice their local knowledge in managing natural disasters.

Although they apply different skills to manage natural disasters, their aim is the same. It is also recommended that local radios can be used to disseminate the knowledge. Elders or those who hold the knowledge could be invited to talk on radio about issues of cultural astronomy and natural disaster management. Knowledge custodians should be enlightened about the danger of going to the grave with rich knowledge like indigenous knowledge.

Civil societies should also make an input in motivating youth to grow interest in knowing their identity and their roots. This could encourage them to acknowledge this indigenous knowledge which they regard as myth. Programs such as these should be on national

television and their production should meet the relevant needs, that is to decolonize the minds of our youth and elders who also see local knowledge as untrue.

Decolonizing people's minds may be seen as tedious but if government has invested and put all structures in place with targeted time frame, the results could be positive. Members of the community should be encouraged to know meaning of celestial bodies when they appear on the sky even their shapes or patterns, as they could manage their lives with ease.

In conclusion indigenous knowledge is a rich knowledge which is not supposed to be eroded by modern technology. This knowledge is far richer than the formal education. An indigenous person who use his or her knowledge for living and is upholding can connect with all living organisms that is, from animals to plants as well as insects and birds. They are able to foretell the future and this sustains them, making their lives manageable.

Government must make programs that focus on indigenous knowledge research and documentation. This must also be availed to relevant sectors that it corrects some of information which has been distorted. Students who have studied in line with African Renaissance should be given opportunities to do the research work as already they have understanding of the value of indigenous knowledge and its importance in the lives of African people especially those living in rural areas far from modern technology.

REFERENCES

1. Allen, K. (1993). *Interpreting Space. GIS and Archaeology.* London: Taylor & Franci
2. Aveni, A F. (1980). *Skywatchers of Ancient Mexico, Austin: Texas.*
3. Baki, P. (2006). *Astronomy in the Cultural Heritage of African Societies.* Nairobi: UNEP
4. Kamara, J. (2008). *Indigenous Knowledge in Natural Disaster Reduction in Africa.* Nairobi: UNEP
5. Marsella, A. (2008). *Ethno Cultural Perspective on Disaster and Trauma.* Springer
6. Mercer, J. (2007). *Environmental Hazards.* Vol. (7)4:245-267.
7. Urama,J. (1980). *African Cultural Astronomy: Current Archaeoastronomy and Ethnoastronomy.* Springer
8. Warren, D M. (1991). *Using Indigenous Knowledge for Agricultural Development.* Washington, DC: World Bank.
9. World Bank, (2004). *Indigenous Knowledge: Local Pathways to Global Development, Making Five Years of the World Bank. Indigenous* Knowledge for Development. Washington, DC: World Bank.10.
10. Aveni, A., (1993). *"Africa's Socialized Astronomy",* in Ancient Astronomers, Montreal: St. Remy Press.
11. Bass, T. A., (1990). "Camping with the Prince", in Camping with the Prince, Boston: Houghton Mifflin.
12. Hunter, Havelin, (1984). "African Observers of the Universe: The Sirius Question", in Blacks in Science: Ancient and Modern, Van Sertima, I., New Brunswich, N.J.: Transaction Books.
13. Doyle, L., (1997). Frank, E. "Astronomy in Africa", Encyclopedia of the History of Science, Technology, and Medicine in Non-Western Cultures, Helaine Selin,Dordrecht: Kluwer.
14. Holbrook, J. (1998) "Tunisian Stellar Navigators", Archeaoastronomy & Ethnoastronomy. UCLA.
15. Lynch, B. M., Robbins, L. H. (1983). " Namoratungu: The first archaeoastronomical evidence in sub-saharan Africa", in Blacks in Science: Ancient and Modern, Van Sertima, I., New Brunswich, N.J.: Transaction Books, New Brunswich, NJ.
16. Ruggles, C. (1987).The Borana Calendar: Some Observations", Archeaoastronomy Supplement II, pg. 35.

17. Sekintu, C.M., (1956). Wachsmann, K.P., Wall Patterns in Hima Huts, , Kampala: the Uganda Museum.
18. Van Sertima,Ivan (1983). "The Lost Sciences of Africa: An Overview", in Blacks in Science: Ancient and Modern, Van Sertima, I., New Brunswich, N.J.: Transaction Books, New Brunswich, NJ.
19. Cuff, K. (1997). African Skies", publication of the Lawrence Hall of Science Holt Planetarium, UC Berkeley.
20. Snedegar, K., "Ikhwezi", Mercury, pg. 13, Nov 1997. Chigwedere, Aeneas. *Birth of Bantu Africa*. Bulawayo, Zimbabwe: Books for Africa, 1982.
21. Davis, N. E. *A History of Southern Africa*. London, U.K.: Longman Group Ltd., 1980.
22. Lanting, Frans. "A Gathering of Waters and Wildlife," *National Geographic* (Vol. 178, No. 6), December 1990.
23. Marquard, Leo. *The Story of South Africa*. London, U.K.: Faber and Faber Ltd., 1973.
24. Morton, Fred, Andrew Murray and Jeff Ramsay. *Historical Dictionary of Botswana*. London and Metuchen, New Jersey: The Scarecrow Press, 1989.
25. Thompson, Leonard. *African Societies in Southern Africa*. London: Heinemann Educational Book Ltd., 1978.26.
26. Zich, Arthur. "Botswana: the Adopted Land," *National Geographic* (Vol. 178, No. 6), December 1990.Tim James and Orville Boyd Jenkins27.
27. Boigu Island Community Council (1991) Boigu: our history and culture. Aboriginal Studies,Canberra.28.
28. Bradley J (1999) Wirriyarra Awara: Yanyuwa land and seascapes. South Atl Q 98(4):801–816
29. Bruno D, Lourandos H (1998) Rock art and socio-demography in north-eastern Australian prehistory. World Archaeol 30(2):193–219
30. Burarra Gathering (n. d.) Burarra gathering.Available at: http://burarra.questacon.edu.au/home.html [Accessed 21 January, 2009]
31. Bureau of Meteorology (2005) Indigenous weather knowledge. Available at: http://www.bom.gov.au/iwk/ [Last accessed 20 Oct 2009]
32. Byg A, Salick J (2009) Local perspectives on a global phenomenon—climate change in Eastern33.
33. Tibetan villages. Glob Environ Change 19:156–166

34. Calamia M (1999) A methodology for incorporating traditional ecological knowledge with geographic information systems for marine resource management in the Pacific. Traditional Resource Knowledge Information Bulletin 2(10):12
35. Chappell J (1988) Geomorphic dynamics and evolution of tidal river and floodplain systems in northern Australia. In: Wade-Marshall D, Loveday P (ed.) Northern Australia: progress and prospects. ANU, Darwin
36. Cruikshank J (2005) Do Glaciers listen? UBC, Canada
37. Davis S (1989) A man for all seasons. Angus & Robertson, Sydney Dept. of Climate Change (2008) Carbon Pollution Reduction Scheme. Available at: http://www.climatechange.gov.au/emissionstrading/index.html [Accessed January 18, 2009]
38. Edwards R (2001) Some songs from the Torres Strait. Rams Skull, Qld
39. Giambelluca T, Henderson-Sellers A (1996) Climate change: developing southern hemisphere perspectives. Wiley, USA
40. Green D (2006) How might climate change affect island culture in the in the Torres Strait? CSIRO working paper #11. CSIRO, Melbourne
41. GreenD (2007) Sharing Knowledge Presentations from 2006 workshop. Available at: sharingknowledge.net.au [Accessed October 20, 2009]
42. Green D, Jackson S, Morrison J (2010) Risks from climate change to Indigenous communities in the tropical north of Australia. A scoping study. Commonwealth Department of Climate Change, Canberra
43. Halling H (1999) From ochres to eel traps: aboriginal science and technology resource guide for teachers. Science Educators Association, Canberra
44. Head L (1994) Landscapes socialised by fire: post-contact changes in Aboriginal fire use in northern Australia, and implications for prehistory. Archaeol Oceania 29:172–181
45. Hennessy K et al (2007) Australia and New Zealand. Climate change 2007: impacts, adaptation and vulnerability. In: Parry M et al (eds.) Contribution of working group II to the fourth assessment: report of the intergovernmental panel on climate change. Cambridge University Press, Cambridge
46. Hill R (2004) YalanjiWarranga Kaban: Yalanji people of the rainforest fire management book. Little Ramsay, QldHuntington H, Callaghan T, Fox S, Krupnik I (2004) Matching traditional and scientific observations to detect environmental change: a discussion on Arctic terrestrial ecosystems. Ambio 13:18–23
47. Holbrook, J (1998) Tunisian stellar navigators, Archaeoastronomy & ethnoastronomy. UCLA

48. IngramM,Underhill D, Wigley T (1978) Historical climatology. Nature 276(5686):329–334
49. Jansen E et al (2007) Palaeo-climate. In: Solomon S et al (eds.) Climate change 2007: the physical science basis. Contribution of working group I to the fourth assessment report of the intergovernmental panel on climate change. Cambridge University Press, UK
50. Jennings J (1971) Sea level changes and land links. In: Mulvaney D, Golson J (eds.) Aboriginal man and environment in Australia. ANU, Canberra
51. King D,Skipper A (2004) Climate forecasting with traditional Maori knowledge. IWA Science Climate Update 64
52. Kington J(1980) Daily weather mapping from 1781. Climatic Change 3:7–36
53. Krupnik I, Jolly D (2002) The Earth is faster now: indigenous observation of Arctic environmental change. ARCUS, Alaska
54. Laidler G (2006) Inuit and scientific perspectives on the relationship between sea ice and climate change: the ideal complement? Climate Change 78:407–444
55. Lawrence A (2009) The first cuckoo in winter: phenology, recoding, credibility and meaning in Britain. Glob Environ Change 19:173–179
56. Lewis D (2002) Slower than the eye can see: environmental change in northern Australia's cattle lands, a case study from the Victoria River District, Northern Territory. Tropical Savannas CRC, Darwin
57. Luntz S (2001) Aboriginal art depicts climate change. Australas Sci 22(4):28–29
58. Mercer J, Dominey-Howes D, Kelman I, Lloyd K (2007)The potential for combining indigenous and western knowledge in reducing vulnerability to environmental hazards in small island developing states. Environ Hazards 7(4):245–256
59. MockC(1991) Historical evidence of a cold, dry summer during 1849 in the north-eastern Great Basin and adjacent Rocky Mountains. Climate Change 18:37–66
60. Northern Territory Government (2008) Discussion Paper on NT Climate Change,issues.NTgovernment.Availableat:http://www.nt.gov.au/dcm/legislation/climatechange/docs/cc_discussion_paper.pdf
61. Pennesi K (2007) Improving forecast communication: linguistic and cultural considerations. Bull Amer Meteor Soc 88:1033–1044
62. Povinelli E (1995) Do rocks listen? The cultural politics of apprehending Australian Aboriginal Labor, Anthropology 97(3):505–518

63. Reeves J, Chivas A, García A, Holt S, Couapel M, Jones B, Cendón D, Fink D (2008) The sedimentary record of palaeoenvironments and sea-level change in the Gulf of Carpentaria, Australia through the last glacial cycle. Quat Int 183(1):3–22
64. Riedlinger D (2001) Community-based assessments of change, contributions of Inuvialuit knowledge to understanding climate change in the Canadian Arctic. http://mspace.lib.umanitoba.ca/handle/1993/1940
65. Roberts R, Jones R, Smith M (1990) Thermoluminescence dating of a 50,000-year-old human occupation site in northern Australia. Nature 345(6271):153–156
66. Rose D (1996) Nourishing terrains: Australian Aboriginal views of landscape and wilderness. Australian Heritage Commission, Canberra.
67. Rose D (1997) When the Rainbow walks. In: Webb (ed) Windows on meteorology: Australian perspective. CSIRO, Melbourne
68. Rosenzweig C et al (2007) Assessment of observed changes and responses in natural and managed systems, In: Parry M et al (eds.) Climate change 2007: impacts, adaptation and vulnerability. Contribution of working group II to the fourth assessment report of the intergovernmental panel on climate change, Cambridge University Press, UK
69. Sharing Knowledge (2006) Sharing knowledge: a workshop on climate change impacts and adaptation strategies for Northern Australian Indigenous Communities, Darwin, Northern Territory, Australia, 29–31 March 2006
70. Sharp N (1993) Stars of Tagai: the Torres Strait Islanders. Aboriginal Studies, Canberra
71. Sillitoe P (1994) Wheather rain or shine: weather regimes from a New Guinea perspective. Oceania 64(3):246–270
72. Simpson J (1997) Perceptions of meteorology in some Aboriginal languages, In: Webb (ed.) Windows on meteorology: Australian perspective. CSIRO, Melbourne
73. Smith L (1999) Decolonizing methodologies. Research and indigenous peoples, Zed Books, London 354 Climatic Change (2010) 100:337–354 Smith M,

Letter of Consent

TO : Research Participant

FROM: Makgosi Loretta Kgotleng

Masters Student – North West University (Mafikeng Campus)

Dear Participant

Thank you for showing interest in participating in my research project. The research is a Master's dissertation for the fulfillment of MA in Indigenous Knowledge Systems Degree at the North-West University. Your views and opinions, through participation in this research study, will be highly appreciated. Confidentiality of the information that you will provide will be respected at all times. No mention will be made of any personal details that may identify you. Only interpreted data will be considered and presented to the supervisor and the Faculty of Human and Social Sciences of the North-West University. The results of the study will be reported in the Master's dissertation as well as in articles.

Thanking you in anticipation.

Yours faithfully

.....

MAKGOSI KGOTLENG

QUESTIONNAIRE FOR BATSWANA COMMUNITY ELDERS

SECTION A

INSTRUCTIONS:-

Please indicate by putting a cross (x) next to the appropriate response.

INVESTIGATION INTO THE ROLE OF AFRICAN CULTURAL ASTRONOMY IN DISASTER MANAGEMENT AMONG THE BATSWANA

A. BIOGRAPHICAL DATA

1.1 Gender

Male	
Female	

1.2 Age Group

21-25	
26-30	
31-35	
36-45	
46-50	
51-60	
60 and above	

1.3 Marital Status

Single	
Married	
Divorced	
Other	

1.4 Religious Affiliation

Hindu	
Muslim	
Christian	
African Religion	
Any other	

1.5 What is your highest level of formal education?

Primary	
Secondary	
Tertiary	

Other, indicate: .....

KNOWLEDGE AND USES OF CULTURAL ASTRONOMY

SECTION B

1. To what extent do the Batswana believe in the use of knowledge of stars in their daily lives?

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2. Can you provide the names of the stars known to the Batswana?

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3. How was knowledge of these stars used?

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4. Is this knowledge still being used?

Yes	
No	

If yes, how do you use this knowledge to determine impending natural disasters such as floods, drought and famine?

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If no, why did the community stop using the knowledge of the stars?

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5. What do you do to prepare for a natural disaster, after early warning from the stars and other heavenly bodies e.g. floods, drought, famine?

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6. What should be done to promote the indigenous knowledge of stars among the youth?

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7. What are the challenges facing the indigenous knowledge of stars and heavenly bodies among the Batswana?

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PROFILE OF BAROLONG BOORA-TSHIDI IN MAHIKENG

PROFILE OF BAROLONG BOORA-TSHIDI IN MAHIKENG

INTRODUCTION

The Barolong nation is named after their first Kgosi, Morolong. He and his second Kgosi, Noto, (the hammer, were probably mythological heads of the tribe because their names are also the totem of the tribe, namely Tholo (kudu) and tshipi (iron) with a later taboo substitute Noto (the hammer).

The name Morolong is linguistically composed of the prefix "mo" to indicate a person, Tholo becomes rolo because of the prefix and and the suffix "ng" is a locative; thus: the man of the place of kudu-totem. Tholo is still the totem of all Barolong nations. The first BaRolong chief was Morolong who lived over 700 years ago.

Following Morolong the probable line of chiefs was:

Noto, Morara, Mabe, Mabudi, Manoto, Mabeo, Modiboa, Tshesebe Setlhare, Masepe, Mokgopha, Thibela, Tau,Thutlwa,Tawana,Montshioa, Bakolopang,Lotlamoreng,Kebalepile, Lapologang,Setumo,Kgotleng, ...

Chief Tau's Sons

The great Barolong chief and warrior Tau, who died at Taung about 1760, had at least ten sons. In order of seniority they were:

Ratlou, Tshidi, Makgetla, Seleka, Rapulana, Modise, Maleme, Ganakgomo, Masetlhe, Ramhitshana. The first five of Tau's sons formed the main Barolong clans.

Tshidi

It was from Tshidi, Tau's second son, and not his first Ratlou, that Montshioa descends, a long time had passed before Tau's second wife Kabasane gave birth to her son Tshidi - an apparent result of receiving a fertility medicine - hence the name Tshidi.

Tawana / Leshomo dispute

By 1814, when Tawana was aged 30 and already had several wives, his regent and uncle Leshomo refused to hand over the chieftainship to him. A serious dispute developed between the two which split the Ratshidi clan into two factions.

Tawana into exile

The larger faction under Leshomo remained at Gatshebethwane near Disaneng while the smaller faction under Tawana fled further westwards - first to Loporung and Mmakgori beyond Phitsane Molopo, and then north across the Molopo to Tsoaneng and Moshaneng, south west of Kanye in Botswana.

DEFEAT OF LESHOMO

Tawana was advised to tackle Leshomo. With the help from Chief Makaba's Bangwaketse, now allies of Barolong he drove out Leshomo from Gatshebethwane eastwards into Bahurutshe territory where in 1818, Leshomo was killed.

His leaderless followers then joined Tawana at Phitshane. Tawana then ascended the throne of Barolong Boora Tshidi. Chief Tawana died and was buried at Dithakong in October 1849.

Birth of Montshioa

During this journey into exile, in August 1815, Sebodio gave birth to a son Montshioa while she was gathering firewood. The name Montshioa means - one who is forced away from home - an exile. Tawana had also married Mmasehera, daughter of Chief Makaba of the Bangwaketse, who bore him two sons: Saane and Rabodieco

MAHIKENG – CAPITAL CITY

The original name of the city, Mahikeng, literally means "the place among rocks". The name refers to the volcanic rocks that provided temporary shelter to stone Age humans in their hunt on animals' drinking water in the Molopo River.

This name was given to the area in 1852 by early BaRolong Chiefs who had settled along the river, near the present day village of Rooigrond, after the upheaval of the "Difequane" was a period of intertribal war, aggravated by the passage of the exiled Zulu chief, Mzilikazi, through the area.

Early Settlements

The Khoikhoi and the san are division of the Khoisan ethnics group of south-western Africa. These two groups of people who can be placed archaeologically in South Africa about 25,000 BC. They were, like everyone else at that time, hunters and gathers.

In about 18,000 BC the San-Speaking hunters, also known as Bushmen (a name now considered derogatory), lived throughout the northwest region and the greater Sub-Continent of southern Africa.

They were migratory in nature, moving around their territories in search of game and plant foods. The San people did not herd either sheep or cattle, but kept on hunting and gathering.

The Khoikhoi & the San

The Khoikhoi ("men of men" or Khoi) are closely related to the San (Bushmen). The Khoikhoi, who kept livestock, probably migrated through the North West region about 3,000 years ago.

They were once known to Europeans as the Hottentots (a name also now considered derogatory). They did not establish permanent settlements but move south to the Orange River where they split. One group moved west along the river whilst another migrated to the Eastern Cape.

The Agriculturists

The agriculturists arrived in South Africa from the north from about 300 AD onwards. The lifestyle they brought with them was characterised by crop cultivation, settled village life and metal tools.

These people led a semi-nomadic life but cultivation of crops soon made it necessary for them to stay in the area for longer periods, and more permanent residences were built.

They however, moved every few years once the soil became infertile. Iron was also important to these early farmers as they needed hoes for farming

and others tools to cut down trees. Their economy included cattle, sheep and goats and the production of tobacco, sorghum and melons.

The First People linked to Mahikeng

The first residents who can be directly linked to the current people in the Mahikeng area are the Barolong who moved into this area between 1200 and 1350, were descendants of Morolong (one of the founding ancestors of the Tswana lineage).

Because of drought in the 17th and 18th century, the kingdom of the Barolong was forced to spread south to Taung and North West through the Kalahari. The capital was moved to Taung in the Bophirima region. In about 1720 the community moved back to this region following the death of their powerful king Tau.

Build up to the Anglo-Boer South African War

During the 1800's there was increased activity in this region by white hunters, traders, prospectors and missionaries. These were the first white people to establish themselves in an area which had been dominated by Sotho-Tswana people for many centuries...

Mahikeng later attracted the attention of the world during the Anglo Boer War/ South African War of 1899 to 1902 as the small British garrison under the command of Colonel Baden Powell held out for 217 days against Boer forces who had surrounded the town.

Today Mahikeng is a vibrant provincial and commercial capital and a major tourism attraction for the aspects of the history, culture and wildlife of this unique region of South Africa.

Sights in around Mahikeng

Most visitors to Mafikeng are surprised to find there is more to the town than the Anglo Boer War, the Mahikeng Siege and the Boy Scouts. Although the city prides itself on these three historically important events, all of them well documented, there is much, much more to be seen.

For many years the mentality of Empire and Colonialism predominated Mahikeng's place in history and little relevance was placed on the role of black people in the town's history.

Since 1995, much has been done to correct this imbalance and the predominant tribe in the area, the Barolong-Boora Tshidi has done much to change these perceptions.

Visit the Mahikeng Museum to view the extensive ethnographic and Anglo-Boer War exhibits. To the south east of Mahikeng is Kanon Kopje, a defensive fort built during the Warren Expedition of 1885.Nearby the Kgotla of the Barolong Boora Tshidi, the tribal meeting place of Chief Montshioa.

A monument honouring the Barolong who died during the Mafikeng siege stands beside another in recognition of Kgosi Besele Montshioa, head of the Barolong Regiment during the siege. Also nearby is the Mahikeng Siege Cemetery.

There are a number of site linking the famous Sol Plaatje, South Africa Politician, and journalist, campaigner for human rights, novelist & translator, to Mafikeng at the time of the siege.

These sites include his residence, his newspaper office and printing works. The 4600 ha Mahikeng Game Reserve hosts a wide variety of game and is on the principal breeding parks for White Rhino.

The Manyane Game Lodge features a lion enclosure and crocodile camp. 30 Km west of the city, the Botsalano Game Reserve is a popular weekend attraction for game viewing. Heritage House, is located at the entrance to Mahikeng on the Lichtenburg Road (R503), housing the Head Office of the North Wes Park and Tourism Board at Cookes Lakes.

To the south of the road to Vryburg are the Lotlamoreng Cultural Reserve and Montshioa Dam where there is a cultural village, recreational area and a demarcated waterfowl sanctuary. Nearby is the Modimola Dam, an angling and weekend picnicking site.

The western suburbs of Mahikeng house the Provincial parliament at the impressive government offices known as the Garona.

The Mmabana Cultural Centre nearby promotes music and many artistic disciplines through numerous practical workshops and exhibitions.

The Mmabatho Convention Centre has facilities to host up to 6,000 delegates and is centrally located for transport and hotels.

The North West Institute of Hotel & Tourism Management is located in Mahikeng. Moving to the east the inland diving venue at wondergat, a vast underwater network of caves used principally for diving instruction.

The Scout Centre of Excellence for Nature & Environment is located on the borders crossing the Mahikeng Game Reserve. The international scouting centre provides skills training in management, leadership and team building to both the local and international students.

Mahikeng is served by excellent hotels, guesthouses and bed & breakfast establishments.

There is a casino located at the Mmabatho Palms Casino Resort. There are two golf courses: the Leopard Park Golf Club, located in the western suburbs and the Mahikeng Golf Club.

The international School of South Africa, which attracts students from all parts of Africa, is located on extensive grounds in Mahikeng.

The Onset of the Anglo Boer War South African War

In 1899 the war began. The first part of the war on our four fronts. One of them was the western fronts, entering on Mahikeng and Kimberly and which was fought by the republicans in two sieges, giving the British time to gather reinforcements.

The siege of Mahikeng began on October 14, 1899 and lasted for 217 days.

The town was under Colonel Robert Stephenson Smyth, Baden Powell and General Piet Cronje. At the start of siege 1200 whites lived in this small town, along with 2000 refugees and other foreigners.

The much larger African town, The Stadt, had huge population of 6000.

It during this time that a boy cadet corps was formed that initiated the idea of Scouting for boys. Today the great movement founded by Baden Powell has membership of more than 26 million in more than 150 countries in the world.

The famous Mafeking Diary, "A Black Man's view of a White Man's war" by S. Plaatje, a founding member and first Secretary General of the South African Native Congress, later the ANC, was written during the siege.

A treaty to end the war was signed in Pretoria on May 31 1902.

APARTHEID

In 1948 an event occurred which was to shape South Africa for the next forty years. The National Party was voted into Gorvenment.

They immediately put through to parliament a battery of legislation needed to prop up their policies of separate development.

In this region, a Tswana Territorial Authority was set up in 1966 consisting of eight regional authorities.

Chief Tidimane Pilane headed the territorial Authority. It had very little authority but received expanded powers in 1968 where Chief Lucas Manyane Mangope took over as Chief Councillor.

In the early 1970s the separate development policies were further streamlined and the Bantu Homeland Citizenship Act of 1970 was instituted. This effectively linked as blacks with their respective Bantustans and ensured independence for all Bantustans.

Black people were expected to maintain their homes and families in the homeland black move to their place of work in the industrial development points.

In 1977 the Tswana Territorial Authority declared its area an independent state and Bophuthatswana came into being.

However, because of a special struck by Bophuthatswana President Mangope and South Africa, The white people in Bophuthatswana retained their African citizenship.

Part of the agreement was that the seat of Government of Bophuthatswana should be Mafikeng, The name having changed back from the British translation of Mahikeng.

The slight name change from Mafeking to Mafikeng was made to give recognition of the original name Mahikeng.

However a new capital, Mmabatho, was planned and developed as a seat of government on the outskirts of Mahikeng.

In 1980 the Apartheid government incorporated Mafikeng into Bophuthatswana and Mahikeng became part of Mmabatho.

Post –Apartheid from 1994

The administration of Bophuthatswana collapsed in March 1994 after three days of arson, looting and bloodshed. This set the ball rolling for the incorporation of discredited homeland of Bophuthatswana back into South Africa.

On October 18 that year the town was declared the capital of the North West Province. In 1996 Mahikeng once again became the capital city but this time with Mmabatho as part of Mahikeng.

The town was presently faced with the challenge of uniting Mmabatho (The Bophuthatswana Heritage), Mahikeng (the Barolong heritage) and Mafeking (the Colonial heritage), into one greater capital for all people of the North West Province.

Today the place is known as Mahikeng the Capital of North West Province.

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