The influence of fundamental beliefs on a community’s understanding and experience of climate change adaptation

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To the ones who made me who I am: my parents, Lucas and Michelle Schuman, and my sisters, Kiara and Laliq Schuman,

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ABSTRACT

Key terms: adaptation, African Traditional religions, beliefs, climate beliefs, climate change, Q-methodology, religious beliefs, South Africa.

This study argues that religious beliefs significantly influence a community's understanding and experience of climate change adaptation, indicating the need for an inclusion of such information in endeavours promoting climate change adaptation. Data were collected using the Q-method, whereby recurring statements were identified from semi-structured interviews in Phase One of the research project with participants from three rural communities in the North West Province of South Africa: Ikageng, Ventersdorp, and Jouberton. During Phase Two, participants were requested to indicate the extent to which they agreed with the Q-statements by taking a Likert scale assessment; this was done allowing a free distribution of responses. In Phase Three the process was repeated, although a forced distribution method was employed that required participants to place only a certain amount of statements under each column. Finally, in Phase Four participant responses were sorted based on their recurrence so as to construct clear narratives that represent differing participant worldviews (Factors: 1-Collectivist/Liberal, 2-Religious Fatalist/Determinist, 3- Religious, 4- Technological/Human, and 5-Governance/Structural).

Conclusions indicate that community members who regard themselves as religious (overall of the Christian faith) fall under two groups: the religious determinists or fatalists who relate to Factor Two and see climate as a natural process that is governed by God (removing it from the realm of human influence, and therefore denying the anthropogenic nature of climate change), and religious participants loading significantly for Factor Three, who deny this “naturalness” and acknowledge human impacts on the climate.

Both groups, however, indicated an overall willingness to change their beliefs if necessary. For the Factor Two group these changes will be based on a “seeing is believing” principle, encouraging the use of practical examples, and the group identifying with Factor Three requires intrinsic motivation in order to affect change, and the use of conceptual change literature is recommended when attempting any such changes of this group’s beliefs.
TABLE OF CONTENTS

ACKNOWLEDGEMENTS ............................................................................................................ I

ABSTRACT ................................................................................................................................. II

CHAPTER 1: INTRODUCTION .................................................................................................. 1

1.1 INTRODUCTION .................................................................................................................. 1

1.2 RESEARCH QUESTIONS ....................................................................................................... 3

1.3 RESEARCH OBJECTIVES .................................................................................................... 3

1.4 CENTRAL THEORETICAL STATEMENT ............................................................................. 4

1.5 METHODOLOGY .................................................................................................................. 5

1.5.2 Sampling ......................................................................................................................... 5

1.5.3 Instrumentation ............................................................................................................... 6

1.5.4 Data collection ................................................................................................................. 7

1.5.5 Data analysis .................................................................................................................... 7

1.5.6 Literature review ............................................................................................................. 8

1.6 LIMITATIONS AND DELIMITATIONS ............................................................................. 8

1.7 SIGNIFICANCE OF THE STUDY ....................................................................................... 8

1.8 PROVISIONAL LAYOUT ..................................................................................................... 9

CHAPTER 2: LITERATURE REVIEW ....................................................................................... 11

2.1 Introduction ....................................................................................................................... 11
2.2 Definition and Discussion of Key Concepts

2.2.1 Beliefs

2.2.2 Fundamental (Religious) Beliefs

2.2.3 Climate Change and Climate Change Adaptation

2.3 Linking of Key Concepts

2.3.1 Humankind and Nature – Religious Perspectives

2.3.1.1 Christianity

2.3.1.2 Islam

2.3.1.3 African Traditional religions

2.3.1.4 Christianity, Islam, and African Traditional religion interaction

2.3.2 Climate Change Adaptation and Religious Beliefs

2.3.3 Conclusion

CHAPTER 3: ACADEMIC ARTICLE

Title

Abstract

Keywords

1. Introduction

2. Theory of religious beliefs and climate change adaptation


4. Religion, Climate Change, and Climate Change Adaptation

5. Study area: three rural communities in North West, South Africa

6. Methods
6.1. Research Design ............................................................................................................. 31
6.2. Sampling .......................................................................................................................... 31
6.3. Instrumentation .............................................................................................................. 32
6.4. Data Collection ............................................................................................................... 32
6.5. Data Analysis .................................................................................................................. 33
7. Results and Discussion ..................................................................................................... 34
  7.1. Qualitative Data .......................................................................................................... 34
  7.1.1. Phase One: Qualitative Data .................................................................................... 34
  7.1.2. Phase One: Conclusion ......................................................................................... 40
  7.2. Q-sort results: the five factors (worldviews) ................................................................. 40
  7.3. Pertinent Q sorts and their rankings ............................................................................ 46
8. Conclusion ........................................................................................................................ 52
9. Reflections: Factor Interpretations .................................................................................... 54
10. Recommendations ........................................................................................................... 55

CHAPTER 4: DISCUSSION OF EMPirical FINDINGS......................................................... 62

4.1 INTRODUCTION ............................................................................................................. 62

4.2 OBJECTIVES ................................................................................................................ 62
  4.2.1 Objective 1 ............................................................................................................. 62
     4.2.1.1 Theoretical basis: religious beliefs ................................................................. 63
     4.2.1.2 Conclusions from Objective 1 ....................................................................... 65
  4.2.2 Objective 2 ............................................................................................................. 66
     4.2.2.1 Definitions and participant views ................................................................. 66
4.2.2.2 Conclusions from Objective 2 ................................................................. 72

4.2.3 Objective 3 .................................................................................................. 72
4.2.3.1 Qualitative data: Phases One to Four ....................................................... 72
4.2.3.2 Conclusions from Objective 3 ................................................................. 74

4.2.4 Objective 4 .................................................................................................. 74
4.2.4.1 Phase One: Qualitative data ................................................................. 74
4.2.4.2 Phases Two to Four: Qualitative and quantitative data and overall findings .......... 79
4.2.4.2.1 Results of the Q-sort: the five factors ................................................. 79
4.2.4.2.2 Relevant Q sorts and their factor arrays .............................................. 83
4.2.4.3 Conclusions from Objective 4 ................................................................. 86

4.3 RECOMMENDATIONS ................................................................................. 86

4.4 REFLECTIONS ............................................................................................ 87

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS ........................................... 90
5.1. Introduction .................................................................................................. 90
5.2. Limitations ................................................................................................... 92
5.3. Recommendations ....................................................................................... 92

REFERENCE LIST .............................................................................................. 93

ANNEXURES .................................................................................................... 100
## LIST OF TABLES

Table 4.1: Factors and descriptions.................................................................................. 79

Table 4.2: Phase 4: Participants’ significant factors and chosen worldviews .................. 81

Table 4.3: Q sorts related to climate change and religious beliefs .................................. 83

Table 4.4: Q-Sorts linked to ancestral beliefs and traditional healers ............................. 84

Table 4.5: Q-sorts related to beliefs.................................................................................. 85
CHAPTER 1: INTRODUCTION

1.1 Introduction

The term belief seems to be quite difficult to define and consensus on its meaning is yet to be reached (Carlisle & Simon, 2012:221). This can be attributed to the fact that the concept comprises various elements that are often context-specific.

Fundamental beliefs, as are investigated in this study, are defined by Beck (2011:32) as enduring understandings about oneself, others and the world around us that are formed from a young age. The goal of this study is to explore fundamental beliefs and the way it influences people’s experiences and understanding of climate change, as well as their adaptability thereto. International research on the link between fundamental beliefs and climate change has been conducted (Bergmann, 2009a; Bergmann, 2009b; Brownlee et al., 2013; Gifford, 2011; Hulme, 2009; McCown, 1927; McNeeley & Lazrus, 2014; Nagle, 2008; Richards et al., 2013; Stern et al., 1999), but studies done specifically in the South African context are less prevalent. It is therefore important to study the link between fundamental beliefs and climate change adaptation within the contexts of Ikageng, Jouberton and Ventersdorp in the North-West province of South Africa.

The basic argument of this study is that fundamental beliefs contain an element of what is generally referred to as religious beliefs. Clouser (2005:41) asserts that all “beliefs in something as unconditionally real” are therefore characteristically religious. Runciman (as cited by Eickelman, 1976:155) adds to this statement:

Whatever else religion might entail, it is a set of beliefs, more often implicit than explicit, that are understood by members of a society against the background of tacit, shared assumptions about the nature and conduct of everyday life.

A working definition for religious beliefs, which has been equated with fundamental beliefs in this particular study, would be that of Schilbrack (2013:313): religious beliefs are “composed of those social practices authorised by reference to a superempirical reality, that is, a reference to the character of the Gods, the will of the Supreme Being, the metaphysical nature of things, or the like”. Clouser (2005:23) defines religious beliefs similarly as the following:

A religious belief is a belief in something as divine per se no matter how that is further described, where “divine per se” means having unconditionally non-dependant reality.

In this study, fundamental beliefs within the African context were therefore examined from a religious point of view, based on the assumption that religious beliefs include subjective commitments to truth within the specific context (Carlisle & Simon, 2012:222) and represent a way of life for those who hold them (Barbour,1990:xiii).
Experiences of climatic conditions forms a major part of everyday life, (Runciman cited by Eickelman, 1976:155). According to the IPCC (2014:1760) climate change refers to:

a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer.

The UNFCCC (cited by the IPCC, 2014:1760) further defines the concept as:

a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

This global crisis of climate change is bound to affect the continent of Africa the most adversely, as it consists of many developing countries (Mendelsohn, 2007; Toulmin, 2009; UNFCCC, 2007). Climate change as a scientific phenomenon, however, may not be something that many people are familiar with, although the effects thereof are definitely being noticed. A study by Clarke et al. (2012:18) showed that 89% of the farmers in their study sample, in the Great Fish River Valley area of South Africa, reported perceived changes in climate. A further study by Benhin (2006:10) indicates that South African farmers are aware of the changes in climate based on varying rainfall timing, reduced crop volumes and higher temperatures. This is an indication that working knowledge of the actual term climate change need not be present for people to be able to perceive changes in climate. It was also this awareness of the changing climate within their South African farming context, and not necessarily education on global climate change, that led to these farmers’ implementation of various adaptive measures (Benhin, 2006:10). Emphasis is therefore placed on the importance of understanding concepts within a specific context, such as the South African context in Clarke et al. and Benhin’s studies.

In response to the effects of climate change, a global trend toward behaviour adaptation, both reactively and anticipatorily, developed (Adger et al., 2005:77). This trend will be referred to as climate change adaptation. According to the IPCC (2014:1758), adaptation can be defined as “the process of adjustment to actual or expected climate and its effects”. O’Brien (2012:669) states that climate change adaptation seeks to “reduce vulnerability to present and future change by minimizing the direct and indirect impacts”, but in order to determine whether or not a community adapts to climate change (including the factors influencing that adaptation), their understanding and experience of the actual changes in climate need to be determined first.

The research presented in this dissertation attempts to give a better idea of the communities’ understanding and experience of changing climate within their own specific context, in order to address the study’s problem statement that religious beliefs significantly influence a community’s understanding and experience of climate change adaptation, indicating the need for an inclusion
of such information in climate change adaptation education. According to Morrison et al., (2015:2), it is vitally important to understand the link between fundamental beliefs and climate change from the context of specific communities, in order to be able to address these communities’ issues from within. This link between fundamental beliefs and adaptation has been established based on literature in various contexts and the findings of this qualiquantological study. The relationship between religion and climate may be more pronounced than people are generally aware of (McCown, 1927:521). Bergmann (2009a:98) states that “climate change challenges and changes images of God and the sacred and their corresponding sociocultural practices”. Climate change can also be regarded as a sociocultural process itself (Bergmann, 2009b:1) in the sense that it cannot exclude the social and cultural aspects pertaining to it when being discussed or assessed.

Based on these ideas, the purpose of this study was to investigate the influences of fundamental beliefs on climate change adaptation. Specific influences were investigated within the specific context of the Ikageng, Jouberton and Ventersdorp communities. These communities were representative of their own specific context, but could also provide potential insight to the necessity of taking belief systems into account when addressing climate change adaptation in other rural South African settings.

This study is presented in article format with additional supporting chapters, in accordance with North West University requirements. Although Chapter 3 of this document comprises the article, it acts as a separate entity, to be submitted for publishing in a peer-reviewed, and all numbering and formatting is therefore done accordingly.

1.2 Research questions

In order to address the problem statement, the following research questions were considered:

1. What are fundamental beliefs, especially within the African context?
2. What are climate change and climate change adaptation?
3. What are the communities’ current experiences and understanding of changes in climate?
4. What is the influence of fundamental beliefs on climate change experiences and understanding?

1.3 Research objectives

In order to answer the research questions, specific research objectives were identified:

1. Investigate and define fundamental beliefs, especially within the African context.
2. Define climate change and climate change adaptation.
3. Determine the communities’ current experiences and understanding of changes in climate.

4. Investigate and determine the influence of fundamental beliefs on climate change experiences and understanding.

The central theoretical statement of this study provides the foundation upon which the research objectives were achieved.

1.4 Central theoretical statement

The assertion that a direct link exists between fundamental beliefs and climate change experiences, understanding and ultimately adaptation, led to this study. Wisner, Gaillard and Kelman (2012:17) maintain that “high casualties amongst certain sectors of the society may be partially explained by cultural patterns that prevent these groups from accessing available means for tackling disaster risk”. Culture is made up of many aspects, religious beliefs being only one of them, and adaptive measures can prove helpful in “tackling” climate change. An important model, called Cultural Theory of Risk, or CTR, “helps to explain how social organizations and institutional cultures frame risks differently and how those different framings create respective “voices” about climate change risks and responses in various public forums” (Mcneeley and Lazrus, 2014:507). According to CTR, a person’s risk framing corresponds to their worldview, of which there are three identified within the CTR process. Mcneeley and Lazrus (2014:507) maintain that these worldviews are “constellations of values and beliefs about how society should be organized”, making the CTR worldview similar to the worldviews or Factor formulated during the Q-methodology process, as is the case in this study.

According to Schipper (2015:151), “beliefs and attitudes to risks have evolved in order to enable” people to be able to cope and live with them. Mcneeley and Lazrus (2014:506) in turn state that:

- the way in which people perceive climate change risk is informed by their social interactions and cultural worldviews comprising fundamental beliefs about society and nature. Therefore, perceptions of climate change risk and vulnerability along with people’s “myths of nature” – that is, how groups of people conceptualize the way nature function – influence the feasibility and acceptability of climate adaptation planning, policy making, and implementation.

Fundamental beliefs, especially those pertaining to man’s place in nature, therefore influence people’s general understanding and experience of changes in climate, and not only specifically its risks, which leads to changes in the adaptive measures referred to by Mcneeley and Lazrus (2014:506).
1.5 Methodology

According to Teddlie and Tashakkori (2009:339) a research methodology is “a broad approach to scientific inquiry specifying how research questions should be asked and answered”. The methodology for this study was chosen based on the applicability and merit thereof. It is important to note that this study forms part of a larger project that explores the relationship between belief systems and climate change adaptation.

1.5.1 Research design

The aim of this study was to determine the relationship between communities’ fundamental beliefs, experiences and understanding of climate change and adaptation to climate change. The research design therefore had to be suited to this purpose and allow for the research questions to be answered. As this study included people’s personal experiences regarding climate change adaptation, as well as findings collected using the Q-research method, the most appropriate research design was the qualiquantological approach (Stenner & Rogers, 2004). Q-methodology was followed to determine the communities’ experiences and understanding of climate change adaptation, while producing statistical data to confirm this study’s assertion, as based on literature (Bergmann, 2009a; Bergmann, 2009b; Brownlee et al., 2013; Gifford, 2011; Hulme, 2009; McCown, 1927; McNeeley & Lazrus, 2014; Nagle, 2008; Richards et al., 2013; Stern et al., 1999), that a link between climate change adaptation and people’s religious beliefs does indeed exist. Q-methodology is especially suited to investigate the influence of religious beliefs on people’s willingness or ability to adapt to climate change, as it enables the researcher to quantify and illustrate abstract concepts such as beliefs, and find correlations between different subjects, in this case religious beliefs and climate change. Previte et al (2007:141) maintain that Q-methodology allows for a “focus on the subjective experiences of participants” and an “emphasis on context”, making it a well-suited option for this study as it investigated specifically individual and communal participant views and beliefs. In turn, it was hypothesised that these beliefs would influence climate change adaptation, further strengthening the case for using Q-methodology for this study.

1.5.2 Sampling

Three separate communities in the North-West province, namely Ikageng, Jouberton and Ventersdorp, were visited for data collection. These communities were chosen because this study forms part of a greater project which ensures that the communities fulfil the necessary requirements. This project was done in conjunction with the South Africa-Norway Research Cooperation (SANCOOP) and focuses on belief systems and climate change adaptation. During Phase One, six interviewers conducted interviews with a total of 103 respondents. Respondents
were chosen at random, based on willingness to participate. Snowball sampling was also used to find more participants. A random selection (lottery) of 51 respondents was interviewed for the Q-sorting during Phase Two and responses were recorded using a free distribution method. 25 participants were contacted for a third phase, during which responses were limited by a forced distribution method. Finally, eight participants were identified as being representative of one of five Factors (worldviews) that were compiled based on factor analysis from the data collected in previous phases. These participants were asked to select the worldview they feel suits them best and verbally discuss their choices for qualitative purposes.

1.5.3 Instrumentation

This study includes findings collected using the Q-research method, which is an appropriate mixed method-type research approach. Q-methodology addresses the problem of finding a scientific methodology with which to study subjective phenomena such as opinions or, in this case, fundamental beliefs (Previte et al., 2007:136).

Previte et al. (2007:136) describe that, after identification of the specific discourse to be studied, Q-methodology tapers the discourse down to identify a specific concourse or issues within the proposed discourse (Phase One). Thereafter the researcher derives a Q-sample, consisting of a set of statements pertaining to the discourse and subsequent concourse. The researcher asks participants to sort the statements in what is called a Q-sort (a method of ranking answers based on a Likert-type scale) (Phase Two). The Q-method itself therefore has specific instrumentation which had to be used during the second phase of the data collection process to enable the codifying of data. This included random magnetic cards that were given to participants, each containing one statement from the Q-set that was to be ranked based on instructions given (Van Exel & De Graaf, 2005:7).

Data collection for this study comprised four main phases – Phases One and Two as discussed, a third phase to further condense collected data and a fourth phase to determine worldviews. Previte et al. (2007:139) indicate that the final stage of Q-methodology involves analyses to determine certain patterns across individuals. The quantitative features of this methodology were uniquely suited to facilitate the outcome of this study concerned with the delivery of statistical data derived from qualitative input.

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1.5.4 Data collection

Initial data collection was done by means of semi-structured individual interviews during Phase One. Only two questions were asked: “what do you think about the climate?”, and “do you think it would be possible to change your beliefs about the climate?”. Further probing questions were asked in order to facilitate a conversation with the participant. From these recorded conversations, 40 statements were identified, as per the Q-methodology process. During Phase Two, instructions were limited and participants were allowed to rank their statements freely from strong disagreement to strong agreement, but during Phase Three they were instructed to rank only a certain number of statements in each position, enabling a forced distribution of data. From this data, four worldviews (factors) were compiled. These factors consist of statements that were grouped together during the previous phases. Phase Four allowed participants to read through the five worldviews and choose the most appropriate one with no further direction given.

It is important to note that Q-methodology is not intended to create logical worldviews that are mutually exclusive, in other words logically defined entities. It is rather a tool with which to create narratives that coincide with participants’ views and beliefs. A worldview is not a constant; it is a point of view and not a logically describable category. The worldviews used in this study therefore do overlap, although they indicate small changes in point of view that make big ontological differences.

1.5.5 Data analysis

The data analysis included a general analysis of available literature on the topic of the study, as well as the analysis done with the Q-method to obtain statistical data from the qualitative input from participants.

Analysis with the Q-method is mostly done using specific computer software, called PQMethod, that calculates the level of agreement and/or disagreement between individual Q-sorters, groups sorts together based on similarities or dissimilarities, calculates the factor scores of each Q-sort, and finally describes and interprets the factors (Van Exel and De Graaf, 2005:8-10). Simons (2013:28-29) states that “factorisation reveals patterns of viewpoints, while allowing the researcher to compare and contrast emerging themes”. Interpretations of these factors allowed for the identification of groups of participants that make sense of a “Q sort’ in a similar way” (Simons, 2013:29), from which the so-called worldviews were constructed.
1.5.6 Literature review

In addition to Q-methodology, a literature review was done to provide an overview of the existing literature on the subject and provide a theoretical background from which to work. Definitions of beliefs, fundamental beliefs (religious beliefs), climate change and climate change adaptation were obtained from various databases. The procedure, findings and conclusions of this study are presented in article format for submission to a peer reviewed journal.

1.6 Limitations and delimitations

There were various limitations to the proposed study, including those imposed by the overall project of which this study forms part of. To improve the focus of the study, specific emphasis was placed on religious beliefs as fundamental beliefs, and not beliefs or belief systems in general.

A second limitation was addressed by improving communication between participants and the researchers (interviewers). Since the communities are located in the North-West Province of South Africa, the expected languages were Tswana (Setswana), English and Afrikaans, with Tswana being the most likely first language. Researchers were included for their proficiency in at least two of these three languages, and interviews conducted in Afrikaans and Tswana were professionally translated to English after being transcribed.

Conceptual analysis of focus terminology was done from existing literature and used to form the study’s basis. It is also worth mentioning many participants expressed a need for more information on climate and climate change and requested explanation of terminology in order to formulate answers to the questions presented to them in the semi-structured interviews. This could potentially influence participants’ answers significantly and researchers attempted to give non-leading definitions by, for instance, standardising information, such as a working definition for climate, beforehand and avoiding further elaborations in order to give participants the opportunity to state their own subjective views.

This study has been approved by the research ethics committee of the North-West University as part of the SANCOOP project (application number: ES518066, project number: -1). All participants were part of the process on a voluntary basis and anonymity was ensured with no answers being linked to any particular participant’s name.

1.7 Significance of the study

Countries have different ways of viewing climate change and its incumbent issues, partly due to the varying levels of influence religious affiliation exerts on these views (Tjernström & Tietenberg, 2008:320). A definite need for context-specific understandings of the relationship between fundamental beliefs and climate change and climate change adaptation exists (Morrison et al.,
2015:2), in order to ensure the best outcomes for members of specific communities. This was clearly indicated in the study by Clarke et al. (2012:18), when the researchers found that:

results suggest farmers would be receptive to any initiatives that could build their understanding and knowledge of climate change, especially in their own context, and this may help facilitate increased adaptation effort.

Understanding fundamental beliefs can aid in understanding a vital element of social functioning and in turn facilitate adaptability to change. Mortreux and Barnett (2009:111) conclude from their study of Funafuti, Tuvalu, that religion plays a significant enough role in people’s lives that it can completely hinder adaptation to climate change – stressing the importance of this study to further substantiate their findings.

Bergmann (2009a:104) points out that “a central reason to develop religious studies with regard to climate change is to increase the manifold of voices and diverse perspectives about weather, climate, nature, and the “common future.” This study aims to highlight the culturally embedded nature of climate change adaptation within the context of rural South African communities, to finally enable further study of this important link within a greater scope of South African societies.

1.8 Provisional layout

This mini-dissertation was written in the form of four chapters, as well as one academic article, prepared and to be submitted for publication in a peer-reviewed journal. The academic article contains a summary of the study’s literature review and discusses the study’s findings in a more condensed format suitable for academic publication.

Chapter 1: Introduction

This section provides a background for the study, the problem statement, a detailed description of the chosen research methodology, as well as a profile of the participants of the study.

Chapter 2: Literature review

This section provides a theoretical background for the study based on a summary of existing literature relevant to the study topic, including key concepts and terms.

Chapter 3: Academic article

This section comprises an academic article submitted for publication in a peer-reviewed journal.

Chapter 4: Conclusions and recommendations

In this section the researcher critically analyses the collected data to finally answer the research questions indicated at the beginning of the study. Conclusions and recommendations, based on the findings of the data analysis, are also presented in this chapter.
Chapter 5: Conclusion

The final chapter serves to provide an overview of the conclusions reached in this study, and provides recommendations for future studies.
CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The purpose of this literature review is to provide a brief overview of relevant literature on beliefs, fundamental beliefs, climate change and climate change adaptation, as well literature highlighting the links between these concepts. This information was used as a foundation for this study, as it informed the interview process, aiding in the analysis of data, and provided support for the overall conclusions of the study.

2.2 Definition and Discussion of Key Concepts

The following section serves to define and discuss the key concepts related to this study based on relevant literature.

2.2.1 Beliefs

The term “belief” is one on which consensus has not yet been reached (Carlisle & Simon, 2012:221). One of the many reasons for this may be the fact that it consists of various elements. Beliefs can be divided into two main categories according to Plantinga (1981:41-42): properly basic (or fundamental) beliefs that are not believed on the basis of other propositions; and beliefs that are dependent on these basic beliefs and are therefore not basic themselves. Clouser (2005:15-16) further divides properly basic beliefs, which he calls primary beliefs, into two types: these beliefs are primary with respect to one another in either the noetic sense or the ontic sense. The noetic sense “concerns the order of our beliefs”. These beliefs are in line with the description given for properly basic beliefs above; no secondary belief can be held without holding the primary belief in the first place. Primary beliefs in the ontic sense, however, “concerns the order of reality”. Here the object of the primary belief determines the object of the secondary belief’s reality (Clouser, 2005:16).

Rokeach (1956:228) asserts that all beliefs are balanced, and often outweighed by what he refers to as disbelief – there exists a system of belief-disbelief in all thought processes, made up of “a system of beliefs which one accepts” and “a series of systems of beliefs which one rejects”. This belief-disbelief system “is conceived to include each and every belief and disbelief of whatever sort the person may have built up about the world one lives in” (Rokeach, 1956:229). The implication of such a system is that the discrimination that takes place during decision-making thought processes may be less dependent on what we believe than it is on what we do not.
When searching for a definition for the concept of a belief, Rokeach and Bonier (1960:31) cite Trueblood:

We have beliefs about history, beliefs about the structure of material aggregates, beliefs about the future, beliefs about God, beliefs about what is beautiful or what we ought to do. Most of these beliefs we state categorically. We say ‘Columbus landed in the West Indies’, ‘Water is composed of hydrogen and oxygen’, ‘Rain is falling today’, ‘There will be a snowstorm tomorrow’, God knows each individual’...We might reasonably preface each of these propositions by the words ‘I believe,’ or ‘There seems to be good evidence that’. Every proposition becomes in fact a judgment, and man is a creature greatly concerned with his own judgments. We make our judgments seriously and, foolish as we are, we are deeply interested in the correctness of our judgments.

From this explanation it becomes apparent that beliefs are inherently part of human consciousness and that many elements of daily functioning, such as decision making, are dependent on our beliefs (and disbeliefs). This also counts for our beliefs about people’s beliefs; we are able to make inferences about the beliefs that people hold – but cannot express verbally – by observing their behaviour (Rokeach & Bonier, 1960:32). In turn our inferences are beliefs that we hold; we may not have any empirical evidence of the reality of the belief we are inferring, yet we choose to accept it as a personal truth. In support of this, Carlisle and Simon (2012:222) state that beliefs are “subjective commitments to truths, by which we mean subjective commitments to those truths as being true”, and DeJoy (1999:186) defines beliefs as “convictions about phenomena or objects that are accepted as true (regardless of actual truth), and often beliefs are viewed as the building blocks of attitudes”.

Beliefs and behaviour are inextricably linked (Aguilar-Luzón et al., 2012; Ajzen, 1991; Bensadon, 2015; Chen, 2015; Driskell & Lyon, 2011; Hulme, 2009:143; Stern et al., 1999) and Bensadon (2015:45) attributes the origin of this link to the self-efficacy theory of Bandura (1997). Bandura’s theory states that a person’s “perceived competence correlates directly and uniquely with their actual behaviour” (Bensadon, 2015:45); in other words, a person’s self-belief will determine their behaviour. Various other theories linking belief and behaviour have been based on this theory, such as the value-belief-norm (VBN) theory by Stern et al. (1999).

Through their value-belief-norm (VBN) theory, Stern et al. (1999:92), along with the study by (Driskell & Lyon, 2011:400), further illustrate the vital causal relationship between beliefs and behaviour, such as adaptation to climate change in this case. According to Chen (2015:145), the VBN theory “suggests that perceiving adverse effects from global warming could promote mitigation behaviour” and their study predicting pro-environmental behaviour in Taiwan confirms this theory. However, the study by Aguilar-Luzón et al. (2012:2797), suggests that the theory of
planned behaviour (TPB) (Ajzen, 1991) is better at explaining ecological behaviour than the VBN theory. The TPB explicitly links beliefs and behaviours, although it is orientated towards attitudinal aspects, rather than moral aspects, as is the case with VBN theory.

It is important to not only take care when relaying the beliefs of the research participants, but also to place the nature of those beliefs within the context they are living in (Carlisle & Simon, 2012: 228). According to Toulmin (2009:7), “... the diversity to be found within Africa's landmass and its enormous size make generalizations impossible...But despite this evident diversity in people and place, there are some important common features.” It is for this very reason that the importance of looking at beliefs from within specific communities within the African context needs to be highlighted for the purposes of this study. Although the three communities that were studied are representative of their own specific context, they could provide potential insight to the necessity of taking belief systems into account when addressing climate change adaptation in the rural African setting. This study contends that one such pathway lies with the study of specific individual and communal religious beliefs, and determining their link to climate change perceptions and adaptation.

2.2.2 Fundamental (Religious) Beliefs

Religion in small societies, such as those that are studied here, is viewed by Bourdillon (1991:3) as being a part of people’s everyday lives, and it is common for people to flow effortlessly between religious and non-religious activities. This holds true for communities within the African context, according to Mbiti (1977:2), especially in those communities where traditional African religions are practiced. According to Mbiti (1977:1) religion consists of religious “beliefs, ceremonies, rituals and religious officiants”, although specific focus in this study is given to religious beliefs. For the purposes of this study fundamental beliefs are equated to religious beliefs, and this is supported by Clouser’s (2005:41) assertion that all “beliefs in something as unconditionally real” are for that reason characteristically religious. In other words, fundamental beliefs within the African context will be looked at from a religious point of view in this study, based on the assumption that religious beliefs include subjective commitments to truth within the specific context (Carlisle & Simon, 2012:222). Runciman (1970:61), as cited by Eickelman (1976:155), states: “Whatever else religion might entail, it is a set of beliefs, more often implicit than explicit, that are understood by members of a society against the background of tacit, shared assumptions about the nature and conduct of everyday life”. The use of the word society here points to not only individuals, but individuals as part of a collective whole – this is important, as the religious beliefs and individual views researched in this study were purposely seen as interlocking parts of a greater communal whole within the rural African context. Barbour (1990:xiii), in concurrence, states that a religious tradition is more than a mere set of beliefs, but rather a “way of life for its members”. Based on
the definition of tradition, as set forth by Dooyeweerd (1979:70), a religious tradition can be equated to the collective religious beliefs of a community, as passed on through generations, and its resulting practices.

The concept of religion, and by proxy religious beliefs, is notoriously difficult to define, although attempts at such definitions are manifold (Clouser, 2005:69). Only a select few of these definitions are considered here for the sake of clarity, as it can be argued that the definition of religious beliefs as a holistic concept is unimportant; rather, emphasis should be placed on determining specific religious beliefs in order to understand them and work with them.

Clouser (2005:23) puts forth the following definition: “A religious belief is a belief in something as divine per se no matter how that is further described, where ‘divine per se’ means having unconditionally non-dependant reality”. Strandberg (2006:27-29) puts forth the following characteristics of a religious belief, in order to distinguish them from other belief types: commitment and devotion, the conviction that God cannot be completely understood, and response to particular human experiences without trying to explain them in a scientific manner. Citing King, Mmassi (2013:229-230) corroborates these characteristics by defining religion as “a set of beliefs and practices that are different from surrounding beliefs and practices that embody special relation to deity, that transcend other”. Religious beliefs in conclusion are defined here as beliefs involving a higher power, that are inherently different from other belief types in their independence from any presuppositions, and form part of religious tradition as a whole.

2.2.3 Climate Change and Climate Change Adaptation

Echoing many other authors (Dryzek et al., 2011:3), O’Brien et al. (2010b:3) write that “climate change is now considered by many to be the most complex and serious environmental issue that human societies have ever faced”. Climate change is “a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer” (IPCC, 2014:1760). Citing the UNFCCC, the IPCC (2014:1760) further defines climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.” According to the UNFCCC (2007:8) climate change can be characterised by four major aspects: global warming, precipitation and cloud cover changes, melting of polar ice caps and glaciers, and higher ocean temperatures. Hulme (2009:42) states that it was the greater understanding of the effects of natural climate change, or rather the shift in awareness of the less than stable nature of the climate in the nineteenth century, that led to the scientific foundations for anthropogenic or “human-made” climate change as we understand it today.
Responses to the growing awareness of the phenomenon of climate change have been varied, although focus was initially and predominantly on mitigation strategies; these strategies have been crucial in addressing the driving forces behind climate change (Richards et al., 2013:113). But the need for adapting to these changing circumstances has been realised (Adger et al., 2009:2). Humphreys (2010:16-17) distinguishes between three different uses for the term “climate change adaptation”: firstly, it implies “actions that individuals take of their own initiative”, secondly, it points to governmental actions, and lastly the more technical meaning derived from the UNFCCC and subsequent negotiations”. The IPCC (2014:1758) defines climate change adaptation as: “the process of adjustment to actual or expected climate and its effects”. When succinctly defining climate change adaptation, Humphreys (2010:16) states that it involves “actions taken to adjust lives and livelihoods to the new conditions brought about by warming temperatures and other physical and weather-related events associated with climate change”. Adaptation in human systems therefore focusses on the avoidance of harm and seeks to elicit advantageous opportunities (IPCC, 2014:1758). In terms of temporal aspects, adaptation can take place either proactively or reactively (Dang et al., 2011:255).

As climate change is primarily caused by social input, the solutions to the issue have to be devised from a social perspective as well (O’Brien et al., 2010a:xi). According to Price et al. (2014:8), cultural perspectives shape peoples’ responses to climate change, along with its unavoidable social context (Lorenzoni et al., 2000; O’Brien et al., 2010b); therefore climate change adaptation requires an even stronger focus on the human dimension of climate change than on mitigation strategies. This allows for context-specific strategies to be developed and implemented as a community’s individual climate change issues and needs can be addressed (Richards et al., 2013:113), citing Preston and Stafford-Smith).

Ultimately, knowledge regarding climate change and its incumbent solutions needs to be broadened (O’Brien et al., 2010b:19), and delving into local, indigenous knowledge may serve as a key way of doing so (Toulmin, 2009:30). Maddison (2007:2) notes that “adaptation to climate change actually involves a two-stage process: first perceiving that climate change has occurred and then deciding whether or not to adopt a particular measure. Therefore to determine whether or not a community adapts to climate change and what influences that adaptation, their understanding and experience of the actual changes in climate first have to be determined.” This serves as motivation for the first part of this study, an investigation of people and their experiences and understanding of climate change and climate change adaptation within rural African contexts.

Academics and scientists alike seem to agree that the greatest effects of climate change will be experienced by developing countries, with African most affected (Mendelsohn, 2007; Toulmin, 2009; UNFCCC, 2007). Because most African countries have very low carbon emission levels
per capita, the key approach to addressing the inevitable impacts by climate change needs to be adaptation, which in turn needs to be addressed on multiple levels (Toulmin, 2009:15). As an example, three separate studies of farming communities in South Africa (Benhin, 2006; Clarke et al., 2012; Gandure et al., 2013) indicated that participants (farmers) are able to perceive changes in the climate; this awareness of climatic changes does not, however, pre-suppose knowledge of the actual phenomenon of climate change. Adaptive measures were undertaken by these individuals not because they had a working knowledge of climate change as a scientific concept, but rather because of their awareness of the changing climate within their farming context (Benhin, 2006:10). These adaptive measures are vital to the survival of these farmers and their livelihoods, and this importance is underscored by O'Brien and Vogel (2003:3): “Climate variability and long-term climate change pose serious challenges for southern Africa, requiring concerted efforts in mitigation and adaptation, as well as improved ability to live with change”. Dang et al. (2011:256) contend that climate change adaptation, for farmers especially, is a “human decision-making process under uncertainty”, and is influenced by various psychological factors. With belief being what it is, it is necessary to determine the link between beliefs (especially religious beliefs) and climate change as evidenced in literature.

2.3 Linking of Key Concepts

This section discusses the various links that can be made between the key concepts as defined and discussed in the previous section.

2.3.1 Humankind and Nature – Religious Perspectives

In view of this study’s focus on the link between religious beliefs and climate change adaptation, it is considered prudent to first determine the role of humankind with regards to nature as represented in established religions. McNeeley and Lazrus (2014:506) state that “the way in which people perceive climate change risk is informed by their social interactions and cultural worldviews comprising fundamental beliefs about society and nature.” Therefore, perceptions of climate change risk and vulnerability, along with people's conceptualisation of “nature” and the humankind-nature relationship, influence the feasibility and acceptability of pro-active climate adaptation planning, policy making, and implementation (Wolf et al., 2011:193). Although by far not the only ones, the three religious systems of Christianity, Islam and traditional African religions alone were considered for further investigation on this point. The reason for this being that these three religions are most prominently represented in Africa when compared with other religions (Turner, 2010).
2.3.1.1 Christianity

There exist many denominations within the religion of Christianity, each with its own specific variation on the Christian view of humanity’s place in nature. For the purposes of this section Christianity will be referred to on a holistic scale, with limited reference to specific denominations, in order to better facilitate comparison with other religions rather than comparisons within the religion itself.

When considering Christian theology, “it is practically impossible not to see humanity as central to the world of nature” (Davies, 1994:47). Christian theology holds that humanity is granted power over nature by God; this is not disputed, although the emphasis is and should be placed on what should be done with that power (Bartolomeus et al., 1998:37). Christianity responds to this in various ways: it retains the tension model of Judaism, which attempts to balance the scale of human power with the limitations of their moral codes and conscience (Bartolomeus et al., 1998:37), the stewardship approach of Islam (Bartolomeus et al. (1998:38), and others still.

Christian doctrine, according to Davies (1994:31), relies on two key terms when describing humankind and nature: relationship and responsibility. To Christians, the term relationship entails a direct connection with nature, where “distinctions between nature and culture are inappropriate” (Davies, 1994:31). The second word, responsibility, “involves moral issues” (Davies, 1994:31), and includes the power over nature which God gives humankind. Along with the Islamic and Judaist influences on Christianity’s responses to humankind’s power over nature, two distinct views can be illustrated from the concept of “responsibility”: on one hand it implies humankind’s dominion over nature, using it for their own gain without giving much thought to the consequences (Edwards, 2007; Hulme, 2009). The other interpretation is that of caretaker or steward, similar to Islamic stewardship, where humans are appointed as nature’s guardians and are charged with the care of the earth’s resources (Russell, 1994; Tiwary, 2009). Orthodox Christian tradition moves away from such interpretations, and rather aims to live like Jesus Christ: by turning this power “away from mastership, dominion and destruction towards servanthood” (Bartolomeus et al., 1998:38). The distinction between these two interpretations underpins the link between religious beliefs and climate change adaptation – strongly diverging views on adaptation may arise from these Christian interpretations of authority over nature.

2.3.1.2 Islam

Although it shares many similarities with Christianity, Islam takes a slightly different view to nature. The main concern in Islam is obedience to God and the penalties for disobedience (Forward & Alam, 1994:79), and the misuse of the earth’s natural resources “is repugnant to God and thus to Islam” (Bartolomeus et al., 1998:38). This stretches to the relationship between humans and...
nature, as the religion “warns of the consequences of disobedience in human plunder and exploitation of the planet earth” (Forward & Alam, 1994:79). Islam’s response to the power over nature that is bestowed upon humanity is “to place such power within the confines and ethics of a greater power – that of God” (Bartolomeus et al., 1998:37). According to Islam, humans have been given this power only to be used on God’s behalf, as khalifas (vice-regents), and not for our own gain (Bartolomeus et al., 1998; Dien, 2003). An important distinguishing aspect, however, is the view that creation will be destroyed once God takes his faithful servants to Paradise; the function of our world is merely to provide an arena for God’s interaction with humans (Forward & Alam, 1994:79). This important aspect of Islamic theology may easily be interpreted in a deterministic or even fatalistic manner, where humanity’s role as steward is rendered ultimately futile. The world that we inhabit is perishable, a kind of “preview of conditions that can be found in an even purer form in the next life” (Matthews, 2007:347), and according to this view there is subsequently no reason to safeguard or protect it (Forward & Alam, 1994:98). This view in itself, although possibly tainted by subjective interpretation of scripture, does not bode well for the possibility of adapting to climate change.

2.3.1.3 African Traditional religions

Cultural groups and subsequent religions in Africa are manifold; similarities with regards to their underlying religious assumptions, however, are almost just as prevalent (Thorpe, 1991:106). It is for this reason that Thorpe (1991:106) believes it is appropriate to refer to these religions as African traditional religions in a general context rather than referring to the differences between the specific traditions. According to African Traditional religions, humanity is part of a religious universe (Mbiti, 1977:1); religion in fact permeates all aspects of human life, including nature and natural objects (Mbiti, 1977; Thorpe, 1991).

African traditional religions are based on the philosophical foundation of what Turaki (1999:97-98) refers to as the “Law of Harmony” – within this foundation, “man stands face to face with the ‘physical’, the ‘material’ and the ‘spiritual’ dimensions of his world” (Mbiti, 1977; Turaki, 1999). Thorpe (1991:107) explains that this harmony stems from humans’ close relationship with nature. This illustrates the anthropocentric nature of African ontology, pointing to the view that humankind is placed at the centre of the created universe (Mbiti, 1977:48). Here nature is placed within the realm of the spirit beings and the impersonal powers that govern the world, although it is seen as a holistic part of creation, created by the Supreme Being (God) (Turaki, 1999:98). This interplay between the spiritual and physical worlds is described by Mbiti (1977:57) as follows: “The invisible world is symbolised or manifested by these visible and concrete phenomena and objects of nature”. Mbiti (1977:16) divides the ontology of African traditional religions into 5 categories, expressed in a highly anthropocentric manner:
1. God as the ultimate explanation of the genesis and sustenance of both man and all things

2. Spirits being made up of superhuman beings and the spirits of men who died a long time ago

3. Man including human beings who are alive and those about to be born

4. Animals and plants, or the remainder of biological life

5. Phenomena and objects without biological life.

Finally, the relationship with nature is defined in terms of communality; community represents an important part of the African traditional religious philosophy (Thorpe, 1991:107), and entails humankind's relationship with nature, as well as humanity. In fact, “man is not independent, but dependant” (Turaki, 1999:101).

2.3.1.4 Christianity, Islam, and African Traditional religion interaction

Across all three Abrahamic religions, and indeed African traditional religions as well (Mbiti, 1977:45), the main view regarding nature is that it is created by God (regardless of the title ascribed to this higher power) (Bartolomeus et al., 1998:31). The differences lie in the relationship between humans and nature, regardless of its origin, and the responsibilities that are placed on humans towards it. Bartolomeus et al. (1998:31) state the following with regards to Islam and Christianity: “The use of the world by humans constitutes a pragmatic relationship between humanity and God, because God gives and humanity receives the riches of nature as an offering of God’s divine love for the sake of the whole world”. A world of possibilities lies in these three religions with which to ultimately promote pro-environmental behaviour and willing adaptation to climate change; the difference merely lies in the subjective truths linked to scripture and religious tradition, and indeed the way these elements are interpreted.

2.3.2 Climate Change Adaptation and Religious Beliefs

The link between religion and climate may be more pronounced than we are generally aware of (McCown, 1927:521). Bergmann (2009a:98) states that “climate change challenges and changes images of God and the sacred and their corresponding sociocultural practices”, and this sentiment is echoed in terms of cultural impacts by O’Brien et al. (2010c:221) and Jenkins (2013:17). Bergmann goes on to speak of climate change as a sociocultural process itself (Bergmann, 2009b:1), in the sense that it cannot exclude the social and cultural aspects pertaining to it when being discussed or assessed. Ensor and Berger (2009:228) further emphasise the role that culture plays in humans’ reactions to climate change, specifically citing climate change
adaptation, and Pelling (2011:3) warns of the dangers of ignoring this cultural dimension in adaptive policy. Ideas on human influence on the climate and adaptation to climate change are equally based in beliefs as they are on global change science (O'Brien et al., 2010c:221).

Brownlee et al. (2013:9) indicate that religious beliefs may be influential in the forming of interpretations regarding climate change. There is also no way around the fact that religious beliefs and human behaviour are closely linked (Hulme, 2009; Slimak & Dietz, 2006:1700). Barbour (c1990:xiii) takes an ideological stance on religion when he states that “above all, religion aims at the transformation of personal life, particularly by liberation from self-centredness through commitment to a more inclusive centre of devotion”. From this one can suppose that religious beliefs that are positive towards nature and its preservation will exhibit higher likelihoods of adapting to the effects of climate change. In a study done on Pacific Island countries, Nunn et al. (2016:14-15) found that the high degree of spiritual engagement with nature (based on religious beliefs) opens up opportunity for the communication of adaptive measures to these communities.

Nunn et al. (2016:477) assert that if these communications are made through religious channels, rather than secular ones, the reception will be more positive. However, negative correlations between religious beliefs and pro-environmental beliefs and behaviours, especially among certain Christian denominations expressing higher levels of religiosity, seem to be prevalent in literature (Gardner & Stern, 1996; Schultz et al., 2000).

In keeping with this, religious beliefs are often cited as possible barriers to successful climate change adaptation. Taoism can be used as an example to illustrate how religion can hamper adaptation to climate change if it is taught and not naturally implemented. Within the Taoist belief, “to contend with other people, to try to push them about, to try to mold, educate, and refine them” will lead to some problems (Kinsley, 1995:79). Based on this thinking, attempting to implement climate change adaptation, or even attempting education on the value thereof, may be met with some resistance within the Taoist community, simply because of their religious beliefs. Gifford (2011:293) states that many people will show little or no reaction to climate change due to their belief in a higher power, or “suprahuman” power. This belief holds that such a deity “will not forsake them or will do what it wishes anyway” (Gifford, 2011:293). Climate change adaptation also seems out of the question in such cases.

In their study on climate change perceptions among rural farmers, Cullen and Anderson (2016:11) found that the self-proclaimed religiosity (Catholicism) of a quarter of their participants had a significant influence on their environmental concern: participants who identified themselves as Catholics were found to have lower concern for the effects of climate change on food production.

Another practical example of the impact that religious beliefs have on climate change adaptation is that of American Evangelicals, as highlighted by Nagle (2008:69). He explains that although
Evangelicals agree on the theological concept of a “good” earth created by God, they are divided on what should be done to adapt to climate change in this regard; those in support of climate change adaptation reason that adaptation needs to take place to preserve this “good” earth, whereas the opposing group sees this “goodness” as a confirmation that the earth will be able to restore itself. Essentially both groups are being influenced by their religious beliefs to have a certain perception of climate change adaptation, be it positive or negative.

Adger et al. (2009:2) are of the opinion that adaptation involves big transitions, rather than incremental changes, which may inevitably be painful for anyone unwilling or incapable of embracing change. As Hulme (2009:161-162) puts it:

Given that our foundational beliefs do not always converge, it is not surprising to find that neither do the ways in which we approach climate change nor our responses to it. The categories of interventions, adjustments and solutions that are advocated for managing climate change are often rooted in beliefs which the claims of science, the calculus of economics and the rhetoric of politicians frequently find hard to shift.

Therein lies the importance of studies such as this; ultimately finding ways of integrating religious beliefs in climate change adaptation endeavours should be considered a priority (O’Brien et al., 2010c:221), and persuading people of faith to react appropriately to climate change is critical (Kearns, 2011:425).

2.3.3 Conclusion

Religious beliefs seem to influence all aspects of human life, and humanity’s response to the changing climate seems to be in part directed by such beliefs. It therefore calls for the respectful integration of culture and context specific religious beliefs in all endeavours aimed at achieving successful adaptation. This is no less relevant in the African context, and Mbiti, (1977:1) emphasises this by maintaining that “[ignoring] these traditional beliefs, attitudes and practices can only lead to a lack of understanding African behaviour and problems”. Taking a more holistic view of the human dimension of climate change adaptation may be the way to go:

…the more completely people adapt to climate change, the more easily humans can continue to change the climate. If people do not identify what climate change means for the things that they value, reflect on how it influences or interacts with their beliefs and world views, and critically question and contest the drivers of climate change itself, then dangerous climate change is likely to be accepted as a given (O’Brien et al., 2010b:11).

The following chapter consists of an academic article to be submitted to a peer-reviewed journal for publication.
CHAPTER 3: ACADEMIC ARTICLE

Title

Religious beliefs and climate change adaptation: A study of three rural South African communities

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Abstract

This paper argues that religious beliefs significantly influence a community’s understanding and experience of climate change adaptation, indicating the need for an inclusion of such information in climate change adaptation education. Data was collected using the Q-method, whereby recurring statements were identified from semi-structured interviews with participants from three rural communities in the North West Province of South Africa: Ikageng, Ventersdorp, and Jouberton. The research found that community members who regard themselves as religious (overall of the Christian faith) fall under two groups: the religious determinists or fatalists, who see climate as a natural process that is governed by God, and religious participants who deny this “naturalness” and acknowledge human impacts on the climate.
Keywords

Adaptation, beliefs, climate change, religious beliefs, South Africa

1. Introduction

Human behaviour is indisputably influenced by religious beliefs and religion (Hulme 2009; Slimak & Dietz 2006); “what people do is motivated by what they believe, and what they believe springs from what they do and experience” (Mbiti 1977, 4). Such behavioural influences include the way in which people perceive and interact with the physical environment. Climate change is widely considered as being “the most complex and serious environmental issue that human societies have ever faced” (O’Brien et al. 2010b, 3). Consensus between scientists and researchers alike is that Africa, with its many developing countries, will be most impacted by this global crisis (Mendelsohn 2007; Toulmin 2009; UNFCCC 2007). Adaptation and mitigation are crucial when it comes to managing the impacts of climate change. However, when it comes to climate change adaptation, a greater focus on the human dimension of climate change than on mitigation strategies is required. As Jenkins (2013, 17) puts it, climate change threatens to “disinherit cultures of the concepts and practices that sustain a way of being human”, and therefore changes in climate are inextricably linked to the social context within which they take place (Lorenzoni et al. 2000; O’Brien et al. 2010b). This allows for the development and implementation of context-specific strategies where a community’s individual climate change issues and needs can be addressed (Richards et al. 2013, 113), since part of the social context referred to by Lorenzoni et al. (2000) and O’Brien et al. (2010b) concerns peoples’ beliefs.

Whether it is about humankind’s place in the universe or about which sports team is the best, beliefs span every aspect of people’s lives. However, Mbiti (1977, 1) contends that it is religious beliefs in particular that permeate “into all the departments of life so fully that it is not easy or possible always to isolate”. Therein lies the issue of defining religious beliefs; hence for the
purposes of this article, religious beliefs will be defined as being “composed of those social practices authorised by reference to a superempirical reality, that is, a reference to the character of the Gods, the will of the Supreme Being, the metaphysical nature of things, or the like” (Schilbrack 2013, 313).

The words “social practices” in the definition above point to a vital component of what can be considered African traditional religions: the inextricable nature of African communities and their religion (Mbiti 1977, 2). According to Mbiti (1977, 15), for African people religion is “an ontological phenomenon” that “pertains to the question of existence and being”. Traditional African religions view nature not as a separate, impersonal object or phenomenon, but rather as being “filled with religious significance” (Mbiti 1977, 56). Many of the rituals, rites, ancestral beliefs, and more in traditional African religions relate directly to nature (Olupona 2006, 264). Consequently, it is not much of a leap to expect that these religious beliefs will influence a person’s adaptation to climate change. It is important to note that other religions, such as Christianity and Islam in particular, have pervaded many traditional African religions, especially through missionary work in the nineteenth century (McVeigh 1974, 5). These influences are to be considered in an attempt to understand the religious views of people in an African context. Although said influences may seem dominant at times, Olupona (2006, 266) maintains that “aspects of traditional religions are still manifest”.

Against this backdrop, this article focusses on the influence that religious beliefs have on people’s willingness and capacity to adapt to climate change. After a brief literature review on the link between religious beliefs and climate change adaptation, follows a discussion of the study’s context, methodology, and results. Based on these findings, this article concludes to show that the fundamental beliefs of community members, more specifically their religious beliefs, greatly influence both their perceptions of and adaptation to climate change. Finally,
recommendations are made on the incorporation of community and individual religious beliefs when promoting or implementing adaptive strategies to alleviate the effects of climate change.

2. **Theory of religious beliefs and climate change adaptation**

Determining what the stance is of the religions involved on the place of humankind in nature and what their views on ecology are is prudent when investigating the influence that religious beliefs have on climate change adaptation. In support of this, although referring specifically to climate change risk, McNeely and Lazrus (2014, 506) state that “the way in which people perceive climate change risk is informed by their social interactions and cultural worldviews comprising fundamental beliefs about society and nature”. Hulme (2009, 161) concurs that “our beliefs about the divine, about the spiritual and the transcendent, and about our role in the world as moral agents, shape our sense of duty and responsibility to care for others and for Nature”. Therefore, perceptions of climate change risk and vulnerability, along with religious conceptualisations of nature and the human-nature relationship, influence the feasibility and acceptability of adaptation planning, policy making and implementation. For the purposes of this study, only Christianity and Islam, along with a broad overview of traditional African religions are briefly considered. This is owing to the fact that both Christianity and Islam are identified as being prevalent, aside from any traditional African religions, within the African continent (Mbiti 1977; Turner 2010). The link between religion and climate change, and climate change adaptation, are discussed in addition although within a broader context of different religions.

3. **Humankind and Nature: Views from Christianity, Islam, and Traditional African Religions**

Christianity and Islam are both what is referred to as Abrahamic religions, alongside Judaism. Within these religions, the significance of nature is not merely instrumental; nature forms part of God’s creation, and humankind’s relationship with it is a pragmatic one (Cooper & Palmer 1998,
Christian doctrine, when describing humankind and nature, relies on two key concepts according to Davies (1994, 31): relationship and responsibility. To Christians, the term *relationship* entails a direct connection with nature, where “distinctions between nature and culture are inappropriate” (Davies 1994, 31). The second, *responsibility*, “involves moral issues” (Davies 1994, 31), and includes the stewardship over nature that God gives humankind. This stewardship, however, can be interpreted in two very different ways. On the one hand it implies humankind’s dominion over nature, using it for their own gain without giving much thought to the consequences (Edwards 2007; Hulme 2009). On the other hand is the interpretation of caretaker, where humans are appointed as nature’s guardians and are appointed to take care of Earth’s resources (Russell 1994, 147). The distinction between these two interpretations underpins the link between religious beliefs and climate. Hence, two diverging views on adaptation may arise from these two interpretations of the Christian stewardship of nature.

Although it shares many similarities with Christianity, Islam has a slightly different view on nature. Islam’s main concern is obedience to God, and the penalties for disobedience (Forward & Alam 1994, 79). This extends to the relationship between humans and nature, as the religion “warns of the consequences of disobedience in human plunder and exploitation of the planet earth” (Forward & Alam 1994, 79). An important distinguishing aspect, however, is the view that creation will be destroyed once God takes his faithful servants to Paradise; the function of our world is merely to provide an arena for God’s interaction with humans (Forward & Alam 1994, 79). To them the world that they inhabit is perishable, and there is no reason to safeguard or protect it (Forward & Alam 1994, 98). This particular view does not bode well for the possibility of adapting to climate change.

As emphasised, humanity and religion are interwoven, implying that natural phenomena, and indeed nature in itself, inextricably form part of traditional African religious beliefs (Mbiti 1977, 48). Traditional African religions are based on the philosophical foundation of what Turaki
(1999, 97-98) refers to as the “Law of Harmony” – within this foundation, “man stands face to face with the ‘physical’, the ‘material’ and the ‘spiritual’ dimensions of his world” (Mbiti 1977; Turaki 1999). This illustrates the anthropocentric nature of African ontology, where the dictating view is that humankind is placed at the centre of the created universe (Mbiti 1977, 48). Here nature is placed within the realm of the spirit beings and the impersonal powers that govern the world which, although seen as a holistic part of creation, is created by the Supreme Being (God) (Turaki 1999, 98). This interplay between the spirit and the physical worlds is described by Mbiti (1977, 57): “The invisible world is symbolised or manifested by these visible and concrete phenomena and objects of nature”. Furthermore, the relationship with nature is defined in terms of communality – community represents an important part of the traditional African religious philosophy, and entails humankind’s relationship with nature as well as humanity. In fact, “man (sic) is not independent, but dependant” (Turaki 1999, 101).

Throughout three religious frameworks discussed above, one main aspect becomes apparent: nature was created by God, or a higher power, and humankind stands at the centre. The potential implication of this shared belief is that willingness to adapt can go either way – whether a person adapts to climate change or not can be influenced by the meaning they associate with humankind’s relationship to God’s creation. In fact, Hulme (2009, 144) states that one of the reasons people disagree about climate change is that “[they] believe in different things about [their] duty to others, to Nature and to [their] deities”.

4. Religion, Climate Change, and Climate Change Adaptation

According to McCown (1927, 521), the link between religion and climate may be more pronounced than generally realised. Decades after him, Veldman et al. (2013, 3) echo other authors in asserting that religions may become critical agents in the fight against climate change. Although multitudinous in nature and in their way of exerting influence, world religions have the ability to “decisively impact how societies all over the world respond” to climate change
(Veldman et al. 2013, 3). In recent years various studies have specifically highlighted the link between religion (and with it religious beliefs), and climate change (and with it climate change adaptation) (e.g. Bergmann 2009a; Bergmann 2009b; Brownlee et al. 2013; Gifford 2011; Hulme 2009; McCown 1927; McNeeley & Lazrus 2014; Nagle 2008; Richards et al. 2013; Stern et al. 1999). This section briefly summarises relevant extant literature on the subject.

Along with the cultural implications posed by climate change as put forth by Jenkins (2013, 17), Bergmann (2009a, 98) maintains that “climate change challenges and changes images of God and the sacred and their corresponding sociocultural practices”. These challenges include the possible necessary adaptation of religious practices, and indeed beliefs, to face the growing global climate crisis. Some of these practices are for instance related to myths, based in traditional African religions, which have been and continue to be contributing factors to climate change (Waapela 2016, 8). Still there are positive influences to be got from religion’s influence on climate change adaptation.

Pro-environmental religious beliefs have been shown to associate directly to willingness and capacity to adapt to climate change; in a study done on Pacific Island countries, Nunn et al. (2016, 14-15) found that the high degree of spiritual engagement with nature (based on religious beliefs) creates possibilities for the communication of adaptive measures to these communities. Furthermore, Nunn et al. (2016, 477) assert that if these communications are made through religious channels, rather than secular ones, the reception will be more positive.

Nagle (2008, 69) identified two distinctly opposing views within the group of American Evangelicals regarding what should be done about the climate crisis: firstly, there is the belief that adaptation needs to take place to preserve the earth, and secondly, the belief that the earth is able to restore itself. Both these beliefs, however, are constituents of the overarching belief that God created a “good” earth (Nagle 2008, 69); humankind’s intervention in its survival is the only point that is disputed. Even so, scepticism toward climate change remains a reality within this
religious group. Research done by Veldman (2016, 212) clearly points to Evangelicals’ “unique religious outlook” (regardless of what that may entail) as being a possible determinant of the climate change scepticism prevalent within this religious group. This brings us to the other side of the religion-climate change coin: the negative influences of religious beliefs.

Although seemingly a likely tool for achieving adaptation goals, religion is also often cited as one of the many limitations to climate change adaptation. Taoism can be used as an illustration of how religion can hamper adaptation to climate change if it is taught and not already implemented through individual decision. Within the Taoist belief, “to contend with other people, to try to push them about, to try to mould, educate, and refine them” will lead to some problems (Kinsley 1995, 79). Based on this thinking, attempting to implement climate change adaptation, or even attempting education on the value thereof, may be met with some resistance within the Taoist community, simply because of their religious beliefs.

In their study on climate change perceptions among rural farmers, Cullen and Anderson (2016, 11) found that the self-proclaimed religiosity (Catholicism) of a quarter of their participants had a significant influence on their environmental concern: participants who identified themselves as Catholics were found to have lower levels of concern for the effects of climate change on food production.

Yet this dichotomous nature of the link between religion and climate change adaptation, is not the point to be taken from literature on the subject; what lead to the undertaking of this study is in fact the evident influence that religion appears to have on adaptation, whether positive or negative. Hence the initial aim was to establish the presence of this link within the specific context of the study area. Veldman et al. (2013, 4) as well as Hulme (2009, 144) stress the importance of remembering that the way in which religion engages with climate change in one locale can differ significantly to the way it does in another. In fact, it is for this very reason that this study is important: research on religion and climate change needs to be context specific if
the overall aim is to improve the adoption of adaptation measures. This study’s secondary aim is to provide conclusions pertaining to the positive or negative nature of the link between climate change adaptation and religious beliefs.

The next section discusses the specific context within which this study was undertaken.

5. **Study area: three rural communities in North West, South Africa**

The three North West Province communities of Jouberton, Ikageng and Ventersdorp are predominantly of the Setswana culture and language. All participants who identified themselves as being affiliated with a specific religion indicated that they were Christians, with elements of traditional African religions present. This affirmed the researchers’ expectations regarding the religious affiliations namely that these communities’ rural statuses and possible subsequent traditional worldviews. This was the rationale behind selecting these communities.

These communities were further chosen because of the fact that this study forms part of a larger project, and therefore the researcher was confident that the communities met the necessary requirements. This overarching project was undertaken in conjunction with the South Africa-Norway Research Co-operation (SANCOOP) and centres on belief systems and climate change adaptation. Three separate studies, this study included, were conducted under this project and covered different aspects relating to the link between overall belief systems and climate change adaptation.

6. **Methods**

The following section discusses the methods of this study in terms of the research design, sampling, instrumentation, data collection, and data analysis.
6.1. Research Design

Since this study involved people’s personal experiences regarding climate change adaptation and religious beliefs, as well as determining specific worldviews, the qualiquantological approach of Q-methodology (Stenner & Rogers 2004) was deemed the most appropriate research design. This remarkable methodology was used to determine the communities’ experiences and understandings of climate change adaptation while producing statistical data to confirm, as based on literature (e.g. Bergmann 2009a; Bergmann 2009b; Brownlee et al. 2013; Gifford 2011; Hulme 2009; McCown 1927; McNeeley & Lazrus 2014; Nagle 2008; Richards et al. 2013; Stern et al. 1999), that there is a link between climate change adaptation and people’s religious beliefs, and to create a series of worldviews regarding climate and beliefs with which participants could identify.

The research comprised four phases. Phase One consisted of semi-structured interviews, from which 40 significant statements (Qsorts) were identified for use in further phases. During Phases Two and Three, participants were asked to rate these statements on a Likert-type scale in order to determine level of agreement and disagreement. Phase Four involved participants identifying one of the five worldviews (compiled from Phase Two and Phase Three data) that they identified with most.

6.2. Sampling

Three rural communities in the North West Province of South Africa were chosen for the collection of data: Ikageng, Jouberton, and Ventersdorp. Respondents were chosen using purposive sampling, based on their willingness to participate. Further, snowball sampling was used to find additional participants when initial sampling attempts were unsuccessful.

A total of 103 participants were involved in Phase One of the research; 51 of these participants were invited to take part in Phase Two based on a random selection and participant availability,
and 25 were in Phase Three. Phase Four had a total of eight participants, chosen based on their significant loading for each of the factor narratives (worldviews).

The study’s overall sample was kept relatively small in order to keep with Q-methodology requirements: Q-methodology is used to obtain and analyse individual views and is not suited to generalisation. This method was ideal for this study, with which the researchers wanted to motivate the importance of the unique, individual voice within the community, while keeping in mind the larger community context.

6.3. Instrumentation

This study utilised the Q-method for data collection. It was chosen specifically for its capacity to produce statistical data derived from qualitative input. The Q-methodology’s combination of qualitative and quantitative processes enabled the systematic identification of participants’ subjective experiences regarding religious beliefs and climate change adaptation, ultimately leading to the creation of specific narratives on the topic.

6.4. Data Collection

Data collection during Phase One consisted of semi-structured individual interviews. Two question were asked: 1) “what do you think about the climate?”, and 2) do you think it would be possible to change your beliefs about the climate?”. Probing questions were asked throughout to ensure that detailed answers were provided for the collection of rich data. Interview transcripts (translated from Tswana and Afrikaans to English where applicable by mother tongue speakers) were analysed and 40 significant statements (referred to as Q sorts) regarding the climate and beliefs were identified.

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3 For a complete list of Q-statements (Phase Three), see Appendix A.
During Phase Two, participants were instructed to rank all 40 statements on a Likert-type scale based on the extent to which they agreed or disagreed. This was done using specially prepared whiteboards and magnetic statement cards. The Likert scale ranges are: strongly agree (+3), agree (+2), slightly agree (+1), neutral (0), slightly disagree (-1), disagree (-2), and strongly disagree (-3). Instructions were limited and participants were free to rank statements at their own discretion, creating a free distribution of data along seven different rankings.

In Phase Three participants were given the same board and statements, but they were instructed to rank select statements per category or rank, thereby ensuring a forced distribution of data.

Finally, in Phase Four, statistically correlating statements were grouped to create five different narratives (factors). Eight participants from Phase Three were identified as loading significantly for the various narratives, and were asked to return for the final research phase. The eight participants were presented with the five narratives (worldviews) and were requested to choose the one they each felt they related to the most. Audio recordings were made for all of the interviews conducted, throughout each of the four phases, to allow for qualitative analysis of participants’ statements.

6.5. Data Analysis

A literature review of the relevant concepts provided a sound theoretical foundation upon which the study could be based. Thereafter a qualitative analysis of the participant interviews was undertaken in addition to the analysis done with the Q-method, to obtain statistical data out of the Q-sort and to factor narrative feedback from participants. Computer software used in the analysis for Phases Two to Four calculate the level of agreement and/or disagreement between individual Q sorts, grouped sorts together based on similarities or dissimilarities, calculated the factor scores of each Q-sort, and finally provided a description and interpretation of said factors (Van Exel & de Graaf 2005, 8-10).
7. Results and Discussion

This section outlines and discusses the overall results obtained from the study. Coding for Phase One to Three participants is based on the audio files of the interviews (e.g. 01-GP-Ikageng-14.13\textsuperscript{4}), whereas Phase Four participant coding is based on the order in which interviews were conducted in that phase (e.g. Participant #1).

7.1. Qualitative Data

Owing to the complex and often personal nature of religious beliefs, much of the qualitative data obtained from the interviews during each of the four phases was used. It was theorised, correctly, that many of the interesting results obtained through the Q-sorts and subsequent worldview interviews in Phases Two to Four might be better interpreted and supported by the qualitative statements made by participants before and during these phases. Therefore, rather than relying solely on the factor-results, this study contained a strong qualitative component.

The following section discusses the qualitative findings from Phase One. Additionally, links between the qualitative data and the Q-sort data are addressed in subsequent sections.

7.1.1. Phase One: Qualitative Data

Participants were free to attribute any meaning of their choice to the terminology used in the open-ended questions asked in Phase One. A first important observation was that the term “beliefs” was often immediately associated with religious beliefs:

"For me? You know when you talk about belief, I automatically think whether you’re Christian--religious--whether you’re religious or you believe in a higher God or you

\textsuperscript{4} e.g. 01 = Participant number, GP = Interviewer, 14:13 = Interview duration
believe in witchcraft and whether those things affect the way that you think about the climate.” - 04-SS-Ikageng-7.11

It is important to note that although participants who identified themselves as religious indicated that they are Christians, no denominations were specified. Beliefs in the mystical powers of traditional healers, as well as rituals, were expressed, indicating ties to traditional African religions; although many participants who identified themselves as Christians refuted these beliefs. This is interpreted as religious exclusivity and is a common characteristic of many religious systems.

Certain participants indicated that they believe that the climate was created by, and is also controlled by, God:

“It’s--. Weather is like that, today is cold and it cannot change. It’s God who created it.” - 08-KM-Ikageng-03.00

“Climate is controlled by God, God created all things in the world.” - 02-KM-Venterdorp-7.46

Others opted for stating that the climate is “natural” or part of nature:

“I don’t think it would be possible to change my beliefs about the climate because every single weather condition is natural and there’s nothing we can do. If it’s raining then there’s nothing you can do about it, you can’t change rain.” - 06-KM-Ikageng-3.22

At least two participants, however, attributed both these qualities to the concept of climate; they indicated that to them the climate is natural, and that that inherently means that it was created by God, and vice versa:
“It’s a natural thing, something we are born into. When it rains, I as person do not have the ability to stop the rain it’s God’s will.” - 05-KM-Ikageng-4.38

“Yes. So I don’t have that belief I can change the climate because of it’s natural.” – 03-SS-Ikageng-6.22 (when asked if the climate is God’s thing)

The extent to which religious beliefs influence a person’s capacity or willingness to adapt to climate change is demonstrated in the following statement (who just before expressed that they believed the climate is “God’s thing”):

“I can’t change anything. Because it is the thing that we got in the world. That’s why we can’t change anything, and I don’t have a belief so that it can change or what.” - 03-SS-Ikageng-6.22

This statement lays the foundation for this study’s assertion that religious beliefs have an influence on climate change adaptation. Evidently, the belief in a God who created the climate along with the rest of the earth, prevents the participant from believing that they can have any effect on, or bring about any change to the climate. This kind of assertion indicates a type of determinism, without the associated doom-and-gloom, regarding humans’ impact on the climate, which explains their probable indisposition to adapt to its change. The following statement can be evaluated similarly:

“How I believe, for me my perspective cannot change what already God has decided. I don’t know, maybe you help me in that, because you studied this, I didn’t study it, but how I think is how God is created things and it should be like that. My culture cannot change the way God has created.” - 02-BJ-Ventersdorp-16.02

The participant above also made no mention of humans causing climate change or even contributing to it in any way – this enforces their belief that climate change is God’s will.
Another type of determinism presented a more fatalistic, metaphorical “shrugging of the shoulders” manner:

“I just have to accept only God knows because I think he is the one doing this, and I think we can blame it on the kids for not listening perhaps God is punishing us because we can’t always blame the change in weather. God put us here on earth we just have to accept the way things are, the way they are going whether he’s punishing us because of our kids’ engagements, we don’t know. Sometimes he just scares us and we just have to accept.” - 04-GP-Ventersdorp-6.16

Another prominent theme is illustrated in the statement above is this: climate change is punishment from God:

“I think that all this things are caused by God, God is punishing us.” - 07-RM-Ikageng-3.34

The reasons for this punishment vary, which include

- abortion:

“Climate it’s because of people that get the abortion, it’s because God he don’t like it, ’cause we kill babies’ spirit, where they are unborn because there is a people that they don’t have a kids, then God he gives you a baby and then you will kill. No matter its three days. The womb it’s already touched then other people that will become it, touched. So I’m thinking it’s punishment.” - 02-AB-Jouberton-16.56

- violence and murder:

“Remember God said “do not kill”, when you walk at night even if is not so dark when going to the shops you will meet criminals and they will search you and take your money
and if they know you, they will stab you and kill. That is the first punishment of God.” - 07-RM-Ikageng-3.34

- and the “sins of the father” – sins committed by previous generations:

“Second punishment of God is that I will punish new generation based on old’s [sic] generations sins.” - 07-RM-Ikageng-3.34

Failure to change the causal behaviour in response to punishment results in further punishment; therein lies potential for this religious belief to assist adaptive efforts.

Climate change was also attributed to signs of the Apocalypse, or the end of the world, citing the Bible as proof:

“According to my belief--. These things that are happening currently, it’s like the prophecies in the Bible, not from someone, but from the Bible are coming true. They are coming true have you noticed?” - 01-GP-Ikageng-14.13

The above statement refers to Biblical prophecies heralding the second coming of Christ, and the signs of end of the world, one of which the participant identifies as air pollution (a contributor to climate change).

A synthesis of Biblical Christianity and traditional African Ancestral belief reflected in the Phase 1 interviews:

“The Bible said né, you can’t blame me, you can’t blame me because if you don’t know my picture of me, because of-- you don’t know me, why you blame me, maar you can’t blame your next neighbour. You see, at least you must like your neighbour before you can like me. So it’s just that we can . . . no one have . . . . I have seen the Lord. We dream of
ancestors, we dream of all people that died. We see that. So He uses ancestors.” - 02-AB-Jouberton-16.56

This participant maintained that it is indeed the ancestors causing climate change, but that they are ultimately God’s vehicles to punishment. Ancestor are regarded as intermediaries between humans and God (McVeigh, 1974:35).

Another intriguing aspect of African religions and tradition is the belief that traditional healers possess otherworldly, even magical powers inherent in nature which they can manipulate. Although most participants who made mention of these traditional healers ultimately denied any belief in the truth of their powers, some participants did indicate that they believe that traditional healers have the power to alter the climate:

“Yeah, we believe in them. That a traditional doctor has struck somebody with lightning, the traditional doctor has made it rain. I mean they do indeed work for us, so?” - 02-GP-Ikageng-4.55

The use of rituals to bring about desired changes in the climate was mentioned by some participants, whether it was only to illustrate some of their culture’s traditions, or to state their own beliefs in their power. For instance, these rituals include women in a community who have lost children, coming together to “wash off the blood of their children”, after which this water is poured out all across the community. This is believed to bring rain (01-SS-Ventersdorp-20.00).

Upon encountering more education and scientific knowledge on the topic of climate change, some participants felt that they would be able to adapt specific religious beliefs they held accordingly. They proposed religious institutions as bases of operation for raising climate change awareness, and in so doing highlighted the importance of these institutions in encouraging community participation:
“Ja, if we get taught every time about climate change, like there’s projects where people tell people if we do something like this which is wrong that it will affect climate change in a certain way, like at schools, maybe at church, at the house, maybe do some projects just to show people that something that we do can affect climate change in a certain way and how we will be affected also as people.” - 05-BJ-Ikageng-5.58

Others held this education to be contrary to religion; for them, education discredits religious belief:

“I don’t think--well now, it’s way different, you know, but there are still those people that believe that it’s not really the climate; it’s something to do with the gods, or whatever, not being happy with us, and that kinda stuff you know. But personally, I don’t believe that. I think I have enough information to know it’s not about that.” - 04-SS-Ikageng-7.11

“...I don’t believe in religious things, I believe in scientific theories...” - 01-KM-Ikageng-8.10

7.1.2. Phase One: Conclusion

Participants indicated overall awareness of changes in climate, and attributed these changes to various causal factors. Statements such as those in the previous section were used to compile the Q-sort set of 40 statements which was used in subsequent phases. Findings from these phases are discussed in sections to follow.

7.2. Q-sort results: the five factors (worldviews)

This section summarises the results of the overall Q-sort process, including the five factors that were identified and used in Phase Four.
According to the analysis, the five factors (worldviews) accounted for 58% of the sample variance, with the religion-related Factors 2 and 3 accounting for 32%. Table 1 describes each worldview and refers to each by its descriptive title. Table 2 contains Phase Four participants’ significant factors, as well as their chosen worldviews.
<table>
<thead>
<tr>
<th>Factor (Worldview)</th>
<th>Description/Factor Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1:</strong> Collectivist/Liberal</td>
<td>“The climate change we experience today is not a punishment for people’s sins and neither is it a sign that the world is ending, but rather a natural occurrence where nature wants to reshape itself. Since the climate affects how people’s emotions, it can also cause people to change their beliefs. If we unite we have better chance at solving climate problems and influencing the next generation’s attitudes towards nature. This is important since the climate influences the growth of crops and production of food, and we have to act now to prevent further changes to the climate”.</td>
</tr>
<tr>
<td><strong>Factor 2:</strong> Religious Determinist/Fatalist</td>
<td>“The climate can’t be changed by traditional healers since it’s determined by God. Because of this, the climate is just a natural part of the world that we have to accept and it is not affected by people’s behaviour. Climate change is not related to the burning of fossil fuels, climate is just unpredictable. I’m open to changing my beliefs, but I think the best way of solving any possible environmental problems is by returning to the ways of our ancestors. Things were better when I was younger, and I think that today’s technology plays an important part in the changes we see. In others words; I don’t believe that there is anything wrong with the climate and I don’t think environmental problems are a sign that the world is ending”.</td>
</tr>
<tr>
<td><strong>Factor 3:</strong> Religious</td>
<td>“The climate is determined by God and climate change is a sign that the world is ending. I will not change my belief and the climate influences neither me nor other people emotionally. The climate is not that complicated seeing as the changes are mainly related to the burning of fossil fuels. This means that we can also control the climate through technology, and that natural disasters are largely caused by people’s actions. The next generation will be influenced by our behaviour towards nature, but that doesn’t mean we should return to the ways of old. The climate was not better when I was younger, and I think young people can help the older generations get educated about climate change. This is important, since we have to act now to hinder further damage to the environment”.</td>
</tr>
</tbody>
</table>
Factor 4: Technology/Human

“The climate plays an important part in our lives and we need to respect the environment. We have the right to know about climate issues that affect us directly and indirectly. Even though the climate is changing, it's not caused by population growth and is not a sign that the world is ending. Sometimes I think that traditional healers can cause the climate to change, but I also believe that the changes in the climate are related to the burning of fossil fuels and people damaging the environment when they are trying to make money. This means that we should rather try to use sustainable technologies, since this would benefit the environment. It may not be possible for humans to control the climate through technology, but if we work together, we can make a difference”.

Factor 5: Governance/Structural

“There is something wrong with the environment, but returning to our old ways is not the way to solve problems. Seeing how the climate is both complicated and unpredictable, the government plays an important part in informing people about the changing and drafting laws as an effective way of protecting the environment. There is no way around the fact that the changes we see today are consequences of people’s behaviour, and if we continue the way we are now we will destroy the earth. However, it might be difficult to educate people about the problems because of their beliefs, but I for one am open to changing what I believe to be true”.
Table 2
Phase Four: Participants’ Significant Factors and Chosen Worldviews

<table>
<thead>
<tr>
<th>Factor</th>
<th>Participant No.</th>
<th>Chosen Worldview</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>1</td>
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<tr>
<td>3</td>
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<td></td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>
It was interesting to note that neither of the two worldviews that are geared toward religious beliefs (Factors 2 and 3) were chosen, although qualitative statements were made during the Phase Four interviews that could suggest support of these factors. Participant #2 initially chose Factor 2 (for which they were loaded significantly), but finally opted for Factor 1. The participant stated that their amendment was due to the fact that they knew nothing about fossil fuels and its effects on everything. Therefore there were no issues regarding any religion-related statements, but rather with a statement pertaining to the influences of human activities.

Participant #4 was loaded significantly for Factor 3, although they chose Factor 5. However, they gave a qualitative feedback in the interview during Phase Four that was mainly religious in nature. They explained various concepts in terms of Biblical scripture:

“Maybe if I have to preach a little bit: you remember, in the Bible, when God was destroying Sodom and Gomorrah – this is one story – two: the other one, Noah and the Ark. When God said to Noah: ‘I’m going to destroy the world, because of peoples’ lifestyle that is contrary with me, their God’. People took Noah...there were those who were ignorant: ‘what is he building?’...” (When illustrating people’s ignorance regarding climate change) – Participant #4

“We must understand that the climate...there’s nothing that in the time of maybe God’s servant like Abraham or those people, Isaac and Jacob, you name it: there’s nothing different about the claim of God to man concerning the climate, you see? But I can only say, the disturbance of the climate to the extent whereby the temperature is abnormal – is burning the crops – it’s not that God approve it that way. No, there must be a disturbance from the point of view from the world...” – Participant #4

“The ending of the world has nothing to do with what you may believe in. The only guidelines of the ending of the world is through the Biblical text. It is there, it is written
there, it is captured there, all along. So if you want to know whether it is ending – yes, it is ending, but this climate change is not part of it. The only part of it, the link to it is this so-called war – there will be war, there will be lawlessness, children will bring children forth and so on. Violent society, corruption, selfishness…” – Participant #4

Possible reasons for Participant #4 not choosing either Factors 2 or 3, which are geared toward a religious worldview regarding climate change, are discussed in a later section, where further reference is be made to the above statements in conjunction with the Q-sort data of Phase Three.

7.3. **Pertinent Q-sorts and their rankings**

Table 3 illustrates the rankings of selected Q-sorts based on their link to the topic of climate change and religious beliefs.
Table 3
Q-Sorts Related to Climate Change and Religious Beliefs

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Factor Arrays</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>The climate is determined by God.</td>
<td>-2 3 3 0 -1</td>
</tr>
<tr>
<td>9</td>
<td>Climate is not punishment for the sins that people commit.</td>
<td>3 0 0 1 -1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Factor Arrays</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The climate is a natural part of the world we just have to accept and live with.</td>
<td>0 3 -1 -1 1</td>
</tr>
<tr>
<td>6</td>
<td>Climate change is not a sign that the world is ending.</td>
<td>1 1 -1 1 -1</td>
</tr>
<tr>
<td>7</td>
<td>Natural disasters happen when nature wants to reshape itself.</td>
<td>2 1 -2 -1 0</td>
</tr>
</tbody>
</table>
Consensus between Factors 2 and 3 on the theme of religious beliefs reaches only to statement 9; where Factor 2 agrees with statement 1, 6, and 7, Factor 3 disagrees with these statements. Factor 3 disregards the “natural” element of climate, whereas Factor 2 draws the link between God and nature previously discussed. This “naturalness” of the climate and climate change stands opposite the view that climate change as a sign that the world is ending; if an occurrence is considered natural, it cannot simultaneously be considered an indication of the end of all things.

Although having a seemingly more positive towards nature and climate, Factor 2 may be interpreted as being more deterministic or fatalistic towards the effects of climate change. This is mostly due to the high scoring of statement 1 – in fact, statement 1 scored higher in Factor 2 than in any other factor. This factor is basically says “climate change is a natural occurrence, therefore we cannot and will not do anything about it” – adaptation seems to be regarded as futile. It is also noteworthy that Factor 2 denies human’s involvement in climate change, reinforcing the belief that the climate is controlled by God and is therefore impervious to human influence.

Statement 9, regarding punishment for mankind’s sins, did not load significantly for either factor. Factor 5 alone indicated an overall disagreement with the statement (-1), indicating the belief that climate change is indeed punishment.

Table 4 illustrates statements pertaining to ancestral belief and traditional healers.
Table 4
Q-Sorts Linked to Ancestral Beliefs and Traditional Healers

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Factor Arrays</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Climate change is caused by the fighting of the ancestors.</td>
<td>-3  -3 -1 -2 -2</td>
</tr>
<tr>
<td>11</td>
<td>Traditional healers cause the climate to change.</td>
<td>-3  -3 0 -1 1</td>
</tr>
<tr>
<td>24</td>
<td>Educating people about climate change will anger the ancestors and cause bad luck.</td>
<td>-3  -2 -1 -2 -2</td>
</tr>
</tbody>
</table>
Statements 10 and 11 ranked lower for Factor 2 than for any other factor (-3, -3), indicating strong disagreement with the belief that ancestors and traditional healers can influence the climate. Statement 11, however, ranked higher with Factor 3 than any other factor (-1). This does not indicate agreement with the statement, but may rather point to more of a willingness to accept the possibility of traditional healers playing a role in climate change.

Table 5 illustrates all statements directly related to beliefs.
Table 5
Q-Sorts Related to Beliefs

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Factor Arrays</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>It is difficult to educate people about climate change because of their beliefs.</td>
<td>0 -1 0 -2 2</td>
</tr>
<tr>
<td>34</td>
<td>It is possible to change my beliefs when someone else tells me to.</td>
<td>-1 -2 -2 0 -2</td>
</tr>
<tr>
<td>35</td>
<td>In order to change our beliefs about the climate, we must sit down and discuss the matter.</td>
<td>2 1 1 1 1</td>
</tr>
<tr>
<td>36</td>
<td>My beliefs about the climate can change if I see in reality that things are different from what I believe.</td>
<td>2 2 2 0 2</td>
</tr>
<tr>
<td>37</td>
<td>My beliefs about the climate can change when I feel less vulnerable.</td>
<td>0 0 -2 0 0</td>
</tr>
<tr>
<td>38</td>
<td>I am open to change my beliefs, because I learn new things all the time.</td>
<td>1 2 0 0 3</td>
</tr>
<tr>
<td>39</td>
<td>It is not possible to change my beliefs.</td>
<td>-1 -1 1 0 -2</td>
</tr>
<tr>
<td>40</td>
<td>The climate influences how people feel emotionally and that may influence their beliefs.</td>
<td>1 0 -1 -1 0</td>
</tr>
</tbody>
</table>
Factor 2 displays an openness to changing beliefs that is reflected in the statements above. For Factor 2, beliefs can be changed and they should therefore pose no hindrance to education regarding climate change – in other words, their beliefs should not be a barrier to implementing climate change adaptation. Statement 36 ranked highest for this factor, emphasising that “seeing is believing”, and that telling someone to change their beliefs will have no impact (statement 34 ranked lower than any other factor).

Factor 3, however, exhibits some contradiction in terms of whether or not beliefs can be changed; they agree with both statements 39 and 36. This ambiguity lies at the heart of the stumbling block that religious beliefs pose to climate change adaptation. An explanation for this ambiguity might lie in the link between statements 34 and 39: statement 39 can be seen as implying that the change in belief is being enforced by external pressures, clearly supporting factor 3 in denying that beliefs can change when someone else tells them to. If they realise that their beliefs are untrue, they feel that they would be able to adapt and change those beliefs (statement 36 scored highest for this factor).

8. Conclusion

During Phase Four, where participants were asked to identify the worldview they related to most, and the majority of participants chose factors 1 and 4. Factors 2 and 3, which were discussed in the last section, were not chosen at all – the following section discusses the possible reasons for this.

Firstly, it is important to bear in mind that religious beliefs are often very prescriptive and specific, and elements like doctrine and subjective projection may underlie certain beliefs. They can also be either individually or communally held (Loubser 2013, 72). It is for this reason that the formulation of certain Q-sort statements that may be regarded as being of a religious nature at face value (e.g. statement 8) may not coincide with a participant’s specific formulation of
their religious beliefs, causing them to disagree with the statement altogether. This binary thinking stands in opposition to the evidential non-binary thinking exhibited throughout the research process, indicating a possible exception for religious beliefs. Beliefs entail more of what can be seen as disbelief – “on the one hand a system of beliefs which one accepts, and on the other, a series of systems of beliefs which one rejects” (Rokeach 1956, 228) – and this will result in participants rather discarding statements they don’t agree with. This rigid belief-disbelief dualism seems to be especially prominent in thinking that involves deeper religious commitments. This does not, therefore, automatically exclude religiosity when formulating conceptions of climate and climate change – allowance should be made for the participant rather holding different religious beliefs. This was illustrated especially clearly in the case of Participant #4 in Phase Four of the research process. Participant #4 loaded significantly for Factor 3, but instead opted for factor 5. This variance may be attributed to the fact that they explained their religious views extensively during the actual interview in Phase Four, citing reasons for their climate beliefs, but seemed to disagree with the individual statements that comprise the Factor 3 narrative.

A further issue best illustrated by Participant #4, is that of the individual statements that comprise each narrative. Arguably the best way of determining participant worldviews is having them read through the options and make an intuitive choice, but due to the large volumes of information this did not seem entirely possible. Instead, participants virtually analysed each worldview based on the individual statements, rather than choosing it based on an overall impression. This reflects a possible problem for participants to keep all the components of the narrative of their own identity under consideration at the intuitive level. As Lehrer (1973, 121) almost poetically states: “The shifting sands of subjectivity shape and reshape the foothill paths of evidence that guide us to conclusions in the mountainous terrain of inquiry.” This is inquiry can be into our own worldview, and the “evidence statements” that we choose or discard when determining our own views often change (Lehrer 1973, 121). Without the discussion of the
different worldviews, and by default the different statements, the valuable qualitative input necessary for a study of this nature would not have been attained.

9. Reflections: Factor Interpretations

Aside from ascertaining that religious beliefs do indeed influence climate change adaptation, this study produced one other main finding in the form of two distinct groups of religious participants. Firstly, Factor 2 participants are characterised by theological determinism; these participants view the climate as being a concept that lies within God’s realm, and therefore people can have no influence on it. They do however acknowledge that climate influences people. This view can be detrimental to the cause for adapting to climate change, as it engenders a negligence that adversely affects the reciprocal relationship between humankind and nature. This view coincides with the idea of humankind’s dominion over nature, rather than stewardship, where humans can use and abuse nature in any way they choose (and consequently contribute climate change). Still, there is the view that nature remains a creation of God that cannot be changed or interfered. The belief in a sovereign God is (controls and determines all) relates to lower levels of concern over climate change, according to Peifer et al. (2016, 665). Ultimately, the willingness to change their beliefs, as expressed in the factor arrays, makes this group a prime candidate for accepting climate change adaptation education.

The second group, exemplified by Factor 3, rejects the “naturalness” of climate and subsequently does not deify nature the way Factor 2 does. For these participants, climate change can is understood in more concrete terms, and they choose to acknowledge humankind’s role in it. Adaptation here needs to be motivated intrinsically, perhaps making use of conceptual change methods of education.
10. Recommendations

In conclusion, this study has achieved the overall aim of illustrating the influence that religious beliefs have when considering a person’s willingness or ability to adapt to climate change. As is almost always the case, further research on the topic is urged, with the distinction that the research is done mindful of the specific context it is conducted in. Differently put, more research is required on this nature to determine other specific communities’ climate change and religious beliefs, which would ultimately engender an atmosphere of adaptation rather than mitigation. When working with people, understanding them is essential, especially in terms of climate change adaptation. This study has successfully illuminated the religious aspect of this sentiment. Incorporating such religious beliefs in climate change and climate change adaptation education may assist in obtaining deeper knowledge of a community’s needs and shed light on which practices are acceptable within their religion.

Acknowledgement

The authors would like thank Prof. Karen ‘O Brien for her expertise and guidance during the project. The Climate Beliefs project, exploring the relationship between belief systems and climate change, was conducted as part of the SANCOOP bilateral agreement between South Africa and Norway. The research was funded by the National Research Foundation (NRF) of South Africa and the Research Council of Norway. The authors declare that they have no conflicts of interest.

References


Annexure A:

1. The climate is a natural part of the world we just have to accept and live with.

2. The climate is complicated.

3. The climate is unpredictable.

4. The climate is not changing.

5. There is something wrong with the climate.

6. Climate change is not a sign that the world is ending.

7. Natural disasters happen when nature wants to reshape itself.

8. The climate is determined by God.

9. Climate change is not punishment for the sins that people commit.

10. Climate change is caused by the fighting of the ancestors.

11. Traditional healers cause the climate to change.

12. The climate is affected by the behaviour of people.

13. Increasing population growth causes climate change.

14. Climate change is not caused by technology.

15. Climate change is related to the burning of fossil fuels and pollution.

16. The climate influences the growth of crops and the production of food.

17. People are trying to make money, that’s why they are damaging the environment.

18. The climate was not better when I was younger.

19. We can solve environmental problems by returning to the ways of the past.

20. The next generation will be influenced by our current behaviour towards nature.

21. We must act now to prevent the climate problems of the future.

22. Young people can help older people catch up with new knowledge about the climate.
23. We have the right to know about climate issues that affects us directly and indirectly.

24. Educating people about climate change will anger the ancestors and cause bad luck.

25. It is not the duty of the government to inform people about climate change.

26. We can address climate problems by drafting laws that protect the environment.

27. We can solve climate problems when we stand together and unite.

28. It is possible for humans to control the climate through technology.

29. Using sustainable technology is not good for the climate.

30. It is difficult to care about climate change because of economic pressures.

31. The climate does not play an important role in our lives.

32. We do not have to respect the environment.

33. It is difficult to educate people about climate change because of their beliefs.

34. It is possible to change my beliefs when someone else tells me to.

35. In order to change our beliefs about the climate, we must sit down and discuss the matter.

36. My beliefs can change if I see in reality that things are different from what I believe.

37. My beliefs about the climate can change when I feel less vulnerable.

38. I am open to change my beliefs, because I learn new things all the time.

39. It is not possible to change my beliefs.

40. The climate influences how people feel emotionally and that may cause changes in their beliefs.
CHAPTER 4: DISCUSSION OF EMPIRICAL FINDINGS

4.1 Introduction

Chapter 4 addresses the research objectives set forth in Chapter 1 by briefly discussing the literature summarised in Chapter 2, as well as discussing findings of the study in depth based on participants’ responses in each of the four phases. These responses included qualitative data obtained from interviews during all four phases, as well as quantitative data obtained from Phases Two and Three. Conclusions are drawn from these findings and recommendations for future studies given.

4.2 Objectives

In Chapter 1, four research objectives were indicated to guide the research process:

1. To investigate and define fundamental beliefs, especially within the African context.
2. To define climate change and climate change adaptation.
3. To determine the communities’ current experiences and understanding of changes in climate.
4. To investigate and determine the influence of fundamental beliefs on climate change experiences and understanding.

During Phase One, participants took part in semi-structured interviews during which they were asked the following two open-ended questions:

1. What do you think about the climate?
2. Do you think it would be possible to change your beliefs about the climate?

The experimental findings, as well as the literature study, were used to address the research objectives.

4.2.1 Objective 1

In order to address Objective 1, this section briefly summarises the theoretical basis of this study, as laid out in Chapter 2, with specific regard to fundamental (religious) beliefs within the African context.
4.2.1.1 Theoretical basis: religious beliefs

In order to understand the nature of fundamental beliefs, it is necessary to define the term beliefs, but consensus has not yet been reached on such definition (Carlisle & Simon, 2012:221). A clear definition of beliefs is however given by Trueblood (cited by Rokeach & Bonier, 1960:31):

We have beliefs about history, beliefs about the structure of material aggregates, beliefs about the future, beliefs about God, beliefs about what is beautiful or what we ought to do. Most of these beliefs we state categorically. We say ‘Columbus landed in the West Indies’, ‘Water is composed of hydrogen and oxygen’, ‘Rain is falling today’, ‘There will be a snowstorm tomorrow’, ‘God knows each individual’... We might reasonably preface each of these propositions by the words ‘I believe’ or ‘There seems to be good evidence that’. Every proposition becomes in fact a judgment, and man is a creature greatly concerned with his own judgments. We make our judgments seriously and, foolish as we are, we are deeply interested in the correctness of our judgments.

A clear theme emerging from this definition is human consciousness. Beliefs are an inherent part of this consciousness and influence many of the elements of our daily lives, such as decision-making. Various authors (Aguilar-Luzón et al., 2012; Ajzen, 1991; Bensadon, 2015; Chen, 2015; Driskell & Lyon, 2011; Stern et al., 1999) have consensus that behaviour, along with decision-making, can intrinsically be linked to beliefs. As Mbiti (1977:4) concurs: “what people do is motivated by what they believe, and what they believe springs from what they do and experience”.

Mbiti (1977:1) further states that “religion permeates into all the departments of life so fully that it is not easy or possible always to isolate it.” This research study is based on Clouser’s (2005:41) assertion that all “beliefs in something as unconditionally real” are for that reason characteristically religious. Additionally, Schilbrack (2013:313) proposes the following definition of religion, which serves as the basis of this study:

... religions are composed of those social practices authorized by reference to a superempirical reality, that is, a reference to the character of the Gods, the will of the Supreme Being, the metaphysical nature of things, or the like. In short, I define religion as forms of life predicated upon the reality of the superempirical.

Runciman (cited by Eickelman, 1976:155) adds to this definition:

Whatever else religion might entail, it is a set of beliefs, more often implicit than explicit, that are understood by members of a society against the background of tacit, shared assumptions about the nature and conduct of everyday life.

Society refers not only to individuals, but individuals as part of a collective whole. This is important, since the religious beliefs and individual views presented in this study are purposively seen as interlocking parts of a greater communal whole within the rural South African context. Mbiti (1977:2) agrees when stating that “traditional religions are not primarily for the individual, but for
his community of which he is part”. Toulmin (2009:7) further emphasises this importance when stating that:

the diversity to be found within Africa’s landmass and its enormous size make generalizations impossible... But despite this evident diversity in people and place, there are some important common features.

Since religion equals culture and regions vary drastically, research on small-scale indigenous societies is of the utmost importance (Van Huyssteen, 2007:241). Van Huyssteen (2007:241) states that the “lifeways of indigenous peoples emphasise reciprocal relations between humans and local bioregions” not found in classical religions.

McVeigh (1974:5) refers to African traditional religions as “a felt practical relationship with what is believed in as a superhuman power”. Mbiti (1977:15) maintains that Africans regard religion as “an ontological phenomenon” that “pertains to the question of existence and being”. Smith (cited by McVeigh, 1974:25) proposes the following three essential categories of African religions:

(1) the belief in dynamism, the conviction that there is a mysterious impersonal power at work in the universe; (2) the belief in Spiritism, the view that there are unseen personal beings, rational by nature, who influence the lives of men; and (3) the belief in theism, the conception that there is a Supreme God, who is the Creator of all things.

Beliefs and practices in African traditional religions are not part of systematic dogmas to which people must conform; individuals rather adopt whatever beliefs are held by their families and communities (Mbiti, 1977:3). This, however, does not eliminate individual beliefs, since individuals may hold specific opinions, and religious acts, such as rituals, may differ from place to place (Mbiti, 1977:3). Diversity of belief within a greater context clearly sets African traditional religions apart from other religions.

A strong Christian influence can be seen in many African traditional religious beliefs, which is the result of Christian beliefs and practices brought to Africa by missionaries in the nineteenth century (McVeigh, 1974:5). It must, however, be noted that this influence predates missionary activities, since Christianity was well-established in Africa long before the rise of Islam in the seventh century (Mbiti, 1977:229). Although Christian and Islamic influences are apparent in modern expressions of traditional African religions, “conversion’ to Christianity or Islam must be taken only in a relative sense” Mbiti (1977:229). While many Africans adopted one of these (or other) religions, the African traditional religions from their area most likely still pervade the religion they now associate with.

Ancestors form a vital part of African traditional religions (Mbiti, 1977; McVeigh, 1974; Parrinder, 1974) and the interdependence between these ancestors and their surviving families is emphasised. Ancestors are believed to be directly involved with the lives of their living relatives and use their knowledge of life, and its incumbent evils, to direct and advise them (McVeigh,
The relationship between humankind, ancestors and God ("Supreme Being") can be explained based on this function: God cannot be bothered by petty human problems, such as family feuds, and it falls to the ancestors to step in and help. These ancestors act as intermediaries between humans and God (McVeigh, 1974:35), and praying to God means praying to the ancestors as well (McVeigh, 1974:115). Mbiti (1977:16) divides the ontology of African traditional religions into five categories, expressed in a highly anthropocentric manner:

1. **God** as the ultimate explanation of the genesis and sustenance of both man (sic) and all things.
2. **Spirits** made up of superhuman beings and the spirits of men who died a long time ago.
3. **Man** (sic) including human beings who are alive and those about to be born.
4. **Animals and plants**, or the remainder of biological life.
5. **Phenomena and objects** without biological life.

When studying the relationship between humankind and nature within African traditional religions, one must keep in mind that humankind is part of a religious universe – therefore “nature in the broadest sense of the word is not an empty impersonal object or phenomenon: it is filled with religious significance" (Mbiti, 1977:56).

Medicine men, or traditional healers, play an important role in African traditional religions. These traditional healers are concerned with “sickness, disease, and misfortune”; they “take preventive measures”; and “purge witches, detect sorcery, remove curses and control the spirits and living-dead" Mbiti (1977:169-171) by utilising various natural materials such as herbs, roots, bones and animal excrement to achieve their almost superhuman goals (Mbiti, 1977:167).

Mbiti (1977:210) asserts that “the majority of African people believe that God punishes in this life". God is therefore concerned with the morality of humankind, and any deviation from it leads to punishment in this life (as opposed to the belief of punishment in the next life, for example in hell).

### 4.2.1.2 Conclusions from Objective 1

African traditional religions and its composite beliefs, rituals and rites are manifold in expression, and require close investigation from a contextual perspective. These beliefs pervade the everyday lives of their holders (Mmassi, 2013:231), and its influence on people’s perceptions regarding climate change and climate change adaptation cannot be underestimated. As Mbiti (1977:1) emphatically states:

> to ignore these traditional beliefs, attitudes and practices can only lead to a lack of understanding African behaviour and problems… Religion is the strongest element in traditional background, and exerts probably the greatest influence upon the thinking and living of the peoples concerned.
4.2.2 Objective 2

Chapter 2 summarised relevant literature on the topics of climate change and climate change adaptation. In this section, qualitative interview data in the form of participant responses were compared to the relevant literature to illustrate participants’ understanding of these concepts, and to indicate any correlation between the literature and participants’ views. Coding for Phases One to Three participants is based on the audio files of the interviews (e.g. 01-GP-Ikageng-14.13), whereas Phase Four participant coding is based on the order in which interviews were conducted in that phase (e.g. Participant #1).

4.2.2.1 Definitions and participant views

Some of the definitions presented here explain the concepts in what can be perceived as scientific terms (IPCC, 2014:1760), while others lend themselves to more popular language. Various elements from both these definition types were present in the Phase One qualitative interviews, indicating that participants often had integrated ideas of some of the concepts. This section illustrates these understandings and perceptions by quoting participants and interpreting their words’ relevance to the definitions and explanations given in Chapter 2.

A few participants expressed from the outset that they are unsure of what the word climate means when asked the first question of the interview (cf. Section 4.2):

“Climate. I don’t understand – how? When you say climate, specifically what do you mean by that?” – 01-BJ-Ikageng-5.37

“The main thing is I just wanted to know about the climate because I don’t have more info about it.” – 02-SS-Ikageng-8.07

For some participants this confusion remained even after interviewers provided a brief definition of the term, while others eventually understood the question. When some participants expressed their need for a better explanation of the term climate, interviewers struggled to explain it without creating any leading statements that might influence participants’ reactions to the posed questions. The interviewers agreed to explain climate as “weather that takes place over a longer period of time”. This seemed like the safest option, as it conveys a minimal amount of subjective experience from the researchers, while still linking to one of the main scientific definitions of climate change which is:

a change in the state of the climate that can be identified (for example by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer IPCC (2014:1760).
Many participants expressed the view that the climate used to be better, or at least different, in previous years. This can be linked to the temporal element in the IPCC’s definition which incorporates the changes that are recorded over a longer period of time.

“No, the climate is not nice as it was in that time that we started growing up, truly so.” – 2
04-BJ-Ikageng-7.31

The UNFCCC (as cited by the IPCC, 2014:1760) defines climate change as:

a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

This definition highlights the anthropogenic nature of climate change as it is known today, which also was a major point of discussion during the Phase One interviews:

“That is why I say that my opinion is that climate change is caused by our actions.” – 01-GP-Ikageng-14.13

“No my moral beliefs are not changing –, but climate change is caused by man-made, I mean man-made things you see.” – 03-GP-Ikageng-7.56

Various participants made statements that explicitly refer to humans as being the cause of climate change, while others rather discussed the human actions and activities that have a negative effect on the climate:

“I can explain the reason as to why it keeps changing, it’s because people are burning, and it’s like smoke pollution that’s what causing climate change. Population growth also plays a role in influencing climate change, things are not like they used to be.” – 01-KM-Ikageng-8.10

“…Climate has been caused by the air pollution and then the illegal – Whereby people burn things and then that – That air, that smoke that’s going up is the one that causes the climate.” – 03-AB-Ikageng-1.43

“Climate change, pollution, maybe there’s a dump and in the dump they burn some things, and the smoke around peoples and maybe they throw away thing and thing and those smells. Plays an important role in climate change in my thinking.” – 02-BJ-Ikageng-6.26

“Okay, I think it changes yearly, because it’s affected by how we treat the earth. Like there’s air pollution, land pollution, it also affects the climate. Also causes the climate to change. Have... Where we have the earthquakes and so forth, like the – what do you call – the drought. It is caused by us people, whereby we can’t take care of everything as we should. Like keeping the plants green and not littering everywhere, not making any pollution by causing fire that’s huge…” – 05-BJ-Ikageng-5.58

“Many people they got cars. And industry, mines, that something maybe.” – 08-BJ-Ikageng-4.21

Major themes were burning (smoke), pollution and littering. These activities were identified by participants as being the main contributors to climate change. Although many of these
explanations are incorrect in terms of the latest scientific interpretations of climate change causes, the statements indicate a basic understanding of the impact humans have on the climate.

A smaller amount of participants, used terminology that indicated a more scientific interpretation:

“Climate change… let me explain like this, climate change is all about different gases —, the thing is let me say climate change is about weather.” – 03-GP-Ikageng-7.56

“Yes not really —, but as for climate —, things like smokes and the others, for that I can actually say things I said before, like factories, those are the ones that has impact on the climate. Since, there is airspace and there are smokes on the airspace too. Yes, inside the airspace there are different layers then now they are accumulating and closing the oxygen that was supposed to enter in the space. Yes. Those have serious impacts on climate change.” – 03-GP-Ikageng-7.56

“What I understand about the climate is. What can I say? When the ozone layer changes, the weather patterns that’s what I understand about the climate.” – 03-KM-Ikageng-3.13

“No, because of the ozone layer it is damaged... by gases... by err... insufficient of oxygen.” – 05-RM-Ikageng-7.07

“Water animals... of water... of water, in the bush... they are suffering... a person just... just go, when they die they produce other gases that are going to damage... err... space, and then to the ozone layer.” – 05-RM-Ikageng-7.07

“It is caused by err... carbon monoxide that is in excess... it is caused by too many things... pollution and gases that... that... that is caused by cars that are moving... that’s why there is... now presently... they say we must live green.” – 05-RM-Ikageng-7.07

“The wind the beliefs that we have within ourselves, and the exhuming of natural resources unnecessarily, I think that’s climate change. I say that because I will give categories, I will start with air pollution, with air pollution we have a lot of factories that excrete smoke anywhere anytime each and every day. They cause us to have climate change because they produce smokes, the kind of gases that we do not need then some of the plants cannot grasp... because natural resources are being exhumed in South Africa that might possibly help us to grasp that carbon dioxide so they can excrete oxygen. Those are the things that cause climate change. Dumping unnecessarily in the streets and water because of climate change that’s causing that process of photosynthesis whereby plants produce us green plants, water brings us, no man I meant climate brings us rain, so that those plants will, [inaudible] yes I think so. The more we lessen the plants and build factories, that’s the thing that’s making our land be hit by climate change as well as the mines. The mines cause climate change because the land is no longer held by natural resources, the gold, the iron metals and the platinum, the land is held by metals underground, the land is used by metals.” – 03-RM-Ikageng-8.54

These participants described the effects of climate change in terms of greenhouse gases (although only referred to as gases) and the ozone layer.

According to UNFCCC (2007:8):

the main characteristics of climate change are increases in average global temperature (global warming); changes in cloud cover and precipitation particularly over land; melting of ice caps and glaciers and reduced snow cover; and increases in ocean temperatures and ocean acidity – due to seawater absorbing heat and carbon dioxide from the atmosphere.
Statements indicating awareness of these main effects include:

“About the weather? Oh, about the weather. I saw the... it’s not really time for winter but it is cold at times, but let me say in the morning we can wake up and its cold, but during the day its warm like it has never been cold in the morning, and now we get rain, too much rain and in winter, normally in winter there’s not much rain, but now we can get rain.” – 01-BJ-Ikageng

“It changes. Like maybe in summer it’s not hot, it’s a little bit cold.” – 05-BJ-Ikageng-5.58

“I think that the current climate situation is based on changing temperature. Sometimes there is dust, sometimes it’s cold, sometimes there is –. It is hot. Sometimes it’s too hot, sometimes it’s too cold and sometimes it rains. This is climate change.” – 02-KM-Ikageng-6.15

“This air changes temperature and it becomes hot. So I think this is what increases temperature. Even our large population size increases heat.” - 02-KM-Ikageng-6.15

“Climate can have four seasons at once. When it’s winter for example –. In a single season we can have rain, wind and winter in one season.” – 05-KM-Ikageng-4.38

“Let me say I don’t know, looking way back it seems as if things have changed drastically... we used… we knew that way back that the was… was.... was four seasons in the year so but now you will find out that it is winter, but it is hot, we used to know that during winter there is no way that it could be hot, so now, you find that during the winter the rain falls and then you don’t understand why… that is the issue.” – 10-RM-Ikageng-3.47

Clearly the greatest change felt is expressed in terms of temperature – whether it is higher or lower temperatures experienced on a daily basis or changes in precipitation. The unawareness of the effects on polar ice caps, glaciers and ocean temperatures may be attributed to the inland location of the study sample – participants do not live near the ocean, so rising sea levels and ocean temperatures do not directly affect their daily lives. This is an important point, as it is an indication of the extremely subjective nature of concrete climate perceptions. Since perceptions of climate change are shaped by social context, people’s immediate circumstances and context shape what they deem important information (Lorenzoni et al., 2000; O’Brien et al., 2010b). Perceptions of climate change heavily influence whether or not people adapt to its effects.

Climate change adaptation is “the process of adjustment to actual or expected climate and its effects” (IPCC, 2014:1758). Humphreys (2010:16) states that it involves “actions taken to adjust lives and livelihoods to the new conditions brought about by warming temperatures and other physical and weather-related events associated with climate change”.

One participant indicated an understanding of the need for adaptation by using the word strategy:

“What must happen is that we must only have more resources and strategy to deal with that problem at that certain time.” – Participant #6

“Now I have to be… to be more open, so that if tomorrow something can happen I must not just believe in that: “no, last time we did this, and it works, let’s do this again; it will work”. I must be open to other ideas – to the new information.” – Participant #6
However, most other participants were more inclined to discuss mitigating, rather than adaptive, efforts when asked what can be done about the climate issue:

“I don’t know how can I say – I think maybe if we change the way we do things, maybe the climate change will, maybe we won’t have any problem with the change, maybe things will stay the same as they are. Ja [transl. yes], ja [transl. yes]. If you stop doing the air pollution, the littering everywhere, throwing everything everywhere, ja [transl. yes], it will stop the climate change.” – 05-BJ-Ikageng-5.58

“It will never change; it can only be reduced but not be stopped. It will never end but it can be reduced. I can’t remember it ending and it has never ended and in years to come, climate change will never end because it is caused by human beings. It’s a mankind creation so it will never end. They can even involve technology, but it will never end. That is my belief.” – 01-GP-Ikageng-14.13

“The only thing I can say is that if we people can stop burning things, stop cutting trees, stop –. What can I say? Stop burning things, stop cutting trees, everything would be fine. I think the burning of things and the cutting of trees disrupts and changes our climate.” – 05-KM-Ikageng-4.38

“Yes it is possible. I believe it is possible because people act differently in certain situations, where else [inaudible] you would do something knowing exactly it is wrong to do it, but because of your ignorance you continue anyway. I do believe it is possible. Those ignorant people must realise that the consequences of their stupid actions will affect us as humans. We can change.” – 01-RM-Ikageng-13.00

“Yes my brother yes, I believe if we can reduce building more factories each and every day, climate change could [inaudible] my brother because of everything about [inaudible] because of the plants we live on everyday evaporating, plants evaporate my brother, the land evaporates, water evaporates and what do they call this... those ozone layers that are covering the earth [inaudible] if we can use material that is natural...” – 03-RM-Ikageng-8.54

“Yes it’s a mixture of those things and when they get in contact with each other they make flames you see, those flames affect err climate change because of the smoke, there is no way there can be a fire without smoke, those things cause climate change. If we can reduce those things my brother, I’m telling you the truth, there will no longer be climate change.” – 03-RM-Ikageng-8.54

“That’s why they say we must live green... with bio-products... those that do not produce too much carbon monoxide.” – 05-RM-Ikageng-7.07

“We can protect our nature, we can protect it by taking care of it, planting trees... (pause) there... to plant trees, like here... so that we can avoid to burn the grass... a parker must be established and taken care of, it is good...” – 05-RM-Ikageng-7.07

“Yeah so I think those are the kinds of things that we need to cut down on. I mean the level of pollution is ridiculous. I don’t know what we can do about that, ‘cause I know that I’m part of that as well but I’m trying to do better.” – 04-SS-Ikageng-7.11

Causal links between participants’ perceptions regarding the causes of climate change and their proposed solutions for the issue can be established. Smoke, for instance, causes climate change and therefore people need to stop burning things. The scarcity of resources that permeates the lived experience of economically vulnerable groups, may be a reason to rather opt for the reduction of ecologically unsound behaviour and mitigation. This once again reinforces the
assumption that reduction poses a greater solution for climate issues than adaptation, and
emphasises the necessity of adaptive and developmental efforts in communities such as these.

Some participants expressed a need for climate education, showing a willingness to learn to
adapt:

“Ja [transl. yes], if we get taught every time about climate change, like there’s projects where
people tell people if we do something like this which is wrong that it will affect climate change
in a certain way, like at schools, maybe at church, at the house, maybe do some projects
just to show people that something that we do can affect climate change in a certain way
and how we will be affected also as people.” – 05-BJ-Ikageng-5.58

“If I get the proper training, I receive information and a person who is giving me information
making me understand exactly what we’re talking about or what is he or she is teaching me
about then I don’t see a problem. I’ll have a better understanding of between A and Z.” –
03-AB-Jouberton-15.26

Education as an adaptive strategy can be successful when employing conceptual change as a
way to change or shape beliefs and behaviours. Clark (2013:9) underscores this by stating that:

while less complex or conceptual materials may be faster to comprehend than science-
related materials, the total amount of learning or conceptual change can be far greater when
that individual engages with concepts with rich connections to their understandings.

Clark (2013:87) concludes that science education concerning climate change may be an effective
way of achieving desired behavioural changes (for example adaptation). By combining this
information with conceptual change and the “rich connections” mentioned earlier, success rates
can be increased (Sinatra et al., 2014:124).

Humphreys (2010:16-17) distinguishes between three different uses for the term climate change
adaptation: firstly, it implies “actions that individuals take of their own initiative”; secondly, it points
to governmental actions, and lastly he indicates the more “technical meaning derived from the
UNFCCC and subsequent negotiations” (cf. Section 2.2.3). The participants expressed views on
the government’s involvement and responsibilities regarding adaptation and climate change
education:

“So I think that if our municipality tries to contact the community, especially the youth, and
teach them about dumping sites because every person creates it wherever they want to
and burn whenever they want to. Do you see how it is?” – 01-GP-Ikageng-14.13

“If they don’t educate us. We can’t just go out on the street, you know, to people who are
not in government. What is climate? It’s the government’s duty and responsibility to make
sure that grade R to grade 12… that we know the issues around climate change or the
issues about where we are living. Whatever it is affecting us directly or indirectly, we must
– we have the right to know.” – 03-AB-Jouberton-15.26
4.2.2.2 Conclusions from Objective 2

Participants seemed to grasp the meaning of climate change on an elementary level, but more weather-related conditions and effects were mentioned more often than actual climate issues. Adaptation was also limited to adaptation to weather conditions rather than climate – the difference between the two being the timeframe and “significance of the changes required” (Adger et al., 2009:1). The interest in receiving climate change education does, however, signify a need for adaptive responses.

4.2.3 Objective 3

Various insights regarding the communities’ experiences and understanding of changes in the climate were recorded during the four research phases. The following section provides examples of these insights from each of the four phases, as pertaining to the third research objective.

4.2.3.1 Qualitative data: Phases One to Four

The following statement echoes what was mentioned a few times throughout the research process:

“…I do believe there is something wrong…” – Participant #1

Participants expressed the view that something is wrong with the climate. When asked what they understand with regard to climate, a recurring view was that climate is measured by experiences of weather conditions, as opposed to the experience of weather patterns over a longer period of time. To these participants, climate entails the concrete experience of the present, and references were often made to recent weather and temperatures:

“I think that the current climate situation is based on changing temperature. Sometimes there is dust, sometimes it’s cold, sometimes there is –. It is hot. Sometimes it’s too hot, sometimes it’s too cold and sometimes it rains. This is climate change.” – 02-KM-Ikageng-6.15

“Yes, an example that it changes itself? Out of the blue –. It changes itself, we don’t know why it’s raining, we don’t know why it’s hot or why it’s sunny, you see? We don’t know why it’s cold except for the seasons, we know that during winter it should be cold, in spring it should be warm, in summer it should be hot, in autumn leaves should fall off from the tree so that when spring comes new leaves and flowers should appear.” – 06-KM-Ikageng-3.22

“So every year--. Let me say every now and then climate changes, like weather changes. Sometimes it rains out of a sunny day, sometimes it gets cold even if it doesn’t rain and sometimes it becomes cold you know, it changes as it pleases.” – 06-KM-Ikageng-3.22

“I think our climate is okay, but I have a problem with the sun. So our climate is not okay because sometimes the sun becomes too hot so I’m not okay.” – 07-KM-Ikageng-5.35
“I, for example, know that [inaudible] when the climate changes how my body functions. If the weather changes, it reacts badly and then when the weather gets hot, it gets better, when it is dusty the sinus reacts to that and your sinusitis operation reacts even worse in a dusty weather.” – 01-RM-Ikageng-13.00

“Because now we see rains are a bit more hectic than we’re used to. They’re coming at times when we’re not used to them coming. It’s getting a bit colder than I’m used to. I don’t know if it’s in my mind or what, but, yeah, that’s all I can say about that. Literally now things are changing and we can all see it.” – 04-SS-Ikageng-7.11

“Yeah. Daily basis – well each and every day. So most of the time the climate it affects us via the changing of weather...” – 02-SS-Ikageng-8.07

One participant even referred to climate change and weather as interchangeable concepts:

“Climate change umm hmm, let me explain like this, climate change is all about different gases –., the thing is let me say climate change is about weather.” – 03-GP-Ikageng-7.56

A few participants compared climate as experienced in the present and climate as it used to be (for an undetermined period of time in the past):

“Even things are worse now.” – AB-01-Ikageng-P3 (When discussing why the participant agrees that the climate was better when he was younger.)

“At this early stage climate it’s not like the way it used to be...” – 01-KM-Ikageng-8.10

“Okay, according to my view climate is no like it used to be, nowadays during winter there can be rain.” – 05-KM-Ikageng-4.38

Participants tended to view changing climate conditions in the present day as different to what it used to be – mainly due to perceived temperature and precipitation patterns. The statement was, however, often made without providing any substantiation for their beliefs.

The negative effects of climate change on food production was another theme of participant climate change experiences:

“Pause I don’t know... you see... err... err issue of climate change... let me talk about the... the agriculture sector/side err... on the side of agriculture we know that at a certain time, a certain crop grows well but know since we had this mix-up of... of... of seasons affects the issue of crop farming too much yes that is the issue I would... will ...will say.” – 10-RM-Ikageng-3.47

“...here with us, when you are thinking about the environment around. Especially the agricultural sector, whereby it’s mostly affected. Animals are dying and then other – The crops – Food, it’s not being produced at that level and population is increasing...” – 04-AB-Jouberton-70.36

“We know the impact of the climate on our crops of which we are dependant from for food on the table on a daily basis. And it’s not only the crops; it’s also water which is the main of the basic need of people...” – Participant #4

A participant linked the issue of drought in South Africa to climate change and the decreasing production of crops:
“Like now, there was a drought in South Africa. Which is maybe, it’s not — even if it can rain now, so far this rain doesn’t solve that much because of the damage that happened from last year (2015) September. So obvious [sic] the maize meal... there’s going to be a lack of maize meal...” — Participant #6

This particular participant also linked reduced food production with loss of income for farmers, and ultimately emotional distress and vulnerability:

“When there was drought, the farm owners, they were emotionally affected because of — their product — they were not selling their product, and to sell is their way of to pay the bills. But since when there were no production, they were starting to be emotionally vulnerable. They don’t know what’s going to happen in their — they lost their livestock.” — Participant #6

4.2.3.2 Conclusions from Objective 3

Although it is clear that many participants believe that something is wrong with the climate, the overall picture of participants’ climate change experiences is disappointing. The main finding from the participants’ statements is that the majority use the terms weather and climate interchangeably. This means that they do not focus on the effects of climate change, but rather on the overall discomfort and unpredictability of unfavourable weather. Subjective experience coloured most of the statements, directing them towards the participants’ daily lives and physical states in terms of the weather.

4.2.4 Objective 4

The following section discusses the link between climate change adaptation and religious beliefs within the context of the study sample as observed throughout the research process. For an overview of relevant existing literature on the topic, refer to Section 2.3.3.

4.2.4.1 Phase One: Qualitative data

The discussions presented here refer only to the qualitative statements made by participants during Phase One of the research. Subsequent phases of the study presented participants with similar statements in the form of the study’s Q-sorts (compiled specifically from relevant statements made by participants during Phase One), and the level of agreement and disagreement will later be compared to the Phase One statements accordingly. In other words, correlation between the statements made during interviews and the agreement or disagreement with the identified Q-sorts will be pointed out in later sections.

Certain participants immediately associated the terms beliefs and belief systems with religious beliefs (as defined within this study):
“For me? You know when you talk about belief, I automatically think whether you’re Christian – religious – whether you’re religious or you believe in a higher God or you believe in witchcraft and whether those things affect the way that you think about the climate.” – 04-SS-Ikageng-7.11

“Accepting God and making peace with who I conceive Him to be. Or whatever He may be.” – 06-SS-Ikageng-11.41 (When asked for their definition of a belief system.)

It is important to note that any affiliation with religious groups was recorded as being exclusively Christian, although no specific denominations were expressed. Although belief in the mystical powers of traditional healers was also expressed (thereby leaning towards an African religious perspective), many participants, who identified themselves as being religious (Christian), denied any truth in the statements that traditional healers possess over any otherworldly powers. This phenomenon can be interpreted as religious exclusivity which is characteristic of many religious systems.

A clear theme evident from the interviews is that the climate is determined, changed and created by God:

“Yes, he can maybe change or what, we just wait now, it is the Lord that know that now. Yes, it is the Lord that knows.” – 04-BJ-Ikageng-7.31

“The Lord, look the Lord bring the rain. Oh Lord give us rain. Oh Lord, take away the drought. The Lord he feels sorry for us, look it’s dry.” – 07-BJ-Ikageng-6.42

“I don’t know if it changes by itself or not, but I think it’s God’s doings. God knows what should and shouldn’t happen.” – 06-KM-Ikageng-3.22

“It’s –. Weather is like that, today is cold and it cannot change. It’s God who created it.” – 08-KM-Ikageng-03.00

“Climate is controlled by God, God created all things in the world.” – 02-KM-Venterdorp-7.46

Others stated that the climate is “natural”, or part of nature itself:

“I don’t think it would be possible to change my beliefs about the climate because every single weather condition is natural and there’s nothing we can do. If it’s raining then there’s nothing you can do about it, you can’t change rain.” – 06-KM-Ikageng-3.22

Some participants, however, linked the aforementioned godly origin of climate to the view that the climate is natural. What is perceived to be natural, and in effect out of humans’ control, is placed under the control of a higher power:

“It’s a natural thing, something we are born into. When it rains, I as person do not have the ability to stop the rain it’s God’s will.” – 05-KM-Ikageng-4.38

“Yes. So I don’t have that belief I can change the climate because of its natural.” – 03-SS-Ikageng-6.22 (When asked if the climate is God’s thing.)

The participant continued the statement that the climate is “God’s thing” by saying:
"I can't change anything. Because it is the thing that we got in the world. That's why we can't change anything, and I don't have a belief so that it can change or what." – 03-SS-Ikageng-6.22

The participant's statement affirms this study's assertion that religious beliefs have an influence on climate change adaptation. It is clear that this participant's belief in the climate being God's creation ultimately prevents him/her from believing that he/she has any impact on the current state of the climate. This is an example of a type of determinism which accompanies certain religious beliefs and explains the participant's probable unwillingness to adapt to the changing climate. The following statement can be assessed similarly:

"How I believe, for me my perspective cannot change what already God has decided. I don't know, maybe you help me in that, because you studied this, I didn't study it, but how I think is how God is created things and it should be like that. My culture cannot change the way God has created." – 02-BJ-Ventersdorp-16.02

In this participant's interview no mention was made of humans having any impact on the climate or causing climate change in any way – climate change is just part of God's will and something we cannot do anything about.

Another example of the determinism expressed earlier, is the following statement where the word accept represents a metaphorical shrugging of the shoulders:

"I just have to accept only God knows because I think he is the one doing this, and I think we can blame it on the kids for not listening perhaps God is punishing us because we can't always blame the change in weather. God put us here on earth we just have to accept the way things are, the way they are going whether he's punishing us because of our kids' engagements, we don't know. Sometimes he just scares us and we just have to accept." – 04-GP-Ventersdorp-6.16

The participant in the following statement is also not adapting to climate change because of religious beliefs:

"No, we just continue with our life, we continue with our life. Like the Bible says, yes." – 04-BJ-Ikageng-7.31

This statement contains another clear theme, namely that climate change is God's punishment for our sins which is also echoed by other participants:

"I think that all this things are caused by God, God is punishing us." – 07-RM-Ikageng-3.34

The reason for this punishment varies and includes:

- abortion:

"Climate it's because of people that get the abortion, it's because God he don't like it, cause we kill babies' spirit, where they are unborn because there is a people that they don't have a kids, then God he gives you a baby and then you will kill. No matter its three days. The
womb it’s already touched then other people that will become it, touched. So I’m thinking it’s punishment.” – 02-AB-Jouberton-16.56

- violence and murder:

“Remember God said “do not kill”, when you walk at night even if is not so dark when going to the shops you will meet criminals and they will search you and take your money and if they know you, they will stab you and kill. That is the first punishment of God.” – 07-RM-Ikageng-3.34

- and sins committed by earlier generations:

“Second punishment of God is that I will punish new generation based on old’s generations sins.” – 07-RM-Ikageng-3.34

The religious belief that punishment without the altering of causal behaviour leads to further punishment, may serve as aid in climate change adaptation.

A strong religious belief that links to the changing climate is that of the impending apocalypse, or “end of the world”:

“According to my belief – These things that are happening currently. it’s like the prophecies in the Bible, not from someone, but from the Bible are coming true. They are coming true have you noticed?” – 01-GP-Ikageng-14.13

This was often based on biblical prophecy, where climate change contributors such as air pollution are heralded as signs of the second coming of Christ and the world's demise.

A synthesis between biblical Christianity and traditional ancestral belief was reflected in the Phase One interviews:

“The Bible said nè [transl. right], you can’t blame me, you can’t blame me because if you don’t know my picture of me, because of – you don’t know me, why you blame me, maar [transl. but] you can’t blame your next neighbour. You see, at least you must like your neighbour before you can like me. So it’s just that we can... no one have.... I have seen the Lord. We dream of ancestors, we dream of all people that died. We see that. So He uses ancestors.” – 02-AB-Jouberton-16.56

As illustrated by this statement, ancestors act as intermediaries between humans and God (McVeigh, 1974:35), are primarily concerned with their living family members, and enforce morality through various supernatural means (McVeigh, 1974:30).

Another aspect of traditional African beliefs is that traditional healers can manipulate magical powers inherent to nature, including powers that affect the climate. Although the majority of participants that mentioned these beliefs denied holding the beliefs themselves, at least one participant indicated a belief in the power of traditional healers:
“Yeah, we believe in them. That a traditional doctor has struck somebody with lightning, the traditional doctor has made it rain. I mean they do indeed work for us, so?” – 02-GP-Ikageng-4.55

The view that traditional healers “work for us” links directly to the ontological hierarchy displayed by the ancestral belief discussed earlier – traditional healers are intermediaries between humans and God, and even between humans and their ancestors.

Some participants mentioned the use of different rituals to have a desired effect on the climate – whether only to illustrate some of their culture’s traditions or to indicate that they believe in the power of these rituals themselves. These rituals include women in a community, who have lost children, to “wash off the blood of their children” (01-SS-Ventersdorp-20.00) from their hands and bodies. The water is then poured out across the community and this is believed to bring rain. Such rituals almost always have their origin from consultation with traditional healers, further strengthening the link between religious beliefs and climatic conditions.

It can ostensibly be said, based on participant interviews, that more information on climate change, or being more educated on the topic, leads to the disposal of religious beliefs linking to the climate:

“…but there are still those people that believe that it’s not really the climate; it’s something to do with the gods, or whatever, not being happy with us, and that kinda stuff you know. But personally, I don’t believe that. I think I have enough information to know it’s not about that.” – 04-SS-Ikageng-7.11

When faced with more education and scientific knowledge on climate change, some participants felt that they would be able to adapt specific religious beliefs accordingly. These participants proposed religious institutions as vehicles for helping to raise climate change awareness, thereby highlighting the importance of these institutions in encouraging community participation:

“Ja, if we get taught every time about climate change, like there’s projects where people tell people if we do something like this which is wrong that it will affect climate change in a certain way, like at schools, maybe at church, at the house, maybe do some projects just to show people that something that we do can affect climate change in a certain way and how we will be affected also as people.” – 05-BJ-Ikageng-5.58

Others maintained that education and religion are mutually exclusive. For them an education discredits religious belief:

“I don’t think – well now, it’s way different, you know, but there are still those people that believe that it’s not really the climate; it’s something to do with the gods, or whatever, not being happy with us, and that kinda stuff you know. But personally, I don’t believe that. I think I have enough information to know it’s not about that.” – 04-SS-Ikageng-7.11

“I don’t believe in religious things; I believe in scientific theories…” – 01-KM-Ikageng-8.10
One specific exchange, however, expressed a clear synthesis between Christian, traditional and scientific worldviews:

Respondent: “According to my belief (laughs), my belief is complicated and I don’t know how to put it. I’m a person that believes in culture and I know that old things are different from current things, but you can tell your brain. Immediately once you’ve told your brain nothing can change it because that will be what you believe in. You understand?”

Interviewer: “Yes.”

Respondent: “So this thing of culture, mostly, it is something that we think about. Let me explain myself using the Bible, I don’t know if you’ll accept it?”

Interviewer: “Yes I’ll accept it my sister.”

Respondent: “Okay. Climate change is —. It will always —. It will —. It will always change until infinity. You understand me?”

4.2.4.2 Phases Two to Four: Qualitative and quantitative data and overall findings

Statements such as those quoted from Phase One in the previous section were used to compile the 40 Q-sort statements for use in consequent phases of the research process. These statements and their significance, along with the Phase Four worldview interviews, are discussed in the following section.

4.2.4.2.1 Results of the Q-sort: the five factors

Five factors (narratives) were constructed from the Q-sort data in Phase Three, and presented to participants in Phase Four as differing worldviews. Table 4.1 illustrates the five factors and their descriptions. These five factors constituted 58% of the sample variance, with Factors 2 and 3 (relating directly to religious views and beliefs) accounting for a total of 22% (12% and 10% respectively). Although Factor 1 was the dominant factor, only Factors 2 and 3 will be discussed for the purpose of this study, as they contained the majority of statements identified as being relevant to beliefs and more specifically religious beliefs.

**Table 4.1: Factors and descriptions**

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<tr>
<th>Factor (worldview)</th>
<th>Description</th>
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<tr>
<td><strong>Factor 1:</strong></td>
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<tr>
<td>Collectivist/liberal</td>
<td>The climate changes we experience today are not a punishment for people’s s</td>
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<td>people feel emotionally, it can also cause people to change their beliefs.</td>
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<td>If we unite, we have a better chance of solving climate</td>
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problems and influence the next generation’s attitudes towards nature. This is important since the climate influences the growth of crops and production of food, and we have to act now to prevent further changes to the climate.

| Factor 2: Religious fatalist/determinist | The climate can’t be changed by traditional healers since it’s determined by God. Because of this, the climate is just a natural part of the world that we have to accept and it is not affected by people’s behaviour. Climate change is not related to the burning of fossil fuels, and the changes are just the fact that the climate is unpredictable. I’m open to changing my beliefs, but I think the best way of solving any possible environmental problems is by returning to the ways of our ancestors. Things were better when I was younger, and I think that today’s technology plays an important part in the changes we see. In others words: I don’t believe that there is anything wrong with the climate and I don't think environmental problems are a sign that the world is ending. |
| Factor 3: Religious | The climate is determined by God and climate changes are a sign that the world is ending. I will not change my belief and the climate influences neither me nor other people emotionally. The climate is not that complicated seeing as the changes are mainly related to the burning of fossil fuels. This means that we can also control the climate through technology, and that natural disasters are largely caused by people’s actions. The next generation will be influenced by our behaviour towards nature, but that doesn’t mean we should return to the ways of old. The climate was not better when I was younger, and I think young people can help the older generations get educated about climate change. This is important, since we have to act now to hinder further damage to the environment. |
| Factor 4: Technology/human | The climate plays an important part in our lives and we need to respect the environment. We have the right to know about climate issues that affect us directly and indirectly. Even though the climate is changing, it’s not caused by population growth and is not a sign that the world is ending. Sometimes I think that traditional healers can cause the climate to change, but I also believe that the changes in the climate are related to the burning of fossil fuels and people damaging the environment when they are trying to make money. This means that we should rather try to use sustainable technologies, since this would benefit the environment. It may not be possible for humans to control the climate through technology, but if we work together, we can make a difference. |
| Factor 5: Governance/structural | There is something wrong with the environment, but returning to our old ways is not the way to solve problems. Seeing how the climate is both complicated and unpredictable, the government plays an important part in informing people about the changing and drafting laws as an effective way of protecting the environment. There’s no way around the fact that the changes we see today are consequences of people’s behaviour, and if we continue as |
now we will destroy the earth. It might however be difficult to educate people about the problems because of their beliefs, but I for one am open to changing what I believe to be true.

The majority of Phase Four participants (three out of eight per worldview) chose worldviews (factors) 1 (collectivist/liberal) and 4 (technology/human). Table 4.2 provides an overview of Phase Four participants based on their significant loading and eventual factor choices. Participants who “loaded significantly” for a factor essentially sorted their Q sorts or statements in a way that was very similar, or the identical to the worldview (factor) in question, as it is comprised of Q sorts. The specifics of the findings of this phase are discussed shortly; however, when asked why they felt they relate to the worldviews they chose, some of the following responses were given:

Factor 1:

“The climate change experiences – it’s not the punishment, firstly, and it’s a natural thing, and it’s just nature reshaping itself. Like today it was a bit cloudy and everything, so it changes. And there’s nothing we can do about that.” – Participant #2 (significantly loaded for Factor 2)

Factor 4:

“I will go with viewpoint 4 because it says ‘climate plays an important part in our lives’. Yes. When we see the climate outside, I can say it’s… how can I put it? It plays an important part of our lives. When it’s cold, our body – it make us not to feel ill. It controls our body, so that it can cool.” – Participant #8 (significantly loaded for Factor 5)

“It says we have to respect the environment – I agree with it. We must not pollute our environment. We have to respect it. If we make pollution, it will cause people and animals to get sick.” – Participant #8

Factor 5:

“I don’t know, but my gut is saying 5, you know?” – Participant #1 (significantly loaded for Factor 1)

“Yeah, because when you look at viewpoint 5 it says unemphatically [sic] that it is a consequence of people’s behaviour, which is what I believe is true.” – Participant #1

“So for me, I think I’d have to go with 5 because I think viewpoint 1, the very first sentence there, maybe I’m, like you said, I’m looking at it in a different way… so I think maybe if viewpoint 1 had said that it is a natural occurrence, but it would not have been where it is now had it not been for our behaviours then I would have probably gone with it. But because of the way that it’s put, I’d have to go with 5. I think 5 is a little bit better for me.” – Participant #1

Table 4.2. Phase Four: Participants’ significant factors and chosen worldviews

<table>
<thead>
<tr>
<th>Factor</th>
<th>Participant number</th>
<th>Chosen worldview</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
It was interesting to note that neither of the two worldviews seemingly geared toward religious beliefs (Factors 2 and 3) were chosen, although qualitative statements were made during the Phase Four interviews that would suggest support of these factors. Participant #2 initially chose Factor 2 (for which they were loaded significantly), but finally opted for Factor 1. The participant stated that the amendment was due to the fact that they know nothing about fossil fuels and how they affect everything. It was therefore not an issue with any religion-related statements in the worldview, but rather with a statement that pertained to the influences of human activities.

Participant #4 was loaded significantly for Factor 3, meaning that they were statistically predicted to fit into that category, although Factor 5 was chosen. The qualitative interview with this participant during Phase Four was, however, mainly religious in nature where various concepts in terms of Biblical scripture were explained:

“Maybe if I have to preach a little bit: you remember, in the Bible, when God was destroying Sodom and Gomorrah – this is one story – two: the other one, Noah and the ark. When God said to Noah: ‘I’m going to destroy the world, because of people’s’ lifestyle that is contrary with me, their God’. People took Noah… there were those who were ignorant: ‘what is he building?’…” (When illustrating people’s ignorance regarding climate change.) – Participant #4

“We must understand that the climate…there’s nothing that in the time of maybe God’s servant like Abraham or those people, Isaac and Jacob, you name it: there’s nothing different about the claim of God to man concerning the climate, you see? But I can only say, the disturbance of the climate to the extent whereby the temperature is abnormal – is burning the crops – it’s not that God approve it that way. No, there must be a disturbance from the point of view from the world…” – Participant #4

“The ending of the world has nothing to do with what you may believe in. The only guidelines of the ending of the world is through the Biblical text. It is there, it is written there, it is captured there, all along. So if you want to know whether it is ending – yes, it is ending, but this climate change is not part of it. The only part of it, the link to it is this so-called war – there will be war, there will be lawlessness, children will bring children forth and so on. Violent society, corruption, selfishness…” – Participant #4

Possible reasons for Participant #4 not choosing either worldview 2 or 3, which are geared toward a religious worldview of climate change, are discussed in Section 4.4. Further reference to these statements are made in conjunction with the Q-sort data of Phase Three.
4.2.4.2.2 Relevant Q-sorts and their factor arrays

This section provides an overview of the factor arrays attributed to Q-sort statements relevant to this study, as well as discussions regarding the significance of religious beliefs’ influence on climate change adaptation. For a complete list of Q-sort statements used in Phases Two and Three, see Annexures 1 and 2.

Table 4.3 illustrates the ranking of Q-sorts relevant to the study, based on their link to the topic of climate change and religious beliefs.

Table 4.3: Q-sorts related to climate change and religious beliefs

<table>
<thead>
<tr>
<th>Number</th>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>The climate is determined by God.</td>
<td>-2</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>9</td>
<td>Climate is not punishment for the sins that people commit.</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>-1</td>
</tr>
</tbody>
</table>

Factors 2 and 3 are in accord only on Statements 8 and 9, strongly agreeing that the climate is determined by God, and both remaining neutral on climate change being punishment for sins. All other statements in this table indicate a clear division between the beliefs of the two factors regarding climate change and religious beliefs. This is where the first distinction between two specific groups of religiously inclined participants can be made. Beliefs regarding the origin of climate provides for this distinction:

“*The climate is determined by God’, yes, that’s true.*” – Participant #2

While Factor 2 agrees with statements 1, 6, and 7, Factor 3 entirely disagrees; the word “natural” seems to be the cause for this. Factor 3 does not acknowledge the “natural” state of the climate, whereas Factor 2 creates a link between this “naturalness” and the climate being determined by
God (cf. Section 4.2.4.1). Participant #2, who was loaded significantly for Factor 2, made the following statement to corroborate this conclusion:

“So because it’s determined by God, it’s natural.” – Participant #2

Denying this “naturalness” removes the possibility of nature (including the climate) containing inherent powers (occultism), which means that this group does not deify nature as Factor 2 seems to do. Factor 2 therefore attributes a sense of self-government or autonomy to the climate, without disregarding the power that God has over it, which Factor 3 disagrees with completely.

Factor 2 may also be interpreted as being more deterministic with regard to the effects of climate change, regardless of their apparent positive attitude towards nature and the environment. This is mostly due to the high scoring of Statement 1 which scored higher in Factor 2 than in any other factor. The Q-sort states that “climate change is a natural occurrence, therefore we cannot and will not do anything about it” – adaptation therefore seems to be regarded as futile. It is also relevant to note that Factor 2 denies human involvement in climate change, adding to the idea that it is “God’s thing”, and therefore not within our realm of power to influence.

Statement 9, regarding punishment for our sins, did not load significantly for either factor. Factor 5 alone indicated an overall disagreement with the statement (-1), indicating the belief that climate change is indeed punishment.

“I don’t really see climate change as punishment.” – Participant #3 (loaded significantly for Factor 2)

Table 4.4 illustrates statements pertaining to ancestral belief and traditional healers.

**Table 4.4: Q-Sorts linked to ancestral beliefs and traditional healers**

<table>
<thead>
<tr>
<th>Number</th>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Climate change is caused by the fighting of the ancestors.</td>
<td>-3</td>
<td>-3</td>
<td>-1</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>11</td>
<td>Traditional healers cause the climate to change.</td>
<td>-3</td>
<td>-3</td>
<td>0</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>Educating people about climate change will anger the ancestors and cause bad luck.</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>-2</td>
<td>-2</td>
</tr>
</tbody>
</table>

Statements 10 and 11 ranked lower in Factor 2 than in any other factor (-3, -3), indicating strong disagreement with the belief that ancestors and traditional healers can influence the climate. This links very strongly to the view from Factor 2 that humans cannot influence the climate in any way.
Statement 11, however, ranked higher with Factor 3 than any other factor (-1). This does not indicate agreement with the statement, although it may point to a greater willingness to accept the possibility of traditional healers playing a role in climate change.

Table 4.5 illustrates all statements directly related to beliefs.

**Table 4.5: Q sorts related to beliefs**

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Factor arrays</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>It is difficult to educate people about climate change because of their beliefs.</td>
<td>0 -1 0 -2 2</td>
</tr>
<tr>
<td>34</td>
<td>It is possible to change my beliefs when someone else tells me to.</td>
<td>-1 -2 -2 0 -2</td>
</tr>
<tr>
<td>35</td>
<td>In order to change our beliefs about the climate, we must sit down and discuss the matter.</td>
<td>2 1 1 1 1</td>
</tr>
<tr>
<td>36</td>
<td>My beliefs about the climate can change if I see in reality that things are different from what I believe.</td>
<td>2 2 2 0 2</td>
</tr>
<tr>
<td>37</td>
<td>My beliefs about the climate can change when I feel less vulnerable.</td>
<td>0 0 -2 0 0</td>
</tr>
<tr>
<td>38</td>
<td>I am open to change my beliefs, because I learn new things all the time.</td>
<td>1 2 0 0 3</td>
</tr>
<tr>
<td>39</td>
<td>It is not possible to change my beliefs.</td>
<td>-1 -1 1 0 -2</td>
</tr>
<tr>
<td>40</td>
<td>The climate influences how people feel emotionally and that may influence their beliefs.</td>
<td>1 0 -1 -1 0</td>
</tr>
</tbody>
</table>

Factor 2 displays an openness to revise beliefs; beliefs can be changed and they should therefore pose no hindrance to education regarding climate change. Beliefs should therefore also pose no hindrance to implementing climate change adaptation. Statement 36 ranked highest for this factor, emphasising that for them “seeing is believing”, and that telling someone associating with this factor to change their beliefs will have no impact on their willingness to do so. Statement 34, which relates to this directly, ranked lower than any other factor.

Factor 3, however, exhibits some contradiction in terms of whether or not beliefs can be changed: they agree with both Statements 39 and 36. This ambiguity lies at the heart of the obstacle religious beliefs poses to climate change adaptation. An explanation for this ambiguity may lie in
the link between Statements 34 and 39: Statement 39, which was indicated in the positive by this factor, can be seen to imply that the change in belief is being enforced by external pressures, clearly supporting Factor 3’s denial that beliefs can change when encouraged by someone else to do so. If they can see for themselves that their beliefs are untrue, they feel that they would be able to adapt and change those beliefs. Statement 36, highlighting this view, scored highest for this factor.

4.2.4.3 Conclusions from Objective 4

Factors 2 and 3 place participants that can be regarded as religious, into two categories. Factor 2 describes theological determinists that regard the climate as a concept that lies within God’s realm; these participants acknowledge that the climate has an impact on them, but denies any human influence on the climate. It also interesting to note the similarity between Factor 2, and the “fatalist” worldview as described in the CTR model, which entails persons believing that “nature and climate are capricious and fundamentally random and unpredictable (Mcneeley and Lazrus, 2014:508). This view can be detrimental to the enforcement of adaptation measures, as it engenders a negligence of nature that does not allow for a two-way relationship between humanity and nature. In other words: humans can utilise nature whichever way they want (and consequently contribute to climate change), but it remains a natural creation of God that cannot be changed or interfered with. The willingness to change their beliefs, however, as expressed in the factor arrays, makes this group prime candidates for accepting climate change adaptation education.

The second group, relating to the narrative of Factor 3, rejects the “naturalness” of the climate and subsequently does not deify nature as is the case with Factor 2. These participants believe in the climate in more concrete terms and acknowledge humankind’s impact and contribution to climate change, while still believing in God. Adaptation needs to be motivated intrinsically, with external encouragement, perhaps via conceptual change in the form of education. In other words, Factor 3 should respond well to external influences promoting climate change adaptation, as long as the right to make a decision for themselves is still present.

4.3 Recommendations

Based on the conclusion that religious beliefs, specifically within the context of this study, do indeed have significant impacts on people’s willingness and ability to adapt to climate change, this section provides brief recommendations for the incorporation of religious beliefs in climate change adaptation education and interventions.

The first group of religious participants identified (cf. Section 4.2.4.3) exhibited willingness to participate in climate change education and adaptation in order to change their current beliefs,
which presents a relatively easy task for individuals or organisations looking to provide such education. It is, however, important to remember that these people still hold their own religious beliefs and that their willingness to adapt these beliefs, and consequent behaviour, does not negate the importance of said beliefs. Before any educational or awareness interventions are undertaken, discussions need to be held to determine individual and communal religious beliefs, as well as any links it may have with the climate. The community-based disaster risk management (CBDRM) approach will be ideal, as it involves community members directly in the process of knowledge acquisition and dissemination. The emphasis is on the community’s needs, knowledge and especially beliefs, in order to create a risk management plan that suits their context.

Participants who identified as being deterministically religious, pose a slightly greater challenge in terms of adaptive climate beliefs. These participants will most likely respond best to initiatives that employ a conceptual change approach to education. Incorporating conceptual change processes into any parts of the CBDRM process may be the best way forward. Clark (2013:4) states that “when an individual is ‘exposed’ to ideas in opposition to their currently held beliefs, these beliefs serve as a defence against any potential conceptual change”. However, careful consideration of information disseminated in terms of the religious belief context during the conceptual change and CBDRM process, may lead to greater success rates regarding adaptation for these types of community members. As Clark (2013:72) found in his study on conceptual change and climate change (global warming or GW) beliefs:

well-considered information, even received online, increases GW acceptance and behaviourally relevant attitudes; the conceptual changes that result from reading even 400 words have notable longevity.

4.4 Reflections

This section gives a few final reflections regarding the overall research process and addresses some other problems experienced during the Q-methodology process.

During Phase Four, the majority of participants chose different worldviews than the ones for which they were loaded significantly in the data from previous phases. This caused some statistical problems, since the data was essentially skewed by 7/8 participants (87.5%). During the semi-structured interviews in Phase One, a large number of participants struggled with the second question: Do you think it would be possible to change your beliefs about the climate? The most common answer implied not being able to change the climate itself, rather than referring to whether or not their beliefs can be changed. This indicated that the meta nature of beliefs was not immediately grasped:

“Yes. So I don’t have that belief I can change the climate because of it’s natural.” – 03-SS-Ikageng-6.22 (After being asked whether they think they would be able to change their beliefs about the climate.)
Explanations were subsequently needed to illustrate the intention of the question. This posed some problems, since the researchers had to be careful not to make leading statements or infer their own interpretations of the word beliefs.

There were some discrepancies between the qualitative data and the Q sorts in Phase One, for example verbal communication (the qualitative data) that contradicted the results of the Q-sort – participants sometimes said things that differed from their plotted statements on the board. There were also certain Q sorts (statements) that either led to some confusion, or were misunderstood completely. One such example was Statement 37: My beliefs about the climate can change when I feel less vulnerable.

Two significant points could be observed with regards to this statement. Firstly, many participants were unfamiliar with the word vulnerability, especially in the context of climate change, and others were of the opinion that they are not vulnerable. The former tended to place the statement in the neutral category as they were unsure of how to respond, whereas the latter merely indicated that they disagree with the statement. It should be noted that Q methodology is specifically designed to measure subjectivity and that the subjective interpretations of participants regarding statement 37 represents valuable data points, whether or not interviewers agree with the way in which participants “understand” the statement.

Secondly, the problem of changing beliefs was raised. Participants failed to see the link between decreasing vulnerability and changing beliefs, especially since the concourse does not specify which type of beliefs were being referred to. The statement did however represent relevant information obtained from the Phase One interviews and was therefore included as a Q-sort in order to determine participants’ views on the matter.

Various issues arose with regard to the aspects of the study that applied to participants’ religious beliefs. Firstly, it is important to take into account that religious beliefs are very prescriptive and often based in doctrine, but ultimately some extent of subjective interpretation comes into play. The formulation of statements that may have appeared to be of a religious nature (for example Statement 8: The climate is determined by God) were vehemently rejected if the formulation strayed from the very specific interpretation of the participant. Beliefs entail more of what can be seen as disbelief – “on the one hand a system of beliefs which one accepts, and on the other, a series of systems of beliefs which one rejects” (Rokeach, 1956:228) – and this will cause people to rather eliminate statements they disagree with. This rigid belief-disbelief dualism seems to be particularly pronounced in thinking that involves deeper religious commitments, but this does not mean that the participant does not involve religious belief when expressing their views on climate change and climate change adaptation – it may just mean that the particular view expressed in the statement is strongly rejected because it does not precisely reflect the participant’s own
specific formulation. This was especially noticeable in the case of the Phase Four interview of Participant #4 who was expected to choose Factor 3 (religious worldview), but instead opted for Factor 5 (governance/structural worldview). The discrepancy can be attributed to the fact that he explained his own religious beliefs extensively and specifically during the actual interview, while he seemed to disagree with the more general religious statements of Factor 3.

A further issue, best illustrated by Participant #4’s case, is that of the individual statements comprising each factor narrative. Arguably the best way of determining participant worldviews, is having participants read through the options and make an intuitive choice, but due to the large volumes of information, this did not seem entirely possible. It therefore called for participants to virtually analyse each worldview based on the individual statements, rather than choose it based on an overall impression. This poses a possible problem for participants to keep all the components of the narrative of their own identity under consideration at the intuitive level. As Lehrer (1973:121) almost poetically states:

> The shifting sands of subjectivity shape and reshape the foothill paths of evidence that guide us to conclusions in the mountainous terrain of inquiry.

This inquiry can be into our own worldview and the “evidence statements” that we choose or discard when determining our own views often change (Lehrer, 1973:121). Without the discussion of different worldviews, and by default the different statements, it would have been impossible to get the valuable qualitative input necessary for a study of this nature.
CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

The aim of this study was to investigate whether religious beliefs have any impact in the way people perceive climate change, as well as on their willingness and ability to adapt to it. In this regard the study was successful: it has been determined that within this specific context, participants who regard themselves as religious exhibited evidence of influence from their religious beliefs, whether positive or negative. The two groups ultimately identified as exemplifying Factors 2 and 3 showed that it is worth pursuing the incorporation of religious beliefs in practices geared towards ensuring proper adaptation, and the overall outcome was an optimistic one encouraging further study.

5.2 Conclusions to the study

Based on the research, it is evident that participants had an overall understanding and awareness of climate change, although many of their interpretations thereof were of an elementary level and only somewhat corresponded with the official definitions thereof (cf. Section 4.2.2.1.). The effects of climate change were largely expressed in terms of changes in temperature and precipitation (cf. Section 4.2.2.1.), although references were made to its effects on food production, especially within the context of the drought in South Africa (cf. Section 4.2.3.1.). The anthropogenic nature of climate change was also largely acknowledged, and participants expressed their view that the changes in climate are due to the actions of people (cf. Section 4.2.2.1.). Participants tended to describe the climate and the effects of climate change in terms of their own context, pointing to the highly subjective nature of such concrete climate perceptions and beliefs (cf. Sections 4.2.2.1., 4.2.3.2.). This is in keeping with the notion put forth by authors such as Lorenzoni et al. (2000) and O'Brien et al. (2010b), that social context is a strong determinant of climate perceptions.

Heavy emphasis was placed on mitigation strategies, rather than adaptive measures, for curbing the effects of climate change (cf. Section 4.2.2.1.). It is possible to draw causal links between participants’ perceptions regarding the causes of climate change, and their proposed solutions to the issue. The scarcity of resources that permeates the lived-experience of economically vulnerable groups may be seen as a reason for rather opting for reduction of ecologically unsound behaviour and mitigation.

Participants expressed significant interest in receiving more information and possible education on climate change, and the incorporation of conceptual change in educational endeavours was suggested to ensure the necessary changes in the event of uniformed or harmful climate beliefs.
The role and responsibility of the government in such endeavours was raised by some participants (cf. Section 4.2.1.).

When faced with the term “beliefs”, many participants immediately assumed a religious connotation, and participants who identified themselves as religious were all Christians (no denominations were specified) (cf. Section 4.2.4.1.). African traditional religious elements were also described, including the belief that traditional healers can change the climate, ancestral beliefs, and religious rituals that relate to changes in the climate (cf. Section 4.2.4.1.). A clear theme being that climate change is punishment for the sins of humankind was recorded from the qualitative data. These punishments are responses to a variety of sins, including abortion, violence and murder, and sins committed by previous generations (cf. Section 4.2.4.1.). Biblical prophecy relating to the end of the world was also cited as a reason or explanation for climate change, although this belief was not widely held (cf. Section 4.2.4.1.).

Certain participants expressed the belief that the climate is a natural process; others were of the opinion that the climate is determined and controlled by God (cf. Section 4.2.4.1.). Furthermore, another group of participants indicated a link between the climate “naturalness” and its being created by God (cf. Section 4.2.4.1.), laying the foundation for the identification of the two distinct religious groups referred to earlier.

This first group (Factor/worldview 2), distinguished from the other group by their belief that natural objects and phenomena are under God’s control, displayed what can be interpreted as a type of religious determinism or fatalism. These participants deny human involvement in the changing of the climate, and reason that because of the power over nature enforced by God, humans can have no influence on it at all. This belief leads to a metaphorical shrugging of the shoulders that has the potential to hamper adaptive capacity and willingness (cf. Sections 4.2.4.1., 4.2.4.2.). Interestingly, this group expressed a willingness to change their beliefs, based on the principle of “seeing is believing” – merely telling this group to adapt will get you nowhere. It will require careful education with the inclusion of practical examples to change their beliefs about the climate (cf. Section 4.2.4.3.).

The second group (Factor/worldview 3) does not acknowledge the “naturalness” of climate as pointed out by the religious determinist group, therefore denying the deification of nature. These participants perceive the climate in more concrete terms, acknowledging humankind’s role in changing it. Although this group displayed a similar willingness to change their beliefs about the climate, adaptation would have to be motivated intrinsically. The emphasis is moved from being shown why change is necessary, to personally understanding and accepting the reasons for adaptation. Conceptual change education is recommended for achieving such a goal (cf. Section 4.2.4.3.). Clark (2013:4) states that “when an individual is ‘exposed’ to ideas in opposition to their
currently held beliefs, these beliefs serve as a defence against any potential conceptual changes”. It is for this very reason that this study’s findings are important: showing that religious beliefs can hamper (or assist) adaptation highlights the need for further study in order to achieve global adaptation goals.

5.2. Limitations

A clear limitation was anticipated for this study in terms of language and this was addressed by involving researchers who are proficient in Tswana (home language for the majority of participants) and also making subsequent transcriptions and verbatim translations of these interviews.

5.3. Recommendations

As was discussed in detail earlier (cf. Section 4.3.), the use of the CBDRM process, as well as integrating conceptual change methods in this process, can be recommended for climate change adaptation endeavours to successfully include religious beliefs. Further, Q-methodology is specifically geared towards determining individual views and perceptions, and was well suited to supporting this study’s contention that the socio-cultural elements of climate change, such as culture, behaviour, and indeed religion, need to be taken into greater account in future endeavours. Continued culture-specific Q-methodology studies are recommended to further amplify the manifold voices to be found in Africa, to ultimately provide knowledge and understanding of their own religious views in the global context of climate change effects and how to adapt to them.
REFERENCES


Clark, D.J. 2013. Climate change and conceptual change. California: University of California. (Dissertation – PhD).


ANNEXURES

Annexure 1: Q-sort statement set (Phase Two)

1. The climate is a natural part of the world we just have to accept and live with.
2. The climate is complicated.
3. The climate is unpredictable.
4. The climate is changing.
5. There is something wrong with the climate.
6. Climate change is a sign that the world is ending.
7. Natural disasters happen when nature wants to reshape itself.
8. The climate is determined by God.
9. Climate change is punishment for the sins that people commit.
10. Climate change is caused by the fighting of the ancestors.
11. Traditional healers cause the climate to change.
12. The climate is affected by the behaviour of people.
13. Increasing population growth causes climate change.
14. Climate change is caused by technology.
15. Climate change is related to the burning of fossil fuels and pollution.
16. The climate influences the growth of crops and the production of food.
17. People are trying to make money, that’s why they are damaging the environment.
18. The climate was better when I was younger.
19. We can solve environmental problems by returning to the ways of the past.
20. The next generation will be influenced by our current behaviour towards nature.
21. We must act now to prevent the climate problems of the future.
22. Young people can help older people catch up with new knowledge about the climate.
23. We have the right to know about climate issues that affects us directly and indirectly.
24. Educating people about climate change will anger the ancestors and cause bad luck.

25. It is the duty of the government to inform people about climate change.

26. We can address climate problems by drafting laws that protect the environment.

27. We can solve climate problems when we stand together and unite.

28. It is possible for humans to control the climate through technology.

29. Using sustainable technology is good for the climate.

30. It is difficult to care about climate change because of economic pressures.

31. The climate does not play an important role in our lives.

32. We must respect the environment.

33. It is difficult to educate people about climate change because of their beliefs.

34. It is possible to change my beliefs when someone else tells me to.

35. In order to change our beliefs about the climate, we must sit down and discuss the matter.

36. My beliefs can change if I see in reality that things are different from what I believe.

37. My beliefs about the climate can change when I feel less vulnerable.

38. I am open to change my beliefs, because I learn new things all the time.

39. It is not possible to change my beliefs.

40. The climate influences how people feel emotionally and that may cause changes in their beliefs.
Annexure 2: Q-sort statement set (Phase Three)

1. The climate is a natural part of the world we just have to accept and live with.
2. The climate is complicated.
3. The climate is unpredictable.
4. The climate is not changing.
5. There is something wrong with the climate.
6. Climate change is not a sign that the world is ending.
7. Natural disasters happen when nature wants to reshape itself.
8. The climate is determined by God.
9. Climate change is not punishment for the sins that people commit.
10. Climate change is caused by the fighting of the ancestors.
11. Traditional healers cause the climate to change.
12. The climate is affected by the behaviour of people.
13. Increasing population growth causes climate change.
14. Climate change is not caused by technology.
15. Climate change is related to the burning of fossil fuels and pollution.
16. The climate influences the growth of crops and the production of food.
17. People are trying to make money, that’s why they are damaging the environment.
18. The climate was not better when I was younger.
19. We can solve environmental problems by returning to the ways of the past.
20. The next generation will be influenced by our current behaviour towards nature.
21. We must act now to prevent the climate problems of the future.
22. Young people can help older people catch up with new knowledge about the climate.
23. We have the right to know about climate issues that affects us directly and indirectly.
24. Educating people about climate change will anger the ancestors and cause bad luck.
25. It is not the duty of the government to inform people about climate change.
26. We can address climate problems by drafting laws that protect the environment.
27. We can solve climate problems when we stand together and unite.
28. It is possible for humans to control the climate through technology.
29. Using sustainable technology is not good for the climate.
30. It is difficult to care about climate change because of economic pressures.
31. The climate does not play an important role in our lives.
32. We do not have to respect the environment.
33. It is difficult to educate people about climate change because of their beliefs.
34. It is possible to change my beliefs when someone else tells me to.
35. In order to change our beliefs about the climate, we must sit down and discuss the matter.
36. My beliefs can change if I see in reality that things are different from what I believe.
37. My beliefs about the climate can change when I feel less vulnerable.
38. I am open to change my beliefs, because I learn new things all the time.
39. It is not possible to change my beliefs.
40. The climate influences how people feel emotionally and that may cause changes in their beliefs.
Annexure 3: Journal Instructions to Authors

INSTRUCTIONS FOR CONTRIBUTORS

All manuscripts should be submitted to the Human Ecology online submission and review system, Editorial Manager. Note that PDF files are NOT supported for purposes of submission.

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In order to provide timely review and publication, articles will be considered in three categories:

- Feature Articles, not to exceed 10,000 words
- Research Reports, not to exceed 7000 words
- Brief Communications, not to exceed 5000 words

While all submissions are externally peer reviewed, the turnaround time for research reports and brief communications is usually shorter. However, it should be emphasized that the standard of scholarship and research is the same for all submissions.

Illustrations (photographs, drawings, diagrams, figures and charts) should be numbered in consecutive Arabic numerals. The captions for illustrations should be on a separate page and include corresponding author's name. Consult Editorial Manager for specific rules regarding submission of photographs. Either the original drawings or high-quality photographic prints are acceptable. Identify all with author's name and number of the illustration.

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Each table should be on a separate sheet of paper, numbered and include corresponding author's name.

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Submissions should be classified as one of the following:

- **Feature Paper, Original Research**

Feature articles address topics or problems of broad interest going beyond studies of circumscribed regional and topical interest generally drawing on an identifiable body of theory and presenting evidence based on well-defined methodology. Contributions should not exceed 10,000 words, including footnotes (end notes are not used). The Editor will consider longer submissions on their merits. An abstract no longer than 150 words should be accompanied by 4-
5 keywords which express the precise content of the manuscript and research area. They are used in the external review process and for indexing purposes.

- **Research Reports**

Research reports should present the results of current and timely research including reference to problem addressed, methodology used, and likely relevance. Contributions should not exceed 7,000 words, including footnotes; shorter manuscripts are preferred. The Editor will consider special cases on their merits. An abstract no longer than 150 words should be accompanied by 4-5 keywords to express the precise content of the manuscript as well as the venue of research. Keywords are important as they are used in the review process.

- **Brief Communications**

Brief communications address a wide range of problems and issues including those of a speculative nature or where the contributors feel further work is called for and focus on data presentation and methods. Contributions should not exceed 5,000 words, including footnotes; shorter manuscripts are preferred. The Editor will consider special cases on their merits. No abstract or keywords required.

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By invitation of the Book Review Editor, contributions should not exceed 3,000 words. The editor will consider longer reviews where warranted.

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Contributions should not exceed 1000 words and should directly relate to papers recently published in *Human Ecology*. 
CO-AUTHOR PERMISSION FOR ARTICLE: “Religious beliefs and climate change adaptation: a study of three rural South African communities”.

To Whom It May Concern:

As co-author of the presented article, I hereby give permission that the article may be included as part of the dissertation that will be submitted in partial fulfilment of the requirements for the degree Magister Artium in Development and Management at the North-West University and declare that the student contributed sufficiently to the research and the writing process of the presented article.

Signed at Eidsvoll

on the 03rd day of July 2016.

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