THE ROLE OF BUSINESS MANAGER ATTITUDES AND PERCEPTIONS IN DRIVING CLIMATE CHANGE RISK ACTION IN THE AGRICULTURAL SECTOR IN UGANDA

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Abstract

Much is already known about climate change risk mitigation and adaptation globally. However, much needs to be done to make this knowledge cascaded down to a business manager in the agricultural sector in Uganda. This study aimed to understand the role of business manager perceptions and attitudes in influencing climate change risk action in business organizations in the agricultural sector in Uganda with its particular climatic, social and economic circumstances. An assessment was made of whether and how the climate change risk perceptions of business managers from 16 companies engaged in downstream agricultural processing differ from 15 managers engaged in commercial agricultural production in Uganda.

The study utilized a phenomenological approach using comparative case study method. The respondents were selected purposively from managed agriculture processor and producer companies. It is believed that the study of perceptions and beliefs involves uncovering tacit knowledge, knowledge in the minds of managers which cannot easily be articulated and documented. The study therefore made use of George Kelly's Personal Construct theory and its repertory grid analysis technique for data collection, a very useful tool for making tacit knowledge explicit. The study examined nine risks as elements for the repertory grid exploring how business managers perceive there risks and how such perceptions influence their climate change risk action in the agriculture sector in Uganda. The study also intended to identify if there are variations in climate change risk perception between the agriculture producers and processors in Uganda. The personal constructs generated from respondents during the grid interviews are the units of analysis. The results were analyzed using Content analysis, and Honey's data analysis procedures.

The results indicate that as long as business managers perceive climate change risks to have an effect on their business continuity or survival, their production capacities, their profitability, their marketing decisions, affect their cost of production, influence their investment decisions, there are available response options, and consider that they have the capacity to manage those risks, they will take immediate action to put in place strategies to respond to those climate change risks. There is no appreciable variation in climate change risk perception between producers and processors. The study results provide policy makers an opportunity to understand what concerns business owners along the agriculture value chain for them to respond to climate change risks and also informs business owners the areas of key concern that they have to reflect on as they consider climate change risk strategies.

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Glossary of terms

Carbon Disclosure Project	An organization which runs the global disclosure system that enables companies, cities, states and regions to measure and manage their environmental impacts using an online database.
Climate change adaptation	Used to imply systems put in place by organizations to cope with actual or expected climatic changes
Climate change drivers	External or internal forces in the business environment which influence climate change response actions in organizations.
Climate change mitigation	Systems put in place to control the effect or impact of climate change.
Climate change risk management	A process for incorporating knowledge and information about climate-related events, trends, forecasts and projections into decision making to increase or maintain benefits and reduce potential harm or losses (Travis & Bates, 2014)
Construct	A way in which somethings are construed as being alike and yet different from others (Kelly, 1955: 105).
Emergent Pole	In a triadic elicitation, this is the characteristic which two of the triad of elements have in common and is written down on the left side of the grid sheet (Jankowicz, 2014).
Hazard	A source of danger to either property, humans or the environment.
Implicit Pole	In a triadic elicitation, this is the characteristic which is considered the odd one out of the three elements and is written down on the right side of the grid sheet (Jankowicz, 2014).
PwC	This stands for Price Waterhouse Cooper, an Audit Company. It produces several reports, but these

	reports have no author names other than the name of the company.
Risk	The likelihood of an event occurring which would negatively impact the achievement of planned activities or organizational objectives. It's the likelihood of a hazard.

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List of acronyms

DPIA-	Data Protection Impact Assessment
GDP-	Gross Domestic Product
GHGs-	Greenhouse Gases.
IFC-	International Finance Corporation
IPCC-	Intergovernmental Panel on Climate Change
PCT -	Personal Construct Theory
RGT -	Repertory Grid Technique
UNFCC-	United Nations Framework Convention on Climate Change

CHAPTER ONE: INTRODUCTION

1.1 Research Aim

The aim of this study is to examine the role that business manager perceptions and attitudes towards climate change risks plays in driving climate change risk action among business organizations in the Agricultural sector in Uganda, in order to inform key policy decisions and corporate responses.

This will be achieved by addressing key concerns of senior policy makers; formalizing this by means of Key Informant Interviews (Homburg et al., 2012; Tremblay, 1957) during piloting, to guide the main study of how perceptions of business managers towards climate change risks in the agricultural sector in Uganda effect climate change risk action. The study uses George Kelly's Personal Construct Theory in understanding how the managers construe the motivators and drivers of climate change action to respond to climate change risks. The repertory grid technique also developed by Kelly was the main tool used in the data collection process.

An assessment was made of whether and how the climate change risk perceptions of business managers engaged in downstream agricultural processing differ from those engaged in commercial agricultural production in Uganda, using the comparative case study method.

The sections that follow are intended to give the reader the highlights of the key sections of this thesis and to help the reader understand the motivation behind this study and the processes undertaken to achieve the study objectives.

1.2 Background and Organizational Context

1.2.1 Understanding Climate change

It is important that there is a clear understanding of the concept of climate change given its implication on the possible actions that may follow. Climate change is mainly caused by 'anthropogenic greenhouse gas emissions originating from fossil fuel combustion and industrial processes driven largely by high economic activity and population growth' (IPCC, 2014a: 2), and from atmospheric concentrations of carbon dioxide, methane and nitrous oxide (IPCC, 2014a: 4). There are current worries that the current trend of global warming

will be difficult to reverse with its related impacts to humans (Allen et al., 2009; Cairns, 2010; Solomon et al., 2009). The required reductions in global greenhouse-gas(GHG) emissions to hold the increase in global average temperature below 2 °C or 1.5 °C above pre-industrial levels also seem to be unachievable (Matthews & Caldeira, 2008; Peters et al., 2013).

The agriculture and industry sectors taken together are stated to be playing a bigger part in accelerating climate change due to the high GHG emissions as illustrated in Figure 1 below;

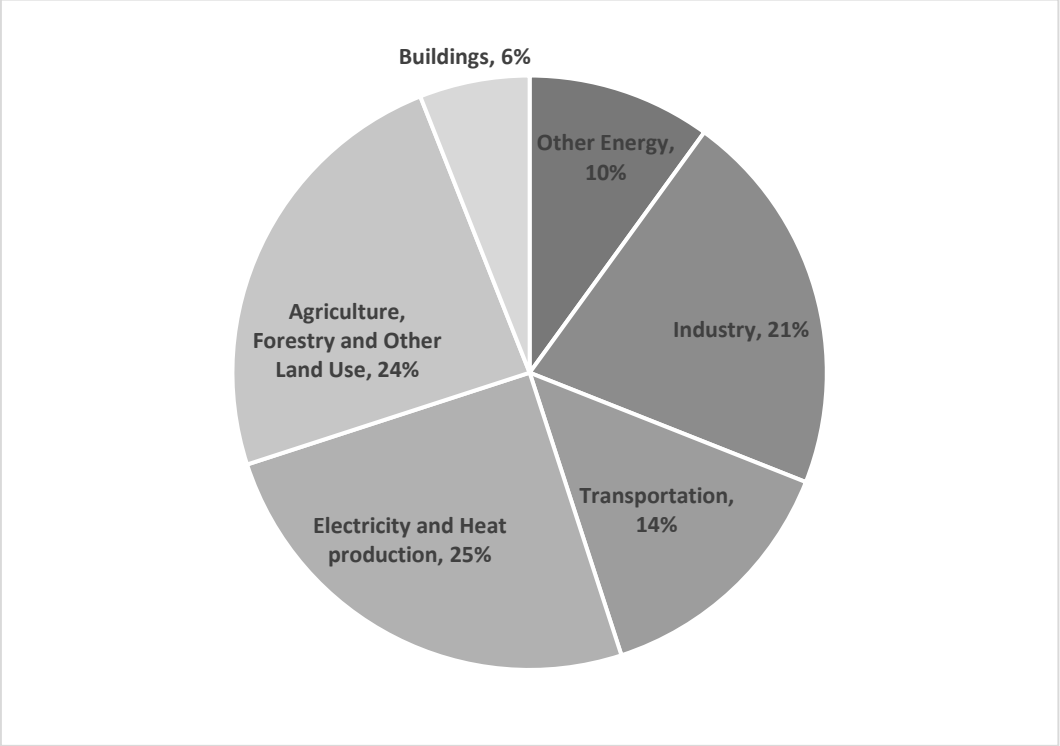

Figure 1: Global GHG emissions by economic sector

Source: 1PCC, 2014b: p.9

In designing meaningful interventions in response to climate change, the role of the agricultural sector and the industrial sectors should therefore not be ignored.

It is further argued that climate change is continuing to reflect itself as a key factor in the decision making processes of companies (Linnenluecke et al., 2013; Su-Yol, 2012; Weinhofer & Busch, 2013) especially as a result of: the anticipated reduction or interrupted resource supply, physical damages to production infrastructure, and reduced or interrupted product distribution (Weinhofer & Busch, 2013:130).

It is also urged that companies' response actions to climate change risks are mainly driven by 'their **capacity** to adapt, their **incentives** to implement actions, and their **perspectives** on the need to manage climate change risks' (Agrawala et al., 2011: 42). Companies' capacities related to their ability to finance climate change related action, the available skills in-house, the available R&D infrastructure, and previous experiences of Climate change events also influence related risk mitigation actions (Agrawala et al., 2011).

Climate change risks faced by businesses can be categorized into four categories:

- Regulatory risks, due to changing laws and regulations
- Physical risks, resulting from effects on production and transport facilities
- Reputational risks, resulting from public opinion of the companies environmental strategies
- Litigation risks

(Nikolaou et al., 2015; Pattberg, 2012).

This study will explore the available drivers, motivations, and barriers to climate change risk action; the perception of business managers and how these translate into climate change risk action.

1.2.2 Understanding climate change impacts

Climate change is continuously being recognized as a major threat to humanity (Willows and Connell, 2003; Agrawala, 2011), and there is a view that Africa may be particularly vulnerable to such change (Adenle et al., 2017; Arndt et al., 2011), with extreme weather events creating risks for a variety of businesses sectors (Weinhofer & Busch, 2013).

Climate change can affect the company's physical infrastructure affecting the firm's revenue streams in return (Gasbarro & Pinkse, 2016). In China for example, 'global warming has caused an economic loss of about $820 million to China's corn and soybean sectors in the past decade; and yields are projected to decline by 3–12% and 7–19%, respectively, by 2100' (Chen et al., 2016:105). Chen et al. used 'estimated coefficients of weather variables to quantify the net economic impact of changing climatic conditions on China's corn and soybean sectors over the sample period'(Chen et al., 2016:107).

Climate change risks pertaining to water shortages, infrastructure damages, changing regulatory environment, changing consumer demands, stressed agricultural production, labor mobility, and an increased cost of energy (KPMG, 2008) create operating challenges requiring businesses to design response strategies (International Finance Corporation, IFC 2010).

Therefore, businesses have to design strategies to address the challenges related to climate change risk in order to especially mitigate its impact on the companies operating capabilities and revenues streams. A detailed review of the climate change risks and possible mitigating actions especially related to business institutions in the agricultural sector will be made in the literature review section.

1.3 A focus on the agricultural sector

Agriculture and industry sectors are playing a bigger part in accelerating climate change due to the high GHG emissions as stated earlier in section 1.2.1. In Uganda, the Agricultural sector makes an important contribution to the National GDP and it employs the highest number of people. The agriculture sector in Uganda accounts for 65% of all the working population (Uganda Bureau of Statistics, 2018b). Agriculture is seen as the main source of income to the majority of the population in Uganda and the main source of export revenue for the country (PwC, 2018: 9).

The World Bank poverty reduction figures in 2016 emphasized the significance of the agricultural sector in Uganda. Agricultural income contributed to poverty reduction in many households, accounting for 79 percent of the national poverty reduction statistics from 2006 to 2013 (World Bank, 2016: p. xviii). The need for carrying out climate change related research in Uganda was also emphasized by the Ministry of Agriculture (Ministry of Agriculture Animal Industry and Fisheries, 2016: viii).

Though there is a lot of research already carried out on climate change adaptation and mitigation in the agricultural sector (Hepworth, 2010; Mase et al., 2017; Niang et al., 2014; Rojas-Downing et al., 2017), these studies create ‘islands of knowledge in a sea of ignorance’, with a much stronger focus on analysis of scientific inputs rather than synthesis of socially relevant outcomes’ (Meinke et al., 2006: 101). For research to be actionable, it needs to be salient, credible and legitimate (Meinke et al., 2006). This study seeks to carry

out a study which will be actionable, focusing on the needs of the end user in developing the research area.

1.4 Rationale for climate change action (motivators and barriers)

Business organizations encounter climate change motivational factors and drivers on a day to day basis either originating from their internal or external environment. Okereke (2007) defines the term motivation to be associated with the desire of businesses to maximize profit. In a situation where motivational factors exist, companies will undertake climate change actions even when direct external (regulatory and public) pressure does not exist. On the other hand, drivers are associated with factors that force corporations to take climate change action (Okereke, 2007).

There is a list of motivators to climate change rick action. Economic self-interest is seen as a key commercial motivator of climate change risk action (Okereke et al., 2018), as is competitiveness, legitimation (Bansal, 2000; Reyers et al., 2011) and ecological responsibility (Bansal, 2000).

However, these motivators may not be sufficient to drive climate change risk action. Action can be driven by external factors: the existence of strong policy frameworks; certainty about government's actions; certainty about the marketplace (Okereke, 2007); existence of appropriate climate change risk information (Scheer et al., 2014); and the cost of action (Gruère & Wreford, 2017).

At the rural farm level, different aspects affect climate change risk action, age, education level, access to agricultural extension, access to agricultural markets, farm income, farm experience, lack of credit facilities, the farm size (Alemayehu & Bewket, 2017; Masud et al., 2017), perceived soil fertility status, and the perception of land tenure security (Alemayehu & Bewket, 2017).

Business climate change risk action is also driven by organizational capabilities and organizational cognition (Bleda & Shackley, 2008). In the next section we look at the role of management cognition, perception and personal constructs in the climate risk response decision making processes.

1.5 Management cognition, risk perception and personal constructs

Many times, it can be assumed that organizational decisions taken by managers follow only standard decision making processes. This is not necessarily true. Managerial decisions follow a mix of subjective thinking and intuition (Dane, 2007; Jankowicz, 2001).

Corporate climate change risk action similarly is believed to be driven by managers' perceptions or awareness (Alemayehu & Bewket, 2017; Bleda & Shackley, 2008). The way how managers perceive climate change risks has a direct bearing on one's behavior intentions, and the response options considered (Gasbarro & Pinkse, 2016; IPCC, 2014b; Linnenluecke et al., 2013). It is important to understand whether corporate climate change decisions must rely more on judgement than on purely rational standard decision-making techniques because of the greater uncertainties involved in anticipating climate change. This is one of the areas that will be examined in section 2.5 of the literature review.

It is also important for us to understand how climate change beliefs and attitudes in businesses are formed as they play an important role in the decision making processes for organizational climate change risk action (Bleda & Shackley, 2008; Lujala et al., 2015).

Manager perceptions or beliefs are influenced by various factors. The perceived actual and potential changes in competitiveness resulting from climate impacts (Bleda & Shackley, 2008); the climate change information received by business managers (Linnenluecke et al., 2015); and possession of expert knowledge on climate change (Taylor et al., 2014). Other factors are the manager's past experiences of climate change impacts (Gasbarro & Pinkse, 2016; Lujala et al., 2015; Niles et al., 2015); gender, educational background, and people's political preferences (Lujala et al., 2015) ; the time horizon, the belief that it won't affect us now (Weber & Hsee, 1998); and one's social-economic status (Ndamani & Watanabe, 2017).

Climate change decision making processes by business managers are based on unwell defined information which is volatile. The strategies that business managers take for addressing climate change are partly dependent on their mental models (Hill & Thompson, 2006). An understanding of how these mental models in relation to climate change risk are formed is therefore very important and can be very useful in formulating climate change risk strategies (Bridges et al., 2013).

There is a need for a way of conceptualizing how perceptions about climate change operate in organizations. Two authors attempted to explain these perception processes in

organizations, ‘Sensemaking’ by Weick (Weick et al., 2005) and Personal Construct Theory (PCT) by Kelly (F. Fransella, 2003; Kelly, 1955).

Weick’s theory of sensemaking attempts to ‘comprehend and to theorize how people appropriate and enact their ‘realities’(Brown et al., 2015). ‘Sensemaking is viewed as a process that involves interpretation, and assignment of meaning to unforeseen, ambiguous, equivocal and confusing events as they are encountered (Davis and Subrahmanian, 2005:58; Weick, Sutcliffe and Obstfeld, 2005; Brown, Colville and Pye, 2015). It helps us to understand how individuals view the world and translate their worldview systematically into organizational coping mechanisms. This theory is useful in understanding how group sensemaking processes play a role in organizational dynamics.

On the other hand, PCT offers a way of understanding sensemaking at the individual level. Using personal construct theory, man is viewed as a scientist interested in predicting and controlling the events he is involved in. Kelly, 1955 proposes a dynamic theory of psychology that helps us to understand how a person makes his prior convictions explicit. Kelly sees man in an existing dynamic world, always faced with changing environment, and therefore with changing thoughts (Kelly, 1955). Man is seen as a having ‘a creative capacity to represent his environment and not merely to respond to it’… ‘Man can place alternative constructions upon it and do something about it if it doesn’t suit him’ (Kelly, 1955:8).

A person can make varied constructions as they experience different events depending on their ability to perceive and understand, but these constructions are always subject to question and reconstruction in alternative ways (Fransella, 2003; Kelly, 1955). Kelly’s theory helps us to understand how man predicts the things to come in a rolling world (Kelly, 1955:14), and how man’s intrinsic knowledge becomes extrinsic and influence his behavior. This will be very helpful in our study in our quest to understand manager perceptions and their role in climate change decision making.

We will explore in more details these two concepts, ‘Sensemaking’ by Weick (Weick et al., 2005) and Personal Construct Theory (PCT) by Kelly in the literature review section 2.8.

1.6 The varying perceptions of business managers at the different levels of the agricultural value chain

This study intends to understand the perceptions of business managers engaged in downstream agricultural processing and those engaged as producers at the farm level. With the population of the world approaching 8 billion people, agricultural value chains have been identified as playing a critical role in ensuring sustainable and equitable food production but are negatively affected by climate change and especially in developing countries (Gómez et al., 2020), Uganda being one of those. Different activities take place at different stage of the agriculture value chain with different players playing varying roles. From the perspective of the global value chains, value chains are described with reference to the sequences of value added within an industry, from conception to production and end use covering a range of activities such as design, production, marketing, distribution and support to the final consumer (Fernandez-Stark & Gereffi, 2019). Related activities also take place in the agriculture value chain as produces move from production to final consumption and the related value added.

In understanding the perceptions involved, it is important to know the different characteristics of the agricultural value chain and how manager perceptions are likely to be impacted at the various stages of the value chain at which they operate (Food and Agriculture Organisation of the UN, 2010), as below;

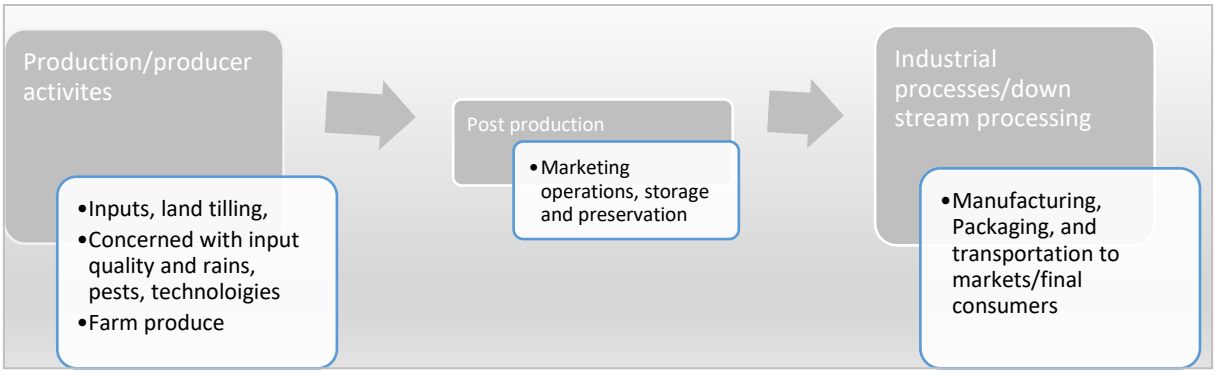

Figure 2: Agricultural value chain and the activities involved

Source: Author, 2018.

It can be noted form figure 2 that producers are more likely to be concerned with issues of quality of inputs suitable for the changing climate; the land used for farming; the farming technologies being introduced to cope with climate change; reliability of rains; and the access to markets for their produce. Climate change risk action by producers is also partly

driven by the farmer's agricultural experience, on the farm training on climate change related practices, social capital (Arunrat et al., 2017); access to credit (Arunrat et al., 2017; Shikuku et al., 2017) and membership to farmer groups (Shikuku et al., 2017).

On the other hand, downstream processors are more likely to be concerned with the reliability of supplies from the farm producers; the production infrastructure; changing product demands; varying tax and government regulation due to climate change, the distribution infrastructure among others. Though as seen from prior sections, they are likely to have similarities in their climate change risk concerns and opportunities especially as regards the drive for profitability.

The perceptions of the business managers therefore at the various stages of the agricultural value chain are likely to be affected differently because of the varying effects and opportunities created by climate change to their businesses.

1.7 Research objectives and questions

The aim of this study is to examine the role that business manager perceptions and attitudes towards climate change risks plays in driving climate change risk action among business organizations in the agricultural sector in Uganda, in order to inform key policy decisions and corporate responses. The businesses in the agricultural sector are prone to high climate change risks and yet corporate action against climate change risks is subject to manager perceptions and sensemaking. This study therefore intends to achieve the following objectives:

i. To understand the level of awareness of business managers in the agricultural sector in Uganda of the potential climate change risk mitigation and adaptation strategies.
ii. To understand how the perceptions of business managers towards climate change risks in the agricultural sector in Uganda affect climate change risk action.
iii. To assess whether and how the climate change risk perceptions of business managers engaged in downstream agricultural processing differ from those engaged in commercial agricultural production in Uganda and how they drive risk action.
iv. To draw out the implications of the varying risk perceptions of these two groups, for theory and practice.

1.8 Research methodology-an overview

The study used the exploratory approach with comparative case study method. In deciding to use case study method, Yin advises that three issues must be considered: 'your main research questions are "how" or "why" questions, you have little or no control over behavioral events, and your focus of study is a contemporary (as opposed to entirely historical) phenomenon'(Yin, 2018). Zainal, (2007) emphasized Yin's definition of case study research method as useful in investigating a contemporary phenomenon, especially when there are multiple sources of evidence and there is a need to answer the how and why questions (Zainal, 2007). Case study method is critical in a situation where there is need to carry out an in-depth examination of the subject (Creswell, 2003; Yin, 2018; Zainal, 2007). The Researcher's intention was to carry out an in-depth study of climate change risk action by business organizations in the agricultural sector, understanding the effect of manager perceptions and how they drive climate change risk action. This required some in-depth analysis and is considered a contemporary phenomenon, therefore case study method was considered a very useful method to adopt.

As part of the main study, the researcher carried out 31 in-depth grid interviews (15 managers from agriculture producer companies and 16 managers from agriculture processor companies), using the Repertory Grid Technique for data collection partly because it is particularly useful in identifying the content of manager's perceptions and sensemaking. It should be noted that Grid technique as used in case study method is typically 'small-sample' based and the constructs generated during the grid interviews are used as the units of analysis. It was anticipated that each grid interview would generate 8 to 12 constructs, making about 360 constructs. Yin (2014) also noted that 6 to 10 case studies would be sufficient to provide compelling support in multiple case study research. The results of the grid interviews were triangulated using the key informant interviews.

1.9 Significance

The World Bank has stressed the need for increased collaboration 'between climate and agriculture-related ministries, research institutes, civil society and farmers' groups, development partners, private sector actors, in designing approaches for addressing climate change challenges in the agricultural sector in Uganda' (World Bank, 2018:XIII). The role of perceptions in climate change policy formulation has also already been emphasized (IPCC, 2014b).

Although there are various studies that have been carried out on corporate responses to climate change risk, the role of manager perceptions, and the drivers of corporate action, no such studies have been seen to have been carried out in Uganda. A further development is methodological- with one exception (Dowbiggin, 2017) repertory grid methodology, which identifies the stakeholders' own construing while minimizing the imposition of the researcher's own terms of reference, has not been used in climate change risk assessments before; and the contribution to Ugandan policy setting, obtained by this repertory grid technique is unique. The desired multi-stakeholder corroboration as highlighted in the World Bank report, the ministry of Agriculture's highlighted focus on climate change related research, and the climate change formulation process will therefore be strengthened with the understanding of the private sector climate change strategy formulation processes. Preliminary discussions with the Coordinator for the Parliamentary forum on Climate change-Uganda indicate that there is great need to understand why the private sector in not taking up the use of available modern climate change mitigation and adaptation production technologies. This research will generate information, which will greatly contribute to the ongoing formulation of various national laws on climate change in Uganda with a focus on the private sector.

CHAPTER TWO: BACKGROUND (LITERATURE REVIEW)

In the next sections, focus will be put on developing the literature review in more details with an in-depth analysis of the themes highlighted in the first chapter; concluded with a Literature synthesis providing a justification for the current study. The section contains a review of literature related to:

a. Climate change, the impacts, and the scientific basis raising concerns of climate change risks;
b. literature on the role of agriculture in accelerating climate change;
c. literature on the global and national efforts to respond to climate change;
d. the literature on state of the agriculture sector in Uganda;
e. literature on the agriculture value chains and how they are affected by climate change risks;
f. literature related to risk management, the definitions, risks assessments, and risks sources;
g. literature on climate change risks mitigation and adaptation, and what drives action; and
h. literature on management cognition and risk perception.

All this literature is intended to provide a good theoretical justification for the proposed research questions for this study.

2.1 The science of climate change

2.1.1 Climate change terminologies, causes, and likely impacts

In order to understand well the climate change risks faced by business organisation in the agriculture sector, and the appropriate strategies to tackle them, it is important to the science behind climate change, the key causes, and likely impacts. ‘Climate change refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer’(IPCC, 2014:39). The definition emphasizes the long period of change in climate, whether due to natural variability or as a result of human activity (IPCC, 2013). Framework Convention on Climate Change (FCCC) has a slightly varying definition for climate change especially on the implications of the causes stated and defines it 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 over comparable time periods'(Pielke, 2005:549). These varying definitions have had an effect on the directions of specific actions by the different players based on their understanding and interpretation (Schneider, 2001; Schneider & Lane, 2006), but it is important to note that both emphasize the role of human activity in accelerating climate change.

Climate change is also said to be caused by the greenhouse gas effects and global warming (Schlesinger, 2011; World Meteorological Organization, 2019). Greenhouse effect originates from water vapor, carbon dioxide (CO2), methane, nitrous oxide and a few other gases in the earth's atmosphere (Schlesinger, 2011; Schmidt et al., 2010; World Meteorological Organization, 2019). Human activity is pointed out as the main cause of the accumulation of greenhouse gasses (IPCC, 2013, 2014b; King, 2004; Oreskes, 2004; Schlesinger, 2011) as a result of industrial revolution which resulted in a lot of burning of fossil fuels (coal, oil, and natural gas); and deforestation for agricultural activities (King, 2004; Schlesinger, 2011). GHG emissions have continued to rise at a rate of 1.5 per cent per year in the last decade, (Jackson et al., 2018; UNEP, 2019) resulting into increased warming of the atmosphere and ocean; diminishing amounts of snow and ice, sea level rise; and an increase in the concentration of greenhouse gases (IPCC, 2013; Pielke, 2005; UNEP, 2019; World Meteorological Organization, 2019).

The last three decades have seen successive warming of the earth's surface (IPCC, 2013; Miller, 2016) with global average surface temperature in 2018 approximating to about 1 °C above the pre-industrial baseline, with the five warmest years occurring between 2015-2019 in the last 140 years. (NOAA, 2020; World Meteorological Organization, 2019). The registered increase in temperatures are a result of increased emissions into the atmosphere of carbon dioxide and other greenhouse gases produced by human activities and the trend seems to be persistent (NASA/NOAA, 2020). Though there are some recorded question on the validity of some of the statistics (Cowtan & Way, 2014; Karl et al., 2015; Schmidt et al., 2014) used to arrive at the different climate change reports, and the uncertainties related to climate change projections (IPCC, 2013; Parry et al., 2001; Seneviratne et al., 2018), the science basis for climate change is not disputable, climate change is occurring (Oreskes, 2004), and mainly caused by human activity (American Meteorological Society, 2018).

Therefore, considering that these are human induced events, human induced actions are required to respond to climate change. These required responses are a two-fold: 'reducing emissions of and stabilizing the levels of heat-trapping greenhouse gases in the atmosphere

("mitigation"); Adapting to the climate change already in the pipeline ("adaptation")' (IPCC, 2014b)

The discussions so far in this section have given us a good background of the climate change science and the critical role played by human activities in accelerating the problem of climate change. Though there are challenges of uncertainty in carrying out valid climate projections and resource limitations, it is factual that climate change is occurring, and efforts must be made to mitigate or adapt to the changing climate.

The impacts resulting from climate change are significant. As detailed above the variability of the climate systems due to the increase in global temperatures and greenhouse emissions has resulted in increased warming of the atmosphere and ocean, diminishing amounts of snow and ice, sea level rise. It is forecast that changes in climate systems will result in increased human diseases, plant pests, insect borne diseases and will threaten agricultural productivity (Lobell & Field, 2007; Parry et al., 2001; Schlesinger, 2011). There is also a record of several tropical cyclones, hurricanes, flooding, extreme rain fall, extra tropical storms, heart waves, drought, severe coldness, heavy snow, and wildfires in different parts of the world (MET Office, 2017; World Meteorological Organization, 2019). There have been reported increases in world hunger, undernourished people, severe droughts, with a food crisis created especially in Africa due to climate variability and extremes (FAO,IFAD,UNICEF, 2018; FAO, 2017b; World Meteorological Organization, 2019).

There are also reports of population displacement and human mobility due to drought, flooding and storms (FAO, IFAD, IOM, 2018; World Meteorological Organization, 2019). World Meteorological Organisation, 2019 reported various impacts faced by the earth which have a direct relationship with the flow of production inputs, the physical structures used in the production processes, the transport infrastructure, and the markets for the agricultural products at every stage of the agricultural value chain (World Meteorological Organization, 2019).

It is reported that in Uganda, if no adaptive action is taken, climate change is projected to impact the national economy annual costs in the range of US$3.2 - 5.9 billion within a decade (Markandya et al., 2015), with agriculture being one of those sectors most impacted (Markandya et al., 2015; Okonya et al., 2013).

Therefore, there is no doubt that climate change impacts both globally and in Uganda are likely to be catastrophic and with heavy losses to the economic and businesses. What has been documented so far in relation to the impacts from climate change is sufficient to raise

our attention to the need to act to mitigate and adapt to the climate change risks. This study considers the fact that agricultural systems in Uganda are one of those that have been impacted by climate change. Therefore, actions to mitigate the impacts need to be explored. It is important at this point to first review the role that agriculture plays in accelerating climate change.

2.1.2 Agriculture and its contribution to climate change.

Agriculture predominantly uses land for its agricultural activities. As the world population grows, there is a lot of need for land usable for agriculture leading to clearing of forests.

Agriculture is reported to be contributing to climate change directly by emitting Methane (CH_4) and nitrous oxide (N_2O) (Richards et al., 2019) in crop (Zhang et al., 1992) and live stock (Hollis et al., 2016) production. There has been a remarkable rise in CH_4 and N_2O since the start of the industrial revolution (Tian et al., 2016) which are considered major contributors, after CO_2, to climate change (Blandford & Hassapoyannes, 2018).

Agriculture also contributes to the increases of CO_2, from the use of fossil-fuel energy and deforestation (Blandford & Hassapoyannes, 2018; IPCC, 2014b). Farm and other agricultural production processes like powering machinery; pumping irrigation water; heating and cooling products; and others require the use of fossil-fuels and these are escalated with the use of machinery on farm and in the production processes (Blandford & Hassapoyannes, 2018; Richards et al., 2019).

It should be noted that agriculture downstream processing takes place as part of industry processing. Therefore, in reference to figure 1 on page 2, agriculture combined with industry makes a significant contribution to climate change.

A focus on the agriculture mitigation targets and processes is needed if the targets set by the Paris agreement of keeping global warming below 2 °C above pre-industrial levels and to limit the temperature increase to 1.5 °C above pre-industrial levels is to be achieved (Wollenberg et al., 2016). Gernaat et al (2015) also emphasized the importance of emission reduction in agriculture in his assessment of the various emission reduction options if the global warming targets are to be achieved (Gernaat et al., 2015).

It should be emphasized that policy interventions are needed with attention paid to the needs of farmers in the developing world if mitigation targets are to be met at the current projections per sector (Wollenberg, 2017).

This literature therefore emphasizes the effect of Agriculture activities on accelerating climate change. So a study of this kind that aims at generating information that will support climate change policy formulation targeting both the downstream processors and upstream producers in the agriculture sector is relevant noting that emission reduction is required at these levels of the agriculture value chain in order to achieve climate change risks mitigation and adaptation targets.

The section below illustrates some of the global actions taking place in response to climate change both globally and in Uganda.

2.1.3 The trend of action to curb climate change

2.1.3.1 The global effort to curb climate change.

Climate change is now on the agenda of every high level meeting forum today with the most recent one being the UN Climate change conference held in UK, 2021 (COP 26)**.**

Several global treaties have been initiated and high level conferences held over the years since 1992 to try and design strategies for mitigation and adaptation to climate change (Encyclopædia Britannica, 2019). These efforts started with an international Treaty- The United Nations Framework Convention on Climate Change in 1992 with a current membership of about 197 member countries, followed by the Kyoto protocol in 1997 which the US and China declined to participate in (Encyclopædia Britannica, 2019). In an effort to bring US and China on Board, the Paris Agreement was negotiated and adopted in 2015. Over 185 countries have signed and ratified the Paris agreement. The critical role of all these treaties is to influence national governments globally to limit their greenhouse gas emissions with the current treaty aiming to prevent the global temperatures from raising above 2 ^{0}C (3.6 ^{0}F) above pre-industrial levels and with efforts to limit warming below 1.5 ^{0}C' (Climate Focus, 2015; Encyclopædia Britannica, 2019; United Nations Framework Convention on Climate Change, 2018). Several countries are already striving to meet their emission target among which include the world's biggest greenhouse gas emitters like China, India, EU countries among others (UNEP, 2019)**.** There is an increased political engagement requiring different countries to adopt better technologies that reduce GHG emissions and there are signs that these improved technologies are being adopted in many countries (UNEP, 2019).

In line with the global efforts to build a sustainable world and respond to climate change, in 2015, the United Nations developed the Sustainable Development Goals, a set of 17 goals

and 169 sub targets that all Countries are expected two work towards meeting. The core of these targets are centered on sustainability and concerns of Climate change. It should be noted also that almost all the SGDs have a connection with Agriculture in one way or another, but there are 11 out of the 17 which are more closely related to Agriculture and climate change:

Table 1: SDG relationship with Agriculture.

No.	**Relates to**
SDG 1	Poverty reduction, which has an implication on the sustainable agriculture production and processing, plus land use.
SDG 2	Achieving food security
SDG 6	Sustainable water resource use
SDG 7	Reliable and sustainable energy sourcing and use which affects agriculture processing.
SGD 8	Sustained economic growth.
SDG 9	Resilient infrastructure and productive employment
SDG 11	Safe, resilient, and sustained cities and human settlements
SDG 12	Sustainable consumption and production
SDG 13	Resilience against climate change
SDG 15	Protect, restore and promote forests.

Source: Own 2021, extracted from the UN 2030 Agenda for Sustainable Development

Countries across the world are already moving towards achieving these SDGs, setting policies and processes to help them achieve the targets which has a direct implication on the agriculture producers and processors own climate change policies/strategies. However, Climate change poses a big challenge to the achievement of the SGDs (Sachs et al., 2021).

Several other initiatives have been put in place by different climate change bodies on different Continents in order to fulfil the Paris Agreement. The European Union and its Member States have already made strides in enforcing or committing to reducing domestic greenhouse-gas emissions by at least 40% by 2030 followed by the target of reducing its own greenhouse gas emissions by 80-95% by 2050 using 1990 as the base year (European

Environment Agency, 2015). In the US, an initiative called the Climate Action 100+ was formed led by investors to engage big greenhouse gas emitters and other companies across the global economy that have significant opportunities to drive the clean energy transition and achieve the goals of the Paris Agreement., with over 360 investors with more than $34 trillion in assets under management (AIGCC et al., 2018). Through the Global Investor Coalition on Climate Change, investor bodies from Asia, Australia, Europe and North America came together to increase investor education and engagement on climate change and climate-related policies and advocate for corporate actions on climate risk and opportunities, and international policies that support the goals of the Paris Agreement (AIGCC et al., 2018).

Globally, different countries who are signatories to the Paris agreement have made commitments/targets through their National Climate Action plans (NDCs) to implement actions aimed at limiting global temperature rise to 1.5C (United Nations Framework Convertion on Climate Change, 2021). Several countries have set up good Nationally Determined Contributions (NDCs), with clear targets to reduce national emissions and adapt to the impacts of climate change, but are still struggling to fulfil their emission targets with several opportunities available to accelerate their emission reduction (UNEP, 2019; United Nations Framework Convertion on Climate Change, 2021). Available reports indicate that it is still a challenge to assess the level of achievement of set NDCs, but it is clearer that the gap is widening between the set targets and the desired levels of GHG emissions and countries need to double their efforts to meet their targets (United Nations Framework Convertion on Climate Change, 2021). Among the high global GHG emitters, Australia, Brazil, Canada, the Republic of Korea and the United States of America, are an example of countries which are behind their targets in fulfilling this NDCs (UNEP, 2020). There were still reported increases in carbon emission in the US (3.4%) and worldwide by about 2.7 percent in 2018 (Encyclopædia Britannica, 2019).

It is possible that implementation of the NDCs is hindered by the lack of access to financial resources, appropriate technology, and appropriate capacity building (United Nations Framework Convertion on Climate Change, 2021). Least developed countries have been specifically noted for having limited capacity and funding to implement the desired targets (UNEP, 2020) and are reported to be lagging behind in achieving their NDCs, East African Countries being an example of such countries (FAO, 2017a).

2.1.3.2 Uganda's efforts to curb climate change

Uganda has put in place several policy measures to address Climate change challenges either through adaptation or mitigation policies (Ampaire et al., 2017). These policies include the National Climate change policy 2015, the National Climate change communication Strategy 2018, the National climate change guidelines intended to help operationalize the national climate change policies, and recently developed the Green Growth Development Strategy, a commitment by government, its development partners and the private sector to use environmental friendly development initiative aimed at addressing climate change for a period of 2017/18 – 2030/31 (Uganda National Planning Authority, 2017). Uganda is also a signatory to the UNFCCC and has set up units in different ministries to coordinate the national climate change response. The Country has also introduced taxes to try and mitigate actions that affect the environment, one of these is the environmental tax on old vehicles (Uganda National Planning Authority, 2017). Uganda has also put in place a strategy aimed at streamlining skills development for climate change mitigation and adaptation (Climate Change Unit, 2013). Several other policies have been put in place which are either sector specific like for Agriculture aimed at influencing Climate change adaptation (Ampaire et al., 2017). In terms of its efforts to achieve SDGs, Uganda is ranked 140, a sign that it is still along way to put in place measures for sustainable development with good progress recorganized under SDG 13 (Climate Action) (Sachs et al., 2021). Despite these efforts, there is scanty literature on how the implementation of all these policy and related guidelines in progressing. Ampaire et al. (2017) conducted a study on policy implementation gap, however, their study did not pay attention to the role of perceptions in the policy implementation process especially for the private sector. The methods used too were not sufficient to elicit personal perception. Their study did not also help us to understand how these policies are influencing private sector responses to climate change mitigation and adaptation.

It seems clear that there are appropriate global efforts to adapt and mitigate the climate change risks. Uganda has also followed the global trend and has made efforts to develop various policies to influence climate change adaptation and mitigation. It is not clear though from the available studies especially in Uganda how business players (Producers and processors) in the agriculture sector are responding to the set policies.

Agriculture has been reported as a key contributor of GHG emissions (Nayak et al., 2015; Science Advisory Group, 2019; Vetter et al., 2017). The next section will help us to review the literature on the contribution of Agriculture to climate change.

2.2 The state of the agricultural sector in Uganda

Climate change poses a particular threat to African countries particularly those heavily relying on agriculture (FAO and ECA., 2018; World Bank Group, 2015). It is reported that 'climate variability and extremes are a key driver of the recent rise in food insecurity and one of the leading causes of the severe food crises that have affected Africa'(FAO and ECA., 2018:5). Uganda is particularly considered as one of those countries in Africa heavily relying on agriculture and therefore prone to the impacts arising from climate change.

In Uganda, agriculture accounted for about 24 percent of GDP in fiscal year 2017/2018, and 43 percent of export earnings (Uganda Bureau of Statistics, 2018a). It is also estimated that the biggest percentage of the working population of the country is employed in agriculture at about 65 percent of Uganda's working population (Uganda Bureau of Statistics, 2018a, 2018b). Uganda has rich soils and produces several food crops including; tea, edible oils, cotton, tobacco, plantains, corn, maize, millet, sorghum, rice, cassava, sweet potatoes, irish potatoes, beans, cow peas, field peas, pigeon peas, groundnuts, soya beans, simsim, and coffee (Caffrey et al., 2013; Uganda Bureau of Statistics, 2018a).

The sector is not yet well commercialized is mainly rain feed. Implying that any variability in the rains will continue to have significant impact on the agricultural productivity. The agriculture sector had a total contribution to GDP at current prices of 24.6 percent in the FY 2016/17 compared to 23.7 percent in FY 2015/16 (Uganda Bureau of Statistics, 2018a).

Despite the importance of the sector to the economic growth of the country, it is prone to the effects of climate change and therefore it is important that these effects are well understood so that appropriate strategies are put in place to ensure that business losses resulting from climate change risks are mitigated.

2.2.1 Climate change effect on the agricultural sector in Uganda

There are several biophysical crop models showing varying effects of crop yield in Africa negatively impacting wheat, maize, sorghum and millet (Knox et al., 2012). Climate change is anticipated to create a lot of yield losses in the whole of Sub-Saharan Africa (Knox et al., 2012; Schlenker & Lobell, 2010), Uganda being one of those.

Uganda as a country is already experiencing the impact of climate change. The Country is experiencing increased frequency and intensity of occurrences of Floods, landslides, increasing temperatures, prolonged dry spells, hailstorms, lightening, and shifts in rainy seasons (Ministry of water and Environment, 2015). Unusual heavy rains, flooding, destruction of infrastructure, soil erosion, prolonged droughts, extra were all reported as effects of climate change in Uganda in the last ten years (OCHA, 2010). These have had a direct effect on the state of the Agricultural sector in Uganda. Uganda registered a reduction in economic growth between the financial; years 2005/2006 and 2004/2005 financial year which was mainly caused by prolonged drought, leading to reduced agricultural production (Kaggwa et al., 2009)

Noting that the mean annual temperature in Uganda is projected to increase between 0.7°C and 1.5°C by the 2020s and between 1.3°C and 4.3°C by 2080s (Hepworth & Goulden, 2008), it is also projected that the agricultural sector in Uganda will continue to be negatively impacted by the effects of climate change with anticipated reduction in crop production of about 40% for some crops by 2050, a strong effect on Uganda's agricultural export production and value by 2050, with increased floods, draughts and diseases for both animals and plants (Baastel, 2014; Kaggwa et al., 2009), with 70-97% of households engaged in Agriculture being adversely affected (Bagamba et al., 2012; Ministry of Agruculture, 2018). Kaggwa et al. (2009) attempted to estimate the kind of projected damage at the time and estimated that 'weather-related disasters annually destroy 800,000 hectares of crops, resulting in economic losses of more than UGX. 120 billion ($71 million). The annual losses from weather-related transport damage are estimated at UGX. 50 billion ($30 million)' (Kaggwa et al., 2009:16).

The impact of climate change on both the Uganda economy and the agriculture sector is high. It is important to note at this stage that all these impacts on the agriculture sector influence the perceptions of the business managers in the sector, but how this translates into climate change risks action at the different stages of the agriculture value chain is of great importance and a subject of further research. These impacts are also felt differently depending on the stage of the agriculture value chain that the company operates in. The next section relate to literature on agricultural value chains to help us understand the extent of the effects of climate change on the different stages of the agricultural value chain.

2.3 Defining the agricultural value chain

The definition of agricultural value chains follows the definition of value chains as described by Kaplinsky and Morris, (2001). They classify the value chains as simple and extended value chains. They defined the simple value chains as 'the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use' (Raphael & Mike, 2001:4). They also define extended value chains as involving consideration for the inputs to the production processes for raw materials and moving through to the disposal/recycling processes undertaken by the final consumer (Raphael & Mike, 2001). The use of extended value chains takes into consideration aspects like; provision of seed inputs, chemicals, equipment, water for the agricultural sector, post-harvest processes, intermediary processes (processing, packaging and branding), transportation, marketing, and delivery processes to the final consumer. This definition covers both the downstream and upstream aspects of the agricultural value chain and is the basis of this study. Value chains can be seen from the perspective of the value added to the product from the input level to the final consumer as described by (Fernandez-Stark & Gereffi, 2019). Value chains can be seen as having an element of linearity or verticality in the structure of its phases involving the sequential transformation from inputs, to outputs, to distribution, and final consumption, adding value to the process of production of goods or services (Coe et al., 2008). It is noted however that in reality, there are several non-linear/horizontal relationships which need to be considered in the study of value chains, for example the relationship between the processes of production, distribution and consumption of goods and services on the natural environment (Coe et al., 2008), the more reason why it is important to focus the current study on the agriculture value chains.

The development and growth of the agricultural value chains is seen as a major vehicle for economic transformation for the Ugandan economy as envisioned in Uganda's development strategy, Uganda's Vision 2040, seeing commercial agriculture, value addition through agro processing as key growth elements (Dekens & Bagamba, 2014; National Planning Authority, 2013). The development strategy has the aim of transforming the Ugandan economy from a peasant to a modern and prosperous country (National Planning Authority, 2013). This implies that there is a great focus on the producers who are dominantly peasant driven or subsistence in nature and processors who add value to the agricultural products to be able to achieve a modern economy.

It is therefore important that a study in made to understand how climate change affects both the producers and processors so that policy is well targeted for the respective groups in order to address any challenges that may hinder the planned economic growth. Government acknowledges that climate change effects on the agricultural value chain have to be put into consideration in all aspects of development planning given their impact on the success of the development plans (National Planning Authority, 2013: 100).

In the following section we highlight how climate change impacts the different stages of the agricultural value chain.

2.3.1 Climate change impacts on the agricultural value chain

FAO findings reveal that 'disasters can cause considerable damage to physical agricultural assets such as standing crops, irrigation systems, livestock shelters and veterinary services, aquaculture equipment or hatcheries; post-production infrastructure such as facilities for storage, processing, marketing and transport, buildings and equipment of farm schools and cooperatives' (FAO, 2015:XX). These 'disasters cause considerable economic losses to farmers with a negative effect on the food value chain, agro-industries, imports and exports' (FAO, 2015).

Uganda's agricultural sector is heavily dependent on physical structures such as roads, bridges, communication networks, storage, and market places that are essential to support the production of goods and services, and the distribution of finished products to market. Drought and flood risks are the major threats/risks to the whole agricultural value chain in different regions (Rosenstock et al., 2019, p. 235). This therefore implies that damages caused by climate change related events to any of these infrastructures has and will continue to have significant direct and indirect impacts on agricultural value chains in Uganda (Caffrey & Farmer, 2014:1). Other studies have also confirmed that climate change is already affecting the value chains of crops, livestock and fisheries in Uganda (Orindi & Eriksen, 2005). Uganda's post-harvest systems are also prone to changes in temperature, rainfall, humidity, and other climate change related extreme events (Stathers et al., 2013).

This therefore implies that agriculture producers and processors engaged in the agricultural sector must understand the kinds of climate change risks that may affect these value chains and devise mechanisms of addressing them.

This study of the agriculture producers and processors will help policymakers, that is to say, the different government agencies and possibly parliamentarians engaged in climate change policy formulation to understand how these risks along the value chain affect the risks perceptions of the business managers which has a multiplier effect on the climate change risks action.

In the following sections, the researcher will review some of the previous studies on risk management, and related risk management approaches by the private sector especially related to the agricultural sector.

2.4 Risk management by the Private sector

2.4.1 Introduction

It has been noted in prior sections that climate change is a growing problem globally and has negative impacts on the business environment. This section is intended to define risk and risk management generally, understand how risk assessments and risk profiling is done, the debate between the constructivist and realist approaches to risks assessment, describe the corporate risk sources, and later describe the traditional corporate risk management processes.

2.4.2 Defining risk, uncertainty and hazard

'The way we understand and describe risk strongly influences the way risk is analyzed and hence it may have serious implications for risk management and decision-making'(Aven, 2016:4). This statement places greater importance on the way we define and understand risks which the researcher attempts to do in this section. Different definitions of risk are available based on different contexts. Risk can be defined as 'the possibility that human actions or events lead to consequences that harm aspects of things that humans value'(Renn, 1998:51). This particular definition of risk is based on the notion that human actions are the cause of the risks. Risk is also defined as the combination of the likelihood (probability of occurrence) and the consequences of an adverse event like a climate hazard (Kaplan & John, 1981; United Nations Development Programme, 2004). Risk refers to 'uncertainty of outcome, whether positive opportunity or negative threat, of actions and events'(Cabinet Office, 2002:7). When we talk about risks, we imply both opportunities and threats that can arise from an uncertain event.

Aven, 2016 summarizes risks definition qualitatively as;

- ‘the possibility of an unfortunate occurrence,
- the potential for realization of unwanted, negative consequences of an event,
- exposure to an uncertain occurrence of a loss,
- the consequences of the uncertain event or occurrence,
- uncertainty about and severity of the consequences of an activity with respect to something that humans value,
- the deviation from a reference value and associated uncertainties.’
  (Aven, 2016:4)

Risk can be further defined based on scientific risk analysis of the physical or social world, or based on the understanding that risk has to be either experienced or perceived. (Dessai et al., 2004). The perception of the decision makers have to always be considered when defining appropriate risk management strategies (Kasperson et al., 1988). Klinke et. al, (2002) actually emphasize that as long as humans perceive the consequences of their actions as unwelcome, they will make an effort to manage the risks (Klinke & Renn, 2002). Aven & Zio, (2014) also emphasized the importance of understanding the role of managerial perceptions and judgements in risks management decision making (Aven & Zio, 2014).

This is the reason why this study focuses on the risk perception of managers knowing that their perceptions affect the choice of the risk actions in an organisation.

These risk definitions so far introduce several aspects of risk; the effect or consequences of human actions, the probability of events occurring, the impacts of the events if they occur (severity or extent of the consequences), and also introduce the concept of perception in the risk decision making process.

When reviewing the different definitions of risk, two other risk concepts keep reoccurring, uncertainty and hazard, which require our understanding in relation to the definition of risk. Uncertainty can be defined as ‘a situation of being unclear about factual statements; ambiguity to a situation of contested views about the desirability or severity of a given hazard’ (Klinke & Renn, 2002:1091-1092). Klinke & Renn, (2002) further indicate that uncertainty manifests in different dimensions: in terms of statistical variations, systematic and random measurement errors, ignorance and indeterminacy. These dimensions always affect the strength of confidence in the estimated cause and effect relationship, and managers should consider these different dimensions of uncertainty when designing risk management strategies (Klinke & Renn, 2002:1074).

Risk can be expressed quantitatively as the summation of the estimated value of uncertainty plus the forecasted damage/loss (Kaplan & John, 1981). According to Kaplan & John (1981) damage /loss can also be equated to Hazards. Renn, (1998) further uses uncertainties as part of his risk categorization expressing risks in two categories; Risk expressed as probabilities and expected values, and Risk expressed through events/consequences and uncertainties (Renn, 1998b). These two mathematical definitions of risks help us to understand how uncertainty is a critical component of our risks understanding. Researchers and practitioners are still having to deal with a lot of uncertainties when working with the probabilities of climate change events occurring and the related consequences of climate change risk (Katz et al., 2013; Reilly, 2001; Webster, 2003). Organizations operate in a very volatile environment which creates degrees of uncertainty (Smith & Fischbacher, 2009). When probabilities are used to help through approximation to deal with uncertainty, these approximations themselves introduce more elements of uncertainties because the future being dealt with is not known to any manager.

From an agricultural point of view, uncertainty can be categorized into production uncertainty, price uncertainty, technological uncertainty, and policy uncertainty resulting from the volatile environment in which they operate and the unknown future (Moschini et al., 1999).

It is clearer based on the various definitions of risk above that the relationship between key concepts of; uncertainty, occurrence of event, probability, and impact, have to always be put in mind during the assessments and design of mitigating actions for climate change risk not forgetting the role that the perception of the decision makers plays in the process. Table 1 below summarizes the alternative risk definitions.

It can be concluded that the definition of climate change risk varies depending on the perceptions of individuals, based on their previous experiences of the climate change events, and takes cognizant of the fact that reference is being made to a future uncertain event arising from human actions whose probable occurrence is expected to impact on several things that human beings value.

Table 2: Alternative definitions of risk.

Risk definition	Source
Risk refers to the possibility that human actions or events will lead to harming things that humans value.	(Renn, 1998:51). Three decades of risk research: Accomplishments and new challenges. Journal of Risk Research, 1(1), 49–71 (Klinke & Renn, 2001). Precautionary principle and discursive strategies: classifying and managing risks. Journal of Risk Research, 4 (1), 159 - 173
Risk is the combination of the likelihood (probability of occurrence) and the consequences of an adverse event occurring.	(Kaplan & John, 1981) On the definition of risk aversion. Theory and Decision, 29(1), 53–68
Risk refers to uncertainty of an outcome, whether positive opportunity or negative threat, of actions and events	(Cabinet Office, 2002) Risk : Improving government's capability to handle risk and uncertainty. In Strategy Unit Report.
Risk can be defined based on scientific risk analysis of the physical or social world, or based on human experiences or perceptions.	(Dessai et al., 2004). Defining and Experiencing Dangerous Climate Change. An Editorial Essay. Climate Change, 64(1), 11–25
The perception of humans based on their experiences play an important part is describing what is risk and what is not risk. This also affects the risk management process.	(Kasperson et al., 2016) The social amplification of risk: A conceptual framework. The Perception of Risk, 8(2), 232–245 (Klinke & Renn, 2002) A new approach to risk evaluation and management: Risk-based, precaution-based, and discourse-based strategies. Risk Analysis, 22(6), 1071–1094.
Risk definition considers aspects on uncertainty and can be expressed quantitatively as equivalent to uncertainty plus damage/loss.	(Kaplan & John, 1981) On the definition of risk aversion. Theory and Decision, 29(1), 53–68.

The next section discusses some of the risk management processes employed in organizations.

2.4.3 Discussion of traditional risk management processes

Risk management is concerned with the identification of risks, their analysis to assess their likelihood and impact, and the evaluation of risk mitigating options as the three major stages (Gasbarro et al., 2017; Weinhofer & Busch, 2013). Other authors have proposed more stages of the risk management cycle to include the need for setting the context and objective of the risk management process at the start; to add the importance of risk communication, and to ensure that there is continuous monitoring and review of the process. Figure 3 below illustrates this process.

The question is whether this same risk management approach is also utilized by companies that consider climate change risks in their risk management agenda.

Figure 3: The traditional risk management process.

Different companies have approached the need to consider climate change risks in their risk management processes differently and using different concepts including:

- Enterprise risk management (ERM), requiring an integrated management of all the risks that the company faces and aligning corporate governance with strategy (Bromiley et al., 2015). This implies that even climate change related risks are supposed to be considered if the company chooses to use an ERM approach to risk management. Many firms are now being encouraged to adopt ERM approach (Bromiley et al., 2015).

- Corporate social responsibility or corporate sustainability aiming for an ‘equitable and wealthy world in which the natural environment and cultural achievements are preserved for generations to come’ (Dyllick & Hockerts, 2002:130). Here companies are expected to use operations that aim to preserve the economic, environmental and Social capital of the organisation. This kind of strategy is more on the side of climate change risk mitigation as more responsible use of resources would help to reduce GHG emissions.
- Integrated disaster risk management, a process for comprehensively estimating and managing risks from different sources, integrating multiple hazards and their drivers (Amendola et al., 2008). This strategy is used mainly in situation where various disasters have been experienced and future occurrences are anticipated.
- Environmental risk management (Mark & Chitru, 2008), looking also at how companies’ production processes are set up to ensure they do not damage the environment. This is also more of a climate change mitigation approach as GHG emissions are the causes of environmental pollution that result into climate change. The attention here is more of the environment and not necessarily the overall risks environment of the firm as is proposed by the ERM approach.

ERM therefore seems to be more cross cutting as it aims not only to identify and manage climate change risks but also all categories of risks. Many companies today approach climate change risk management using either enterprise risk management or corporate social responsibility strategies, emphasizing the need to use operations which do not damage the environment or affect the future of the globe with controlled GHG emissions as customers and the global climate change advocates push for more responsible production processes. The agricultural producers can consider using ERM as their risks management strategy approach, though no sufficient research is available to support its use at the producer level. The producers are more likely to respond to disasters and to respond to the need to conserve the environment and therefore utilize the integrated disaster risks management or the environmental risk management processes.

Global standards have been developed to support companies to effectively design risk management strategies, including AS/NZS 4360 Risk Management Standard and the ISO 31000 standard on risk management (Aven, 2011), which many companies globally are now following in the development of their risk management strategies, with detailed guidance and tools the companies can use. The process of risks management starts with carrying out

risk assessments. So we need to review available literature on how companies actually manage climate change risk assessments. This is the purpose of the next section.

2.4.4 Corporate climate change risk assessment

Risk assessment is a critical stage in the risk management process in an organisation. Risk assessment can be considered to be involving the process of identification, estimation, and evaluation of the risks facing the organisation (Bradbury, 1989; Freudenburg, 1988). From a value chain perspective, risk assessment involves 'the understanding of current and future climate risks, analyzing the implications for value chain activities and assessing different options for minimizing the negative impacts' (Dazé & Dekens, 2016:5). During risk assessments, 'Companies are likely to need to understand the risks and opportunities at a site-specific scale, and / or across their value chain, in order to make timely and robust decisions about how to adapt' (Surminski et al., 2018:2). Certain approaches need to be used to identify what is considered to be risk, estimate the likely impact of these risks, and evaluate the available response options. The approaches to be used by organizations in risk assessment closely relate to how they define and understand risks or according to the means and capacity available in the organisation to carry out the risk assessments. These approaches can either be qualitative, quantitative or a mix of the two, the integrated approaches.

2.4.4.1 Qualitative risk assessment

Qualitative risk assessments have risks assessed in relative terms usually using risk matrixes (Altenbach, 1995). 'Qualitative assessment results are usually descriptive and do not imply an exact quantification of risk'(Stefan, 2014:64). Potential risk scenarios are identified, and then placed on a matrix to determine the frequency and consequence of these risk scenarios. The ranking of the risks scenarios is done subjectively by the risk analysist using scales of low-medium-high on the frequency and consequence axis (Altenbach, 1995; Mustafa, 2014).

According to Stefan (2014), qualitative risk assessments are faster and easier to implement, they are easier to use and understood, do not require a lot of statistical data like it is the case for quantitative assessment, and respond to the capacity gaps in organizations for carrying out mathematical or qualitative analyses (Stefan, 2014).

Qualitative risk assessments are challenged for producing subjective results because of the subjective ranking involved and therefore would have limited use as they are usually difficult to generalize and replicate (Mustafa, 2014).

It is however, noted that qualitative risk assessments are a good foundation for carrying out a detailed quantitative assessment.

2.4.4.2 Quantitative risk assessments

Quantitatively, risk assessments consider the probability of climate hazard and the rate of vulnerability (United Nations Development Programme, 2004). Companies try to assess the likely exposure of their businesses to climate change related impacts and the probability of occurrence of these risk events (Weinhofer & Busch, 2013) using quantitative methods. Quantitative approaches are characterized by the estimation of risk done using numerical measures, assigning a numerical value to the risk using mathematical models (Altenbach, 1995; Rot, 2008). From a quantitative perspective, risk is seen as an objective fact, as a product of the probability and consequence of the risks occurring (Cox, 2008; Baron-puda, 2015; Bradbury, 1989). In quantitative terms, risk assessment considers the probability of unwanted consequences, and the linkage between the probability of occurrence and the likely impact (Renn, 1998a). It is however noted that these quantitative risk analysis are supported by the analysist's judgement which cannot be considered value free or with objective reality (Cox, 2008; Bradbury, 1989). The perception of the quantitative analysist cannot be ignored (Bradbury, 1989) as it has an influence on the choice of values used in the risk analysis and related decisions.

Altenbach (1995) urged against the use of quantitative risk assessments because of their inherent weaknesses as follows:

- Quantitative risks assessments are always subject to question and manipulation;
- They are time consuming and costly;
- They use probabilities which are many times misunderstood and difficult to communicate;
- They need to build the capacity of assessors compared to quantitative risk assessment methods;
- Require the availability of good data.

It should also be noted that the elements of estimation and valuation used in the quantitative assessments are subject to errors and biases resulting from varying perceptions of the different people involved in the estimation process (Freudenburg, 1988, 1992). Quantitative assessments may ignore the role the social (the environment in which the organisation operates) and the human factors (perceptions, errors and bias) play in risk assessments (Freudenburg, 1988). These challenges would also manifest in climate change risk assessments if quantitative methods are used because the occurrence of future climate change risk events is clouded with a lot of uncertainty and it is a challenge to attach valid quantitative measures to forecast the future where historical data in not readily available.

Conway et al. (2019) introduced a comparison of top down approaches (using climate models to project future climate change occurrences) and bottom-up approaches (based on peoples' understandings of present and changing conditions, risks and responses or the past and present conditions) to help us understand the strength and weaknesses of using quantitative and quantitative approaches to risk assessments but also to describe what a structure of a risk assessment should preferably be (to-down or bottom-up)(Conway et al., 2019). Their study credited the bottom-up approaches (Using a mix of qualitative and quantitative approaches) for helping to address complex issues. Therefore, risk assessments should preferably be bottom-up, using a mix of risks assessment approaches.

An integrated approach is therefore recommended where the weaknesses of one approach can be covered by the strength of the other.

2.4.4.3 The argument for an integrated approach

The purpose of an integrated risk assessment approach is to try and pay attention to aspects of human dynamics during risk assessments. It is important to understand the human behaviors that drive risk assessments and management decisions (Bubeck et al., 2018). A comprehensive risk assessment would need to take into consideration both the human factor, the perceptions and human behavior which influence both qualitative and quantitative risk assessment. It is believed that human and social factors play a significant role in defining the risks profile of an institution and therefore should be considered together with striving to achieve valid quantitative estimates of probabilities and consequences (Freudenburg, 1988). This argument was also supported by other authors (Aerts et al., 2018).

Renn and Rohrmann (2000) seem to have made the most comprehensive arguments for an integrated approach to risks assessments in their analysis of the theories of risk perception. This will be discussed in more details in section 2.6 but they emphasized the need to look at psychological, sociological, and cultural conceptualizations of risks together rather than as separate entities for better risk understanding and risk management (Dowbiggin, 2017; Renn & Rohrmann, 2000).

2.4.5 Identification of corporate risk sources or types

In the Global Risk report 2020, it was reported that 'climate change and related environmental issues are the top five risks in terms of likelihood'(World Economic Forum, 2019:4) facing the world. These were reported to be related to; climate action failure, biodiversity loss, extreme weather, natural disaster, human-made environmental disaster and water scarcity. The threats related to climate change and biodiversity loss were reported as accelerated in the last five years which have a direct impact on the external risk sources for business organizations. Company risks can originate from changes in the surrounding climate and associated weather variability and extremes (Barbier & Burgess, 2017; Goldstein et al., 2019), variability in production and prices (Ortmann et al., 1992), changes in costs of farm inputs, changes in legislation or government policies and exchange rates volatility, (Ullah et al., 2016), and changes in the regulatory environment (Sakhel, 2017). Climate change risks can also originate from climate-induced changes in the natural ecosystems such as sea-level rise, changes in global precipitation patterns, increased incidence of droughts, floods, mass movements, thunderstorms, and changes in volcanism. These result in enhanced operational challenges for businesses, affecting the supply of raw materials, changes in the market environment, shifts in consumer and financial markets (Sakhel, 2017).

Risks in agriculture can be grouped into two major types:

(i) Business risk which includes production, market, institutional and personal risks, and

(ii) Financial risk which results from different methods of financing the farm business (Ullah et al., 2016:200).

In the Uganda agricultural sector, if we view the risk sources from the agriculture value chain perspective, it should be noted that different value chain actors will have differing risk sources. The agriculture producers will view their risks originating from seed varieties

resilience to climate changes, and the changes in weather conditions which affect the farming seasons, the occurrence of rains, increased crops and animal diseases (Egeru, 2016). While the processers will view their risks originating from the reliability of input sources, the operating environment, the changing consumer demands arising from the need to use environmental friendly products, and the product distribution systems (Dazé & Dekens, 2016). These studies from Uganda are however, lacking in terms of study area. They are focused on a few regions of the country which may not necessarily be generalizable as different regions have different weather trends.

2.5 Corporate response to climate change risk-Mitigation and adaptation strategies

Companies have different ways to respond to climate change risks either in an effort to mitigate the impact of the risky events on their businesses or in as effort to adapt to the risk events when they occur (Smit et al., 2000). Climate change mitigation refers to all the corporate efforts aimed at moderating, or alleviating the impacts of climate change, but also aimed at reducing the greenhouse emissions in order to mitigate climate changes. Mitigation reduces the number and magnitude of potential climate hazards (Jones et al., 2007).

On the other hand, adaptation refers to all the processes aimed at adjusting businesses to climate change issues, the ecological social economic systems in response to the climate change stimuli, their effect and impacts (Smit et al., 2000). The key aim of adaptation strategies is to build the company's capacity to cope with climate hazards and related impacts. The relationship between adaptation and mitigation in climate change risks management is considered complementary and not being interchangeable (Jones et al., 2007).

Adaptation can be categorized into soft adaptation approaches which include planning and de-risking processes, or hard adaptation approaches which include capital investments in technology or engineered infrastructure, and ecosystem-based adaptation approaches include the sustainable management, conservation and restoration of ecosystems as part of an overall adaptation strategy (Goldstein et al., 2019). At the agricultural processor level, companies seek to reduce greenhouse gas emissions during their business processes, reducing their carbon footprint to achieve sustainable or "green" value chain development (Dekens & Bagamba, 2014). Whereas agricultural producers strive to look out for better

farming methods and sustainable crop varieties that can adapt easily with the changing climate.

Some companies have also put in place adaptation measures like, installing flood protection measures, investing in infrastructure, investment within supply chains, integrating climate risk management into business management practices, undertaking vulnerability risk assessments, moving locations and selecting suppliers based on their resilience profiles, among others (Agrawala et al., 2011; Florence et al., 2018).

In the context of the agricultural sector in Uganda, much of the literature talks about the mitigation and adaptation responses by the agricultural producers and not the other players in the value chain. The producers are striving to improve the level of productivity of their crops and keeping better breeds of animals that can adapt easily to the environment (Bagamba et al., 2012). The Government of Uganda has put in place policy guidelines and institutions to help farmers or producers develop and use better farming methods, use better varieties of crops that can enhance their adaptive abilities (Ampaire et al., 2015).

At producer level, there is promotion of soil and water conservation measures, organic farming, conservation agriculture and afforestation, among others, in an effort to adapt to climate change. Several climate change mitigation measures especially for the producers have been proposed (Ministry of Water and Environment Climate Change Department, 2014). In 2020, Government drafted a National Climate Change Bill to help establish a regulatory framework for managing climate change risks (Government of Uganda, 2020).

From the government perspective, policy instruments of different nature have been either initiated or put in place, but no clearly documented efforts aim to reach out to the private sector (Processors) or to assess their responsiveness to the formulated legislative instruments. This study partly addresses this information gap.

There is also no clear literature on agricultural processor climate change adaptation in Uganda, most of it is related to the producers (Ampaire et al., 2017; Bagamba et al., 2012; Hepworth, 2010; Shikuku et al., 2017).

The role of the private sector, who are mainly the processors in the Ugandan context, in accelerating climate change adaptation has greatly been emphasized globally (Florence et al., 2018). So it is useful to undertake a study that seeks to understand how the agriculture processors as key players in the agricultural value chain in Uganda are responding to climate change risks.

Available literature indicates that there are various factors that influence climate change risks adaptation. The next section helps us to review this literature to help us understand why some companies respond and other do not respond.

2.6 What drives climate change risk response decisions?

But what drives adaptation decisions of companies is a question worth asking. There are several factors (internal and external) affecting the adaptation decisions of companies.

Internally, the perceive importance of climatic factors to business success, the management structure and the internal decision-making processes, available knowledge capacity amongst employees plus the other resource requirements, and the availability of information (Bleda & Shackley, 2008; Florence et al., 2018) play a critical role in influencing adaptation decisions.

According the social amplification of risk framework, risk response decisions are partly influenced by how humans process risk information (Renn, 2011). The frameworks states that 'Humans process risk information by either amplifying signals that appear particularly frightening or by attenuating signals that appear to be less threatening' (Renn, 2011). Kaspersen et. al, (1988) tried to explain how risk responses are generated using the social amplification of risks framework. In their study they tried to explain how the occurrence of a risk event interacts with the psychological, sociological, and cultural processes to amplify or attenuate risks response (Kasperson et al., 1988). They noted that this amplification process occurs in the transfer of information about the risk, and in the response mechanisms of society. Only amplified risk would lead to behavioral responses. Different authors have used the social amplification of risks framework to explain why some risks in organizations get amplified and others get attenuated (Duckett & Busby, 2013; Kasperson et al., 1988; Renn, 2011). These researchers indicated how human perceptions play a critical role in determining what is amplified and therefore considered as great risk which then influence risk behaviors in organizations.

Externally, there are several factors that affect adaptation including the business risks or new opportunities related to climate factors, the business environment which is shaped by government policy, the regulatory environment or legal regime, and the existing advisory services (Crick et al., 2018; Florence et al., 2018; Okereke, 2007).

Government policy specifically has been noted to have an influence not only on the business decisions directly but also on the consumer behaviors. It can be used to moderate countries' production or consumption (Girod et al., 2020). However, there are concerns that several climate change adaptation measures proposed by government policy makers are not necessarily suitable for small scale producers and requires a better understanding of the target producers in a Sub-Saharan setting like Uganda (Abegunde et al., 2019). It is further noted that policy makers who are usually central governments tend to be upwardly accountable, and are not well informed to support the producers to adequately respond to climate change in Uganda (Monjane, 2016). Research carried out to try and understand why there are gaps in climate change policy implementation and adaptation in Uganda also emphasized the lack of engagement of lower level communities or the producers in policy formulation as one of the reasons (Ampaire et al., 2017). Therefore, for government climate change policy to have an effective influence on private sector climate change policy response as proposed in this section, the key gaps highlighted during formulation and implementation of the government climate change policy need to be addressed. This is also another reason why the study identified government policy makers as having a critical role to play in influencing private sector climate change response and were considered key contributors to this study.

Climate action is also driven by the economic self-interest of companies (Okereke, 2007), the desire to achieve competitiveness, comply with legitimation (Bansal, 2000; Reyers et al., 2011), and the need to be seen as ecologically responsible (Bansal, 2000), the available climate change risk information (Scheer et al., 2014), and the cost of action (Gruère & Wreford, 2017). Crisk et al, (2018) made a review of the literature on adaptation and provided the key drivers but also emphasized the lack of appropriate literature on small enterprises (Florence et al., 2018:8) which is typical of the Ugandan economy.

For the agriculture producers especially in Africa, age, education level, access to agricultural extension, access to agricultural markets, farm income, farm experience, lack of credit facilities, farm size (Alemayehu & Bewket, 2017; Masud et al., 2017), perceived soil fertility status, and the perception of land tenure security (Alemayehu & Bewket, 2017; Hisali et al., 2011) affects climate change action.

Some companies' actions are influenced by their previous exposure to extreme events. The more they are exposed, the more they are likely to develop measures to adapt to climate change risks. (Crick et al., 2018). Company actions are also influenced by their business

strategies, management priorities, risk perceptions and the need to achieve a competitive edge (Agrawala et al., 2011; Surminski, 2013).

Another key driver of Climate change risk action in companies is related to the changing customer demands and preferences. Research indicates that stakeholder pressure has a positive impact on corporate climate change risk action (Dhanda et al., 2022; Seroka-Stolka, 2023; Yunus et al., 2020), and for a business organisation, stakeholders include customers. Another study identified a positive coloration between eco-labels and consumer purchase decisions (Feuß et al., 2022) implying the sensitivity of consumers to corporate climate change strategy like the adoption of eco-friendly products. Changing consumer lifestyles and behavior especially in the developed world play a role in influencing corporate decisions (Arslan et al., 2021), as they also continue to affect the competitive marketplace. One study examined 1532 Australian consumers and how they might respond to a food company's climate adaptation strategy and indicated a positive response to companies that would consider climate adaptation and mitigation strategies, at all levels of the food value chain (Lim-Camacho, Ariyawardana, et al., 2017). A survey of 247 firms that participated in the European Union's Emissions Trading Scheme also showed that market pressures for reducing GHG emissions are important determinants of corporate GHG reduction strategies (Cadez et al., 2019). Another study examined the environmental disclosures by the UK FTSE 100 companies and especially the companies that were considered to be close to the consumers. This study confirmed that such companies were significantly more active in putting in place more environmentally friendly strategies (Haddock-Fraser & Tourelle, 2010), therefore emphasizing the strong influence of Consumers on business decisions. Of recent, green consumer behaviour has also come at the forefront in terms of it's ability to influence climate change mitigation and influencing green production (In & Hsu, 2015). Other researchers have continued to discuss the importance of Consumer behavior in influencing climate change risk action (Habib et al., 2021; Shwom & Lorenzen, 2012; Young et al., 2010). This new focus on the roles of consumer behavior in influencing corporate climate change risk action emphasizes the need for policy makers and researchers to continue investigating how changing consumer behaviors impact producer and processor climate change action both globally but also in Uganda the focus of this study.

Theories on organizational behavior may also help to explain why some organizations respond appropriately to climate change risks and other do not. One of such theories is the theory of planned behavior by Ajzen (1991). The theory contents that 'intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the

behavior, subjective norms, and perceived behavioral control; and these intentions, together with perceptions of behavioral control, account for considerable variance in actual behavior' (Ajzen, 1991:179). Other researchers also studied the roles of perception in influencing the desired risk actions, in China using the theory of planned behavior (Zhang et al., 2020) and in New Zealand (Niles et al., 2016).

The values and beliefs of the decision makers (Moser & Ekstrom, 2010) are critical drivers of adaptation decisions in organizations. It is believed that managers use their preexisting values (Braman & Kahan, 2006), preferences, beliefs, norms, one's cognitive processes, and one's experiences in designing or not designing their risk mitigation strategies (Moser et al., 2008; Nielsen & Reenberg, 2010). This was also manifested in one of the studies carried out in Burkina Faso (Nielsen & Reenberg, 2010). These beliefs are affected by Heuristics and Biases (Tversky & Kahneman, 1974) which affect adaptation decisions. Blennow & Persson (2009) in their study of Swedish forest owners found that the strength of belief in climate change had a role to play in the way different organizations respond to climate change risks (Blennow & Persson, 2009). From the Ugandan agriculture perspective, the agro-climatic conditions that affect farmers' livelihoods are noted to affect their risk decision making and perception to adopt investment-related policies (Tanaka & Munro, 2013).

2.7 The climate change emergency and the related inaction

The state of climate change and the required action is currently being considered as a climate emergency (Ripple et al., 2020). 'Profoundly troubling signs from human activities concurrent trends in the vital signs of climatic impacts'(Ripple et al., 2020:8) all point to the fact that the world is now dealing with a climate emergency.

There has been a lot of global efforts to engage different Countries and stakeholders to accelerate efforts to curb greenhouse gas emissions and the likely adverse effects of climate change. However, there are increasing concerns of inaction, the failure to reduce absolute greenhouse gas (GHG) emissions or achieving durable emissions reductions in absolute terms (Gifford, 2011; Slawinski et al., 2017). Despite efforts to curb emissions, the overall emissions continue to rise (Hornsey & Fielding, 2020; Stoddard et al., 2021). The world still conducts business as usual (Ripple et al., 2020). There are also global challengers to the models and basis for climate change modeling asserting that there is nothing like a climate change emergency (Berkhout, 2019). There are also already existing organized groups globally, like the Global Climate Coalition (GCC), formed to object to global efforts for

climate change mitigation and adaptation (Brulle, 2022). The question is why the inaction, the growing forces against climate change risk action, and the sense of belief that climate change emergency is not real?

Some of such reasons have been observed to be the power of the UN political processes to influence climate change mitigation, the variation in resource endowments, and the inequalities of purchasing power among nations contribute to the limitation or the registered inaction to the current climate emergency (Harvey, 2022). The political agendas and economic interests of climate change players are a source of complacency contributing to the inaction to climate change risks (Gills & Morgan, 2021). The role played by powerful fossil fuel corporations and the corrupt politicians (Avery, 2017); climate governance, mitigation modeling, energy systems, inequity, lifestyles, and social imaginaries (Stoddard et al., 2021) all contribute to the registered failure to respond appropriately to climate change emergency and the growing resistance to climate change mitigation and adaptation efforts.

Several researchers have tried to explain the other reasons behind climate change inaction (Gifford, 2011; Hornsey & Fielding, 2020; Pölzler, 2015; Schmitt et al., 2020; Slawinski et al., 2017). Gifford, (2011) asserted that other than the structural barriers, psychological barriers play a significant role in hastening climate change inaction, laying out seven psychological barriers: 'limited cognition about the problem, ideological worldviews that tend to preclude pro-environmental attitudes and behavior, comparisons with key other people, sunk costs and behavioral momentum, discredence toward experts and authorities, perceived risks of change, and positive but inadequate behavior change' (Gifford, 2011:290). Schmitt et al. (2020) proposed that inaction should not only be seen from the psychological nature only, but should consider the roles played by the unequal distribution of power in society and its role in influencing societal beliefs and norms (Schmitt et al., 2020).

Further research indicates that effective climate change risk action requires dealing with the taken-for-granted behaviors and the avoidance of short-termism in institutions (Slawinski et al., 2017). Approaching climate change risk response in institutions using a present-time lens and a low tolerance for uncertainty is considered detrimental for businesses and should be avoided for climate change risk response to succeed in organizations (Slawinski et al., 2017). From a policy perspective, regulations should encourage firms to take a longer-term perspective in addressing climate change issues (Slawinski et al., 2017) and therefore reducing climate change inaction.

Biagini & Miller, (2013) noted that Climate change in-action by the private sector may also be resulting from the private sector feeling that:

- 'Through climate change is occurring, much of the risk is in some seemingly remote future several decades hence and beyond timeframes relevant for investment purposes.
- The outcomes of climate change risks mitigating action are not immediate but seen after some unknown time.
- The feeling that it is the government's responsibility and not necessarily the private sector.
- There are still some held perceptions that climate change is still unproven and a future rather than current risk, and that adaptation is largely dependent on uncertain model results'

(Biagini & Miller, 2013:244-245).

This therefore implies that government has a role to play in enhancing climate change communication and building the capacities of the various state holders to better appreciate their roles in the adaptation and mitigation of climate.

Both Slawinski et al., (2017) and Gifford, (2011) also stressed the important role played by the managers and the role of the cognitive factors at the individual level in heightening climate change (in)action. The role of managerial risk attitudes (Todaro et al., 2021); the study of human behavior, cognitions, and psychological adaptation (Gifford et al., 2011) are all considered critical in reducing climate change risk inaction. These issues will be discussed in detail in the next section.

This study explores the importance of manager perceptions and beliefs in driving climate change risk decisions in business organizations in the agriculture sector. We now need to look at the available literature on the cognitive processes and risk perceptions of managers

2.8 Management cognition and risk perception

Human cognitive processes have been noted to be critical in the climate change response process (Clayton, 2019). 'Cognitive mapping provides a methodology that allows the mapping of farmers' risk perception in line with actual farmer's understanding of risk' (Winsen et al., 2013:51). Conventional research methods have not helped farmers as they

require quantification of risks. This is why cognitive mapping comes in to accommodate the qualitative aspects of risks perception by the farmer (Winsen et al., 2013). Cognitive maps help to represent one's mental models and their interpretation of reality (Winsen et al., 2013).

Corporate climate change action is expected to be in the form of adaptation or mitigation and there are several factors that drive or influence these actions. One of these factors has been noted as the role of the individuals' cognitive abilities and risk perceptions in the adaptation and climate risk decision making process (Cross, 1998; Grothmann & Patt, 2005). This was partly highlighted in section 2.6 above. People are more likely to respond to climate change risks based on their cognitive biases, based on their memory of related climate change events occurring, with events that occurred and left a more vivid memory being considered as those that are more likely to happen (Grothmann & Patt, 2005), aspects of heuristics and cognitive bias discussed by (Ellis, 2018) as being key in influencing managerial decisions in uncertain environments (Artinger et al., 2015).

Research also contends that there are issues of values and ethics, knowledge, and culture construct that limit adaptation (Adger et al., 2009). This section reviews in more details the literature related to management cognition and risks perception to help us understand how these play in affecting risks decisions.

2.8.1 The role of risk perception in climate change risk management

Many times, it can be assumed that organizational decisions taken by managers follow standard decision making processes. This is not necessarily true. Managerial decisions follow a mix of subjective thinking and intuition (Dane, 2007; Grothmann & Patt, 2005; D. Jankowicz, 2001). Corporate climate change action similarly is believed to be driven by managers' perceptions or awareness (Bleda & Shackley, 2008). Risk perception is regarded as a key determinant of climate change risk response (Grothmann & Patt, 2005). This has already been hinted on in sections 2.4.4.3 and 2.6.

Risk perception relates to:

> *'the **perceived probability** of being exposed to climate change impacts and to the appraisal of how harmful these impacts would be to things an actor values (**perceived severity**), relative to the appraisal of how harmful and urgent other problems or challenges in life are'* (Grothmann & Patt, 2005:6)

The way how managers perceive climate change risks has a direct bearing on the response options considered (Gasbarro & Pinkse, 2016; IPCC, 2014b; Linnenluecke et al., 2013). The importance of behavior intentions was also emphasized in the Theory of Planned Behaviour by Ajzen (1991), noting that the intentions to perform a given behavior is influenced from their attitudes toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). The role of risk perception, and the perceived adaptation capacity, are two important cognition factors in the adaptation process which have been largely ignored by researchers (Grothmann & Patt, 2005).

It is therefore important for us to understand how climate change beliefs and attitudes in businesses play an important role in the decision making process for organizational climate change risk action (Bleda & Shackley, 2008; Lujala et al., 2015).

2.8.1.1 The varying perceptions of business managers at the different levels of the agricultural value chain.

The Managers at the different stages of the agriculture value chain have varying perceptions. (Food and Agriculture Organisation of the UN, 2010). If we compare the producers and processors, the two focus groups of our study along the agriculture value chain, they are engaged in various activities which affect their perception towards climate change risks.

Table 3: Different activities at the two stages of the value chain:

Agriculture Producers	**Agriculture Processors**
• Inputs, land tilling, • Concerned with input quality and rains, pests, technologies • Farm produce	• Manufacturing, Packaging, and transportation to markets/final consumers

Source: Author 2021

It is clear that producers are more likely to be concerned with issues of quality of inputs suitable for the changing climate, the land used for farming, the farming technologies being introduced to cope with climate change, reliability of rains; and the access to markets for their produce, increased drought conditions, and the occurrence of more floods (Liverpool-Tasie et al., 2020). Climate change risk action by producers is considered to be partly driven by the farmer's agricultural experience, on the farm training on climate change related

practices, social capital (Arunrat et al., 2017), access to credit (Arunrat et al., 2017; Shikuku et al., 2017), and membership to farmer groups (Shikuku et al., 2017).

On the other hand, downstream processors are more concerned with the reliability of supplies from the farm producers, the production infrastructure, changing product demands, varying tax and government regulation due to climate change, among others. Though as seen from prior sections, they are likely to have similarities in their climate change risk concerns and opportunities especially as regards the drive for profitability.

The perceptions of the business managers therefore at the various stages of the agriculture value chain are likely to be affected differently because of the varying effects and opportunities created by climate change to their businesses.

Several studies have been carried out on climate change risks perceptions along the agriculture value chain but they mainly focus on the agriculture producers (Benedikter et al., 2013; Lim-Camacho et al., 2017; Liverpool-Tasie et al., 2020) yet it is important to understand how risks perceptions vary at the different stages of the value chain in order to guide targeted policy formulation. It is considered more risky if companies to not consider climate change risks for the complete value chain (Goldstein et al., 2019).

Other studies have been carried out on the effect of climate risks on value chains but missed to mention the role of manager perception in the risk response formulation (Benedikter et al., 2013; Lim-Camacho et al., 2017).

2.8.2 A review of what influences risk perception.

Manager perceptions or beliefs are influenced by various factors either from within this own organizations, their external environments, or resulting from their past experiences. Different researchers have attempted to explain what influences risk perception of managers as described in table 4.

It can be concluded from table 4 below that manager beliefs and attitudes are affected by not only what is experienced personally from previous experiences, but also from what is happening outside the organisation or in the managers' external environment. It should also be noted that most of the highlighted influencers like expert knowledge, and experiences, extra are all intuitive in nature. They are in the manager's mind and cannot be easily accessed.

Table 4: Influencers of manager perceptions and beliefs:

Influencers	**Author**
The perceived actual and potential changes in competitiveness resulting from climate impacts, closely related to the Economic theory of risks perception.	Bleda & Shackley, 2008
The climate change information received by business managers	Linnenluecke et al., 2015
Expert knowledge on climate change possessed by managers	Taylor et al., 2014
The manager's past experiences of climate change impacts	Gasbarro & Pinkse, 2016; Lujala et al., 2015; Niles et al., 2015;
Gender, educational background, and people's political preferences	Lujala et al., 2015
The time horizon, the belief that it won't affect us now	Weber & Hsee, 1998
One's social-economic status	Ndamani & Watanabe, 2017

A further attempt is made here using various theories to explain why different people have different risk perceptions even when exposed to the same hazards, risk communication or risk environment. Some of such theories of risk perception mostly argued on the basis of social science understanding are detailed below:

a. **Protection motivation theory (PMT)** proposed by Rogers & Prentice Dunn (1997) focusing on the risk-reducing behavior of individuals and emphasizes two cognitive processes that individuals undergo when faced with a threat, threat appraisal (Risk perception) and coping appraisal (Perceived adaptive capacity) as explained by (Grothmann & Patt, 2005).
b. Other theories proposed by Wildavsky et al., (1990) include:
    - The **knowledge theory focuses on the notion** that people perceive things to be bad just because they know them as bad or dangerous. The perceptions of danger are related to ones knowledge of the risks;
    - **The personality theory** which focuses on the notion that different people have different appetite for risks and this kind of personality drives their

definition of what is risky and what is not. This was also supported by (Sidortsov, 2014);

- **Economic theory** is based on the assumption that risk is understood dependent on one's personal economic status, the rich may be ready to take in more risks than the poor and this condition defines what is considered to be risky and what is not (Sidortsov, 2014; Wildavsky et al., 1990);
- **Political theory** suggests that risk is seen as influenced by power related needs arising from social and demographic characteristics (Dowbiggin, 2017; Wildavsky et al., 1990);
- **Cultural theory suggests** that individuals choose what to fear and how much to fear in order to suit their way of life as influenced by one's cultural biases. Wildavsky et al., (1990) asserted that cultural biases play a greater role compared to the other theories discussed so far in influencing risk perception. Cultural backgrounds are likely to lead to varying risk perceptions (Bontempo et al., 1997), though (Marris et al., 1998) had a slightly varying view of this.
- **Psychometric theory of risk perception** is based on the assumption that all factors influencing perception can be measured quantitatively. Risk is viewed as inherently subjective shaped by psychological, social, institutional, and cultural factors. But even with this subjectivity, the interrelationships are assumed to be quantifiable (Slovic, 1990; Slovic & Weber, 2002).

Slovic, (1990) believes, with the listed assumptions in mind, that information processing (cognition), personality, social factors, economic factors, and cultural factors all interact in a multidimensional way to determine appropriate risk response (Slovic, 1990).

c. **The social network theory of contagion**, focusing more on the relational aspects of individuals and the resulting networks (Scherer & Cho, 2003) implying that business managers' risk perceptions are influenced partly by their social networks.
d. One more theory that Sidortsov (2014) highlighted was the **Rational Action Paradigm (RAP)** which asserts the individualistic nature of choices, the fact that people pursue actions where they are aware of the expected values and benefits. As long as these values and benefits are known by individuals to result in maximum payoff, individuals will tend to have preference of those actions (Sidortsov, 2014).

However, these theories still ran short of explaining the cognitive processes of managers or individuals. How they covert the tacit into explicit knowledge to facilitate climate change risk action decision making.

Sjöberg, (1996) asserts that both the Psychometric and Cultural theory of risks perception are failing to properly explain the variance of risks perceptions with the later even being less successful (Sjöberg, 1996).

The other limitation of all the theories reviewed so far in this section to explain what influence risk perception, is that the studies are all in relation to the wide public and not management teams in organizations with several of them being conducted outside Africa, and with small samples which are difficult to generalize.

The present study on manager perceptions and their effect on climate change risk response in the agriculture sector in Uganda helps to answer several of the questions that could not be answered by the different theories reviewed in this section on what influences risks perceptions especially in the context of a business organisation along the agriculture value chain, the downstream agricultural processors and the producers. We will now consider two other theories of risks perception that help to understand how risk perceptions operate in organizations, but specifically for this study, our main focus will be of Kelly's Personal Construct theory.

2.9 The theory of sensemaking and personal construct theory

There is a need for a way of conceptualizing how perceptions about climate change operate in organizations. Two key approaches can be used; 'sensemaking' (Weick et al., 2005) and Personal Construct Theory (PCT) (F. Fransella, 2003; Kelly, 1955).

2.9.1 An introduction to sensemaking

Sensemaking is described as a 'reciprocal interaction of information seeking, meaning ascription and action'(Davis et al., 2005:55). Sensemaking is viewed as the 'ongoing retrospective development of plausible images that rationalize what people are doing'(Weick et al., 2005:409). This involves interpretation, and assignment of meaning to unforeseen, ambiguous and confusing events as they are encountered (Brown et al., 2015; Davis et al., 2005; Weick et al., 2005). This relies on one's past and present experiences

(Georg & Füssel, 2000; Davis et al., 2005); background knowledge of related circumstances; and the influence by the team members or colleagues with whom the person interacts (Davis et al., 2005). This concept of sensemaking hinges more on the systemic processes in which organizational experiences are shaped through words, written and spoken texts into organizational behavior (Weick et al., 2005). From these definitions, we can conclude that Weick's theory of sensemaking is related more to past events, retrospective in nature.

Weick's theory of Sensemaking is also more about invention, how people generate what they interpret. It is more about an invention than a discovery (Weick, 1995). Our study is more about understanding or discovering how managers construe their environments in the organisation and how this construction affects decision making. So our study would not fit well with Weick (1995)'s sense making theory. The theory also seems to rely more on the function of organizational structures, the homogeneity of top manager construction processes, and the role played by organizational cultures, routines, and procedures in the organizational sensemaking (Weick, 1995). Weick (1993) uses the case of the firefighter's tragedy to emphasize the importance of organizational structures. In this case, there seems to have been a failure in role structures and systemic structures. The fighters were faced with a change of roles and a new environment that they were not well prepared for (Weick, 1993) indicating the difficulty of sensemaking in times of a crisis.

Another assumption under sensemaking is that organizational interpretation is based on the collective understanding of top managers (Daft & Weick, 1984). This may not necessarily be true as various decisions take place in organizations without a collective understanding of managers. Weick &Roberts (1993) also illustrate the need for managers to be careful of other managers meaning construction processes and the role of structured decision making processes in times of crises in their work, 'Collective mind in organizations: heedful interrelating on flight decks' (Weick & Roberts, 1993).

However, many times, managerial decisions are based on individual perceptions which may not follow any particular organizational structure or procedures. Specifically, climate change risks decisions are future in nature, full of uncertain situations and may not follow a particular norm (Dowbiggin, 2017).

This study also agrees with Dowbiggin (2017) that 'individual heuristics and individual common sense at the personal level are assumed to drive risk perceptions' (Dowbiggin, 2017:69).

As stated by Dowbiggin (2017), sensemaking theory emphasizes more of the power of social and collective values while PCT focusses more on an individualistic orientation despite the fact that both theories help us to understand knowledge management in organizations.

The theory of Sensemaking does not clearly help us to understand how managers translate their intrinsic climate change risk knowledge into explicit knowledge which is central to this study. Kelly's personal construct theory seems to be the best alternative to respond to the gaps highlighted in this section which Wieck's theory fails to address and has been chosen by the researcher as the main theory for this study. Its philosophical stance and the related tools for data collection is illustrated in the next section.

2.9.2 Personal construct theory

2.9.2.1 Kelly's philosophical stance

Compared with the theory of sensemaking discussed in the section 2.8.1 above, PCT gives us a better opportunity to understand individual perception and sensemaking processes.

Weick's theory of sensemaking has the following weaknesses highlighted above:

- It is related more to past events, retrospective in nature yet the current study on climate change risks addresses more anticipatory or futuristic risks challenges.
- It is more about invention, how people generate what they interpret. It is more about an invention than a discovery (Weick, 1995)
- Relies more on the function of organizational structures, the homogeneity of top manager construction processes, and the role played by organizational cultures, routines, and procedures, yet managerial decisions are based on individual perceptions which may not follow any particular organizational structure
- Emphasizes more of the power of social and collective values while PCT focusses more on an individualistic orientation

Kelly's (1955) theory can be used to address all the above gaps highlighted from Weick's sensemaking theory and seems to be a better fit in helping us inquire about the role of manager attitudes and perceptions in climate change decision making.

Kelly (1955) states 'that each man contemplates in his own personal way the stream of events upon which he finds himself so swiftly borne' (Kelly, 1955:3), the individualistic orientation.

Kelly defines a person as a scientist desirous of anticipating events and controlling them (Kelly, 1985). Kelly sees the person as evolving in an evolving world. Therefore, he sees the person as having the ability to construe his environment but also reconstruct as the world or different situations evolve, the philosophy of constructive alternativism (Kelly, 1985). PCT helps us to understand how people actually interpret experiences, and states that different people with the same experiences will have different interpretations (Butt & Parton, 2005; Jankowicz, 2001). So different managers will experience the same climate change risks events or climate policy but, prior to discussion with others, will each interpret them differently and therefore take different actions.

Butt & Parton (2005) restated Kelly's position that people are seen 'as if they were each with their own theories, hypothesizes, and experiments on which their actions are based' (Butt & Parton, 2005:797). Humans are presented as having inquisitive minds moving from a position of ignorance, with their construing changing as they experience different events (Kelly, 1955).

Kelly's theory sees a person as having the 'creative capacity to represent the environment, not merely to respond to it. He can also place alternative constructions upon it and indeed do something about it if it doesn't suit him' (Kelly, 1955:8).

The last part of this statement would suit well with the desired climate change risks action which may result if managers construe that their environment is not favorable and take action to change it.

Kelly defines constructs as the means by which people represent the universe. A way in which people see things as being alike and yet different from other. Each person builds a system through which he generates meaning out of events. According to Kelly a person can only see the real world or objective reality through their individual encounters with events and their individual construing (Horley, 2012). A person elects constructs and then tests them against the reality of the universe (Kelly, 1955:12). They sometimes turnout to be correct or wrong as tested by the realities of the world.

Kelly credits his theory for its ability to understand how a person interprets the world around them. This places it as an interpretive/constructivist theory of human behavior maintaining that 'people are constantly engaged in interpreting and reinterpreting their environment, building mental pictures or maps in order to structure and make sense of it'(Littler & Marsden, 2000:129). Kelly's theory suggests that an individual person understands the world

through developing a system of constructs that are personal to that individual, and which are the basis for interpreting experience (Kelly, 1955) further supporting his theory as interpretive.

Kelly's 'Constructive Alternativism' philosophical stance positions a person as evolving and so does his interpretation of his environment as stated that, 'all of our present interpretation of the universe are subject to revision or replacement', there are always alternative constructions available to choose among in dealing with the world' (Kelly, 1955:14). The theory considers the world as real, open to interpretation but with each person having different ways of construing it, and open to reconstruction in infinite ways (Kelly, 1955). Events may be interpreted by people in a potentially infinite variety of ways (Burr et al., 2014; Horley, 2012). A person can make varied constructions as they experience different events depending on their ability to perceive and understand, but these constructions are always subject to question and reconstruction in alternative ways (F. Fransella, 2003). There are always alternative ways of making meaning out of different situations in our world or environment. (Truneckova & Viney, 2012). State it simply, 'there is not a single correct way of seeing things' (Jankowicz, 2001:67). This means that people should accommodate different perspectives in their search for meaning (Butt & Parton, 2005).

There are other influences on Kelly's thinking, but all phenomenological in nature. They all believed in Kelly's notion of a person's lived experiences as a source of knowledge. These included Edmund Husserl who proposed that for researchers to generate valid data, they needed to put aside any presuppositions that they may have in relation to the question in what he termed as bracketing or phenomenological reduction resulting in data that provided better description of the experience (Mcconnell-henry et al., 2009).

Heidegger, who was his student, developed another view which relates more to Kelly's emphasis on capturing a person's understanding (Heidegger, 2014; Mcconnell-henry et al., 2009). Heidegger purported that 'we construct our reality from our own experiences and beliefs' (Mcconnell-henry et al., 2009). Heideggerian phenomenology considers what it means to 'Be-in-the-world' and emphasizes that we construct our reality, and therefore, comprehension from our experience of Being–in-the-world' (Mcconnell-henry et al., 2009). We cannot be separated from the world around us, but a intertwined with it. This therefore implies that the world around us shapes our understanding and behavior. Heidegger's approach in based on his concept of 'Dasein' a description of 'being'(Heidegger, 2014). The term Dasein refers both to the human agent and to the type of being that humans have.

The concept of Dasein see the world as a range of possibilities and the person is seen too in terms of its possibilities (Heidegger, 2014) which might plausibly be seen as a precursor of Kelly's concept of alternative alternativism.

Another such person who closely influenced Kelly was Dewey (Butt & Fransella, 2008). Dewey 'emphasized the anticipatory nature of behavior and the person's use of hypothesis in thinking' (Kelly, 1955:129). In this case a person's construct as proposed by Kelly is considered a hypothesis. Each person designs his daily exploration of life around the rival hypothesizes which are suggested by the contrast in his construction system, emphasizing Kelly's description of a person's thinking as always being on motion (Kelly, 1955). Kelly believed that 'we are forms of motion and we propel ourselves—no one or nothing does it 'to' us'. (F. Fransella, 2003:25). Dewey too agreed that the universe is always on motion and needs to be anticipated to be understood (Kelly, 1955:154). Kelly adds that a person's life is wholly oriented towards the anticipation of events in agreement with Dewey. Dewey as a pragmatist believed that reality is still in the making. Dewey's pragmatism sees the person as 'inquiring, experimenting and hypothesizing' (Butt & Fransella, 2008:22) which is anticipates Kelly's idea of constructive alternativism. 'The object of knowledge is not an immutable, independent reality, but is in part constituted by our cognitive interactions with it.' (Haack, 2004). Dewey believed that knowledge needed to be tested through lived experiences using scientific methods. The more we interact with the world, the more we develop different construction of the world around us as we put acquired knowledge to a test. As managers of business organisation interact with different climate change events, they are anticipated to develop different constructs and meaning which shapes their behaviors.

Several other researchers had an influence on Kelly, like Vaihinger & Rosenthal, (2021)'s philosophy of 'as if' in their work on formulation of constructive alternativism (Vaihinger & Rosenthal, 2021), and all these researchers emphasized the importance of generating knowledge from lived experience, a concept fundamental to the phenomenological philosophy. It is therefore valid to note that Kelly's theory situates appropriately with the phenomenological philosophy (Armezzani & Chiari, 2014) detailed later in section 3.1.

Kelly considered his theory as 'interim' emphasizing 'that all perceptions are open to questioning and reconsideration- as are his own views and theories as well'(Dowbiggin, 2017:52). As the world changes with different outlooks and discoveries and different interpretations are expected to take place (Kelly, 1955:14).

This is critical to our understanding of managers in organizations and the researcher considers it as the main theoretical basis of this study.

2.9.2.2 Kelly's theory: basic assumption and corollaries

Kelly's theory is expressed in one basic assumption that 'A person's processes are psychologically channelized by the ways in which he anticipates events' (Kelly, 1955: 46), seeing man as individualistic and anticipatory in his construing of events. A person makes internal representation of his or her environment as the basis of anticipating future events (Jankowicz, 2001).

This fundamental assumption is supported by eleven corollaries (Fransella, 2003; Jankowicz, 2001). However, this study will make use of the six corollaries based on their anticipated linkage and use in helping us to achieve the research aims of this study, but not necessarily to indicate that the others are not important. These are described in Table 5 below.

It is important for us to understand how managers utilize their past experiences while taking climate change decisions in the organisation well aware that no past event can be the same.

Managers have to recognize a possibility of recurring patterns in their experiences in order to make appropriate internal representations to help them anticipate future occurrences (Construction Corollary). It assumes that managers can anticipate their future full of uncertain events if they can replicate certain patterns of the past events. These internal representations are organized in a hierarchical way with some subsuming the others (Organizational Corollary). Climate change events evolve, and so the manager's construction systems as they encounter different climate change events (Experiences Corollary). These experiences are assumed to be personal with different people encountering the same events but having differing mays of construing them (Individuality Corollary).

However, where managers are able to construe or place the same meaning to a given event, those managers will be considered to be similar and in the perspective of this research will be assumed to have the possibility of taking related actions (Commonality Corollary).

It is also important to note that making effective climate change risks decisions requires good team work in an organisation. This implies that managers have a task of appreciating the other managers' ways of seeing things and make an effort to construe each other's

construction processes. The managers must construe the other manager's outlook. This is the best way managers can enter into an effective role relationship (Sociality Corollary).

Table 5: **Kelly's corollaries as used in this study.**

Corollary…	… dealing with
Construction: A person anticipates events by construing their replication (Kelly 1955:50)	Expression of meaning. Events never repeat themselves, and one can look forward to them only by devising some construction which permits him to perceive two of them in a similar manner. Tomorrow cannot be a duplicate of today. People look out for recurring patterns in their experiences in order to construe their environment and in their quest to anticipate the future.
Organization: Each person characteristically evolves, for his convenience in anticipating events (Kelly 1955:46).	Hierarchical structure of meaning. Constructs are organized in a system which embraces ordinal relationships. There exists hierarchical relationship among personal constructs with some constructs being superordinate and others subordinates. The construction system is also dynamic in nature.
Experience: A person's construction system varies as he successfully construes the replications of events (Kelly 1955:72).	Changes in construing: People's construction systems evolve. When they form initial constructs or anticipations, these constructs are put to a test or validation process as the person successively encounter new events. This implies that the person reconstrues events based on the kind of experiences they have had.
Individuality: Persons differ from each other in their construction of events (Kelly 1955:55).	Personalization of meanings: Two different person may have different ways of construing the same event. Kelly (1955) states that 'No two people can play precisely the same role in the same event, no matter how closely they are associated'. There could be however some possibility of sharing experiences with another person as will be see from the Sociality and Commonality Corollary.
Commonality: To the extent that one person employs a construction of experiences which is similar to that employed by another, his psychological processes are similar to those of the other person (Kelly 1955:90).	Similarity of construing: People can be considered similar if they construe the same events the same way. Not because they encountered the same events, but because of the similarity in the way they have placed meaning on the encountered event.
Sociality: To the extent that one person construes the construction processes of another, he may play a role in a social process involving the other person (Kelly 1955:95).	Role relationships: Effective social relationships depend on the extent to which a person is able to understand the constructs another person uses, regardless of whether the first person's own constructs are similar or different.

Source: Author (2021), after Kelly (1955) & Jankowicz (2001).

Different researchers have used PCT in a wide variety of commercial and business applications (Catulli & Reed, 2017; Cornelius, 2015; Jankowicz, 1990; Jankowicz, 2001), the study of human values (Horley, 2012), in the study of information search processes (Reynolds, 2013), in the study of risks perception of electricity producers and utilities (Dowbiggin, 2017) and especially in the clinical practice where Kelly was a practitioner (Kelly,1955).

In all these studies, the intentions rotated around the need to understand how a person uses the tacit knowledge and intuitive judgements generated from what they experience from their environments to determine personal behavior or decisions. Dowbiggin (2017) successfully used this same theory to examine management cognition of climate change risks in the electricity sector in Ontario. Her analysis compared the risk perceptions of electricity power producers and utilities. Her study relates closely with the current study of climate change risks perceptions of agriculture processors and producers. Jankowicz (2001) also used Kelly's PCT to illustrate how managers in organizations use their expert knowledge, which is tacit to make strategic decisions in an intuitive and subjective way. Jankowicz (2001) used examples from bank commercial lending and venture capital investment to illustrate how PCT can be helpful in organizations to identify tacit knowledge that managers use to make strategic decisions.

Climate change risk decision making processes by business managers are based on unwell defined information, in an uncertain world, and are subject to different interpretations. A lot of intuitive knowledge is used to take climate change decisions. The strategies that business managers take for addressing climate change risks are partly dependent on their mental models (S. D. Hill & Thompson, 2006). An understanding of how these mental models in relation to climate change risk are formed is therefore very important. PCT provides a mechanism for understanding how these mental medals are formulated.

This study focuses on understanding the construction systems of two categories of managers, the producers and processors. These are likely to have varying ways of seeing things as they encounter different events in their business environments as partly discussed in section 2.3. Climate change risks are also in an uncertain future where no one or no manager may have prior experiences of any climate change event. Therefore, managers will have to form constructs in anticipation of what may come in the future, and reconstruct their environments are they encounter new climate change events. So Kelly's theory is useful in helping us understand these construing dynamics of managers in the Agriculture sector business organizations.

In his effort to ensure that his theory is applicable to practical situations, Kelly (1955) developed the Repertory Grid Technique (RGT) as a useful tool for eliciting personal constructs. It is a useful tool for making intrinsic knowledge extrinsic (Jankowicz, 2001). Details about the RGT will be elaborated in details in chapter 3.

One of the weakness related to the use of Wieck's sensemaking theory is its use of data gathering techniques such as interviews, archival material and observation techniques which may not be appropriate for respondents to freely express their own perceptions (Dowbiggin, 2017). So Kelly's RGT comes in to bridge this weakness that would result if Wieck's sensemaking theory was adopted.

In summary, this section has given us an opportunity to conceptualize how manager perceptions work in organizations using two theories, Wieck's theory of sensemaking and Kelly's PCT. We have seen that both theories help to understand how people construct their environments, but Kelly's PCT has a stronger basis for studying individual construing than does Wieck's theory of sensemaking. Several other benefits of Kelly's theory were discussed and the philosophical stance of the theory together with the basic assumptions on which his theory is based. Recent use of PCT in the study of manager perception was also discussed from both the financial sector, the electricity sector and in the clinical setting. The section concluded with the introduction of the RGT, a useful tool for eliciting personal constructs.

The section below provides a synthesis for the literature providing a theoretical basis for the research questions.

2.10 Literature review synthesis

The literature reviewed has indicated that managerial risk perceptions and attitudes have a role to play in driving climate change risk action. In synthesizing the literature review, we look at the various issues discussed in the literature review leading to this conclusion and justifying the need for this study. These issues include:

i) **Climate change is a reality and mainly driven by human actions.** There seems to be a clear agreement globally that the world is faced with risks related to Climate change, a change in the state of the climate caused by the greenhouse gas effects and global warming (Schlesinger, 2011; World Meteorological Organization, 2019) which is partly caused by human activity (IPCC, 2013; Pielke, 2005). Climate

change originate from greenhouse gas emissions which are resulting from various gasses (carbon dioxide (CO2), methane, nitrous oxide and a few other gases in the earth's atmosphere (Schlesinger, 2011; Schmidt et al., 2010; World Meteorological Organization, 2019). Accumulation of these greenhouse gasses is mainly attributed to human activity (IPCC, 2013, 2014b; King, 2004; Oreskes, 2004; Schlesinger, 2011). Agriculture has been particularly reported as a key contributor to the Countries' GHG emissions, and therefore to climate change (Blandford & Hassapoyannes, 2018; IPCC, 2014a; Nayak et al., 2015; Science Advisory Group, 2019; Vetter et al., 2017). Therefore, the role played by human activities in the agriculture sector is very relevant to the climate change mitigation and adaptation initiative.

ii) **Climate change impacts are high and expected to increase in the future, with a negative effect on agriculture productivity.** Globally, businesses are faced with several climate change related impacts like tropical cyclones, hurricanes, flooding, extreme rain fall, tropical storms, heart waves, drought, severe coldness, heavy snow, and wildfires in different parts of the world (MET Office, 2017; World Meteorological Organization, 2019). The levels of world hunger, undernourished people, severe droughts, have also increased especially in Africa due to climate variability and extremes (FAO,IFAD,UNICEF, 2018; FAO, 2017b; World Meteorological Organization, 2019). There are also fears of increased human diseases, plant pests, insect borne diseases which threatens agricultural productivity (Lobell & Field, 2007; Parry et al., 2001; Schlesinger, 2011). National economies like Uganda, are not exceptional and are already being impacted by Climate change (Markandya et al., 2015; Okonya et al., 2013). Climate change is already projected to negatively affect Agriculture in Africa (Knox et al., 2012; Schlenker & Lobell, 2010), and Uganda in particular (Kaggwa et al., 2009) yet agriculture plays a great contribution to the Ugandan economy (Uganda Bureau of Statistics, 2018a, 2018b).

iii) **The world has no options but to find ways to respond to the risks created by climate change.** Global treaties and agreements have been signed between different countries committing themselves to put in place measures to reduce GH gas emissions (Climate Focus, 2015; Encyclopædia Britannica, 2019; United Nations Framework Convention on Climate Change, 2018) and different business organizations are also making an effort to mitigate their emissions and put in place strategies to mitigate or adapt to climate change risks (AIGCC et al., 2018).

In the Ugandan context which is the focus of this study, other than being a signatory to different global climate change protocols and treaties, different policies have been put in place to influence climate change adaptation and mitigation (Ampaire et al., 2017; Climate Change Unit, 2013; Uganda National Planning Authority, 2017). However, the literature is not clear about how businesses are responding to these policies and guidelines. The literature reviewed is also more focused on the public sector and less is known about the private sector or business organizations' climate change response.

iv) **The agriculture sector is structured in terms of value chain processes and different players along the agriculture value chain are affected differently.** It should be noted that this study focuses more on two players on the agriculture value chain in Uganda, the producers and processors, though it is understood that there are different activities involved along the value chain. It is also noted that agriculture producers and processors along the agriculture value chain are affected in different ways by climate change risks, and have varying risk perceptions resulting from their characteristics. For example, producers have their production infrastructures and assets affected, while processors have their post-production infrastructure such as facilities for storage, processing, marketing and transport, buildings and equipment affected by climate change (Andreoni & Miola, 2015; FAO, 2015). We have also seen from the literature that the producers and processors will have varying risk perceptions as a result of their differing characteristics.

v) **Varying definitions of risk exist and these affect how risk assessments are done and the related risk response actions**. In order to develop appropriate climate change risk response strategies, it is important to understand that there are varying definitions of risk. Risk can be defined as 'the possibility that human actions or events lead to consequences that harm aspects of things that humans value'(Renn, 1998:51). Risk is also defined as the combination of the likelihood (probability of occurrence) and the consequences of an adverse event like a climate hazard (Kaplan & John, 1981; United Nations Development Programme, 2004). Other definitions of risk also introduce the element of uncertainty of outcomes of events (Cabinet Office, 2002; Klinke & Renn, 2002). The use of probabilities in the understanding of risk in affected by the uncertainty of future events and this affects the validity of some of the risk assessments done considering the volatility of the business environment in which organizations operate (Katz et al., 2013; Reilly, 2001; Smith & Fischbacher, 2009; Webster, 2003). These uncertainties are as a result of production, price, and

policy volatility resulting from the business environment and the unknown future (Moschini et al., 1999). Therefore, risks is understood based on the reviewed literature as resulting from human action, as involving probabilities, uncertainties of occurrences, and affected by the experiences and perceptions of the parties involved in risks assessments. This has an implication for the current study. The perceptions of managers in the business organizations has an effect on what is considered to be climate change risk and what is not considered as such. The process of risks management is preceded by a risk assessment process done either quantitatively or qualitatively (Altenbach, 1995; Mustafa, 2014), or using an integrated approach (Dowbiggin, 2017; Renn & Rohrmann, 2000), with an integrated approach to risk assessment likely to give a more effective prediction of risk because of its consideration of both the human factor, the perceptions and human behaviors in the risk assessment process.

vi) **There are multiple sources of climate change risks which agriculture producers and processors should be aware of as they assess climate change risks.** To effectively assess risks, it is important to understand that there are multiple sources of climate change risks that businesses face, and managers need to be aware of them in order to develop appropriate response strategies. Climate change risks originate from changes in the surrounding climate and associated weather variability and extremes (Barbier & Burgess, 2017; Goldstein et al., 2019), from the variability in production and prices (Ortmann et al., 1992), changes in costs of farm inputs, changes in legislation or government policies, and exchange rate volatility, (Ullah et al., 2016), and changes in the regulatory environment (Sakhel, 2017). These risks may not differ irrespective of the stage at which one is on the agriculture value chain. From the agriculture value chain perspective especially in Uganda, literature indicates that for the agriculture producers, risks may originate from seed varieties resilience to climate changes, the changes in weather conditions, the variability of occurrence of rains, increased crops and animal diseases (Egeru, 2016). While for processers, risks originating from the reliability of input sources, the operating environment, the changing consumer demands, and the product distribution systems (Dazé & Dekens, 2016). So depending on which reference group the manager belongs to, they will experience different risk environments which will affect their perception of risks and also the related risk response actions.

vii) **Companies can respond to climate change risks through mitigation or adaptation strategies or both.** Companies can choose to put in place strategies that

help to moderate, or alleviate the impacts of climate change risks-mitigation, or strategies to help their businesses to adjust to climate change risks and related impacts-adaptation (Barry et al., 2000; Jones et al., 2007), but the relationship between adaptation and mitigation in climate change risk management is considered complementary (Jones et al., 2007).

viii) **Not all companies take action to respond to Climate change risks as there are many influencers that drive climate change risks actions by companies**. There are various factors which influence managerial decisions to respond to climate change risks or not to respond, and the way to respond**.** These may include government policies in place (Florence et al., 2018), the management structure in the organisation, the internal decision-making processes, the knowledge capacity amongst employees, the resource requirements, and the availability of information (Bleda & Shackley, 2008; Florence et al., 2018). Other issues that affect climate change response are, the regulatory environment or legal regime, the existing advisory services (Crick et al., 2018; Okereke, 2007), the economic self-interest of companies (Okereke, 2007), the desire to achieve competitiveness, and a way to legitimation (Bansal, 2000; Reyers et al., 2011). Action for the agriculture producers may also be affected by age, education level, access to agricultural extension, access to agricultural markets, farm income, farm experience, lack of credit facilities, farm size (Alemayehu & Bewket, 2017; Masud et al., 2017), and the perception of soil fertility and land tenure security (Alemayehu & Bewket, 2017).

ix) **The above issue supports the literature indicating that managerial perception and attitudes have a role to play in influencing risk action**. It is has been discussed in the literature that climate change risk action by companies can also be explained by the way humans process risk information (Renn, 2011). The social amplification of risks framework discussed in the literature, indicates that humans chose to amplify some risks and attenuate others. Only amplified risk would lead to behavioral responses (Kasperson et al., 1988). The literature indicates that managerial risk perceptions play a role in determining what is amplified and therefore considered as great risk to influence risk behaviors in organization and what is attenuated (Duckett & Busby, 2013; Kasperson et al., 1988; Renn, 2011). The theory of planned behavior by Ajzen (1991) also strengthens the role of perception in achieving a desired behavior. Literature also indicates that managerial values and beliefs (Braman & Kahan, 2006; Moser et al., 2008; Moser & Ekstrom, 2010; Nielsen & Reenberg, 2010), heuristics and Biases (Tversky & Kahneman, 1974), and managerial

cognition (Clayton, 2019; Winsen et al., 2013) affect adaptation decisions. This study focuses more on the role of managerial perceptions and attitudes in influencing climate change action, as has already been documented that managers' perceptions play a role in managerial decision making processes (Bleda & Shackley, 2008; Dane, 2007; Grothmann & Patt, 2005; Jankowicz, 2001), and specifically in determining climate change risk action (Gasbarro & Pinkse, 2016; Grothmann & Patt, 2005). These managerial perceptions are influenced by their personal experiences with past climate change events (Gasbarro & Pinkse, 2016), the available climate change information, their expert knowledge (Taylor et al., 2014), their perceived level of competitiveness resulting from climate change (Bleda & Shackley, 2008), education background (Lujala et al., 2015) or social economic status (Ndamani & Watanabe, 2017). These influencers are mostly intuitive in nature and it is important to understand how managers translate this kind of intuitive knowledge to facilitate climate change risk decisions.

x) **There are different theories that can explain variations in managerial perceptions and the related risk actions, but Kelly's PCT provides the best theoretical basis to explain why managerial perceptions may differ.** In order to understand better how managers construe and make sense of their climate change risks environment, and take action to respond, literature reviewed two theories, Wieck's sensemaking theory and Kelly's PCT. However, this study utilizes PCT as the best theoretical basis to explain why managers may have different perceptions of the same events. Kelly's PCT helps us to better understand how managerial intuitive knowledge is made extrinsic to support risk decision making (Burr et al., 2014; Jankowicz, 2001). The theory also sees a human being as having different ways of construing the world as it evolves, and open to reconstruction in infinite ways (Kelly, 1955), with a possibility of each person having different interpretations (Burr et al., 2014; Horley, 2012). So PCT may be of use in explaining why managers may have different perceptions of the same events. It can help us explain how people think and act (Burr et al., 2014; Butt & Parton, 2005; Jankowicz, 2001) and therefore explain why some managers choose to respond to climate change risks and others not.

The literature therefore presents the science basis of climate change, the global efforts and National efforts to curb the climate change, how agriculture contributes as a sector in accelerating climate change, and the role that humans play in accelerating climate change. Literature has also been presented on the importance of the agriculture sector in Uganda and

how any impact on such a sector would affect the economy, positioning it as a valid choice for this study. The current variations in risks definition and the different approaches to risk assessment and management were presented. The various factors that influence the decision to respond to climate change risks were presented. Key among these in the role of managerial perceptions. Important to note also is the literature reviewed on the two study groups, the agriculture producers and processors, which are the focus of this study, and the understanding that each of these groups may perceive risks differently due to their characteristics and position along the agriculture value chain leading to varying climate change risks action. An explanation of the variations in managerial perception was done using various theories. Two theories were presented as useful in explaining how managers construe their risk environment, and PCT was detailed as the choice for this study for its highlighted strength in the current study.

It is important at this point to recall that the main aim of this study is to examine the role that business manager perceptions and attitudes towards climate change risk play in driving climate change risk action among business organizations in the agricultural sector in Uganda, in order to inform key policy decisions and corporate responses. The current section has highlighted the importance of managerial perception but there is no related study in Uganda and especially for businesses in the agriculture sector on this subject which creates a gap for this study to contribute to.

In order to achieve this research aim and objectives, the study set out to answer the following empirical questions:

i. How do the perceptions of business managers towards climate change risks in the agricultural sector in Uganda affect the choice of climate change risk action?
ii. Are there variations in how the climate change risk perceptions of business managers engaged in downstream agricultural processing differ from those engaged in commercial agricultural production in Uganda? How do these variations influence climate change risk action?
iii. How are these perceptions, tacit and explicit, represented in the construing of the two managerial groups?

The sections that follows provides a review of the research methodology that was used to achieve the set aims and objectives and in answering these research questions.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

Kothari (2004) described the research methodology as covering 'the research methods, the logic behind the methods, the data collection tools and the rationale for using a particular method or technique'(Kothari, 2004:8)**.** 'Research methodology helps us to understand why, what, from where, when and how data is collected and analyzed,' (Scotland, 2012:7). So this section reviews the kind of research philosophy, the research method employed by the researcher, details about the case study selection approaches used in this study and the rationale behind it's use, the data collection technique used in this study and the rationale for its use, and the ways data is analyzed. The section also contains details of how quality will be maintained in carrying out the research, and will end with a brief on how the researcher will adhere to ethical requirements.

As emphasized in the prior section 2.10, the main aim of this study is to examine the role that business manager perceptions and attitudes towards climate change risk play in driving climate change risk action among business organizations in the agricultural sector in Uganda, in order to inform key policy decisions and corporate responses. This aim and the related research questions already highlighted are qualitative in nature, the researcher trying to understand how the intrinsic knowledge (attitudes and perceptions) of managers are translated into extrinsic knowledge that eventually influence climate change risk policy actions with a clear focus on the two study groups: the Agriculture producers with a managed team (Not small scale) and the Agriculture processors. This chapter therefore details the process through which the research aims are achieved, and the research questions answered.

3.1 The Research Philosophy

Research philosophy is about a system of beliefs and assumptions underpinning the development of knowledge. These beliefs and assumptions are mainly broken down into two. First are assumptions about the realities in the research process (ontological assumptions), the assumptions about the nature of the social phenomena being investigated (Cohen et al., 2011). Assumptions about the sort of things which exist in the social world and the nature of that social reality. Ontology answers the question of what constitutes reality (Scotland, 2012) and the question of whether a phenomenon needs to be identified as objective or realist, or subjective (Dowbiggin, 2017).

The second research philosophical assumptions are about human knowledge (epistemological assumptions). Epistemological assumptions are concerned with 'the very bases of knowledge – its nature and forms, how it can be acquired, and how communicated to other human beings' (Cohen et al., 2011:7).

Makombe, 2017 advises that before undertaking any research inquiry, the researcher needs to answer the questions related to ontology '(*What is there to be known about the form and nature of reality?)* and epistemology (*What is the relationship between the researcher (would be knower) and that which can be known about the reality?).* These form the structure of any research inquiry' (Makombe, 2017:3363).

Ontologically, a researcher can follow the positivist research approach. These are realists and believe that objects exist independent of the knower (Guba & Lincoln, 1994). Positivist believe in the existence of absolute knowledge about an objective reality (Scotland, 2012). Positivists believe that research can be conducted using logical and rational analysis. Positivism is considered as a 'scientific method involving; systematic observation and description of phenomenon, the presentation of hypotheses, the execution of tightly controlled experimental studies, and the use of inferential statistics to test hypotheses' (Ponterotto, 2005:128). Positivists believe that events can be measured and human activity predicted (Khan, 2014).

The positivist approach usually utilizes quantitative research methods which are considered more objective and generalizable (Dowbiggin, 2017). Epistemologically, this approach is objectivist in nature (Scotland, 2012). Dowbiggin (2017) notes that, 'positivists are less likely to offer a rich and complex view of organizational realities, account for the differences in individual contexts and experiences or, perhaps, propose a radically new understanding of the world than if you based your research on a different view of knowledge,'(Dowbiggin, 2017:127).

The current study therefore is based on the ontological orientation of phenomenology and the epistemological orientation of Constructivism. According to phenomenology, the researcher aims to describe as accurately as possible the phenomenon, without altering it or influencing its meaning basing on the perspectives of people involved (Groenewald, 2004) or their lived experiences (Padilla-Díaz, 2015). Phenomenology emphasizes the concept of peoples lived experiences, based on which the meaning of an event is derived (Mcconnell-henry et al., 2009). Phenomenology was initially advocated for by a philosopher Edmond Husserl, advocating for the study of the phenomena-the world as it appears to us and

contrasts the belief that objects and subjects can be defined in the real world (Fransella, 2003:380). Merleau-Ponty supported the phenomenology philosophy when he asserted that 'objective thought does not do justice to the lived world, the world of our lived experiences' (Fransella, 2003:381). Merleau-Ponty, like Kelly notes that there is need to understand the internal world of experience as that world can't easily be described in terms of distinct variables as would be in the natural sciences (Gallagher, 2010). The perceptions of managers are internal and cannot be easily described using distinct variables, but through an approach that can help us better understand the managers lived experiences. Phenomenology focuses on the study of a phenomena- focuses on personal meaning and construing (Fransella, 2003:381).

Phenomenology shares similar characteristics with Kelly's constructive alternativism, which states that there are many more interpretations possible than those that present themselves immediately (Butt & Fransella, 2008).

The researcher therefore used phenomenology as a basis for this study as the study findings on data collected from business managers relate to their perceptions of climate change risks basing on their lived experiences. The data collection techniques as is illustrated in the following sections ensures that the data collected captures the respondents intended meaning without alteration.

This study also adopts the Constructivism approach which considers the view that 'reality is subjective and differs from person to person mediated by our senses,' (Guba & Lincoln, 1994:110). Constructivism acknowledges one's active role in the personal creation of knowledge, the importance of experience (both individual and social) in this knowledge creation process (Doolittle & Camp, 1999). Constructivists believe that knowledge is a result of an interaction between an investigator and the respondents (Guba & Lincoln, 1994; Ponterotto, 2005). This points to a requirement for an interview as a tool for extracting meaning from a person. The data collection tool (repertory grid) that is used in this study is administered through a structured interview and therefore suits well this approach. This approach accommodates individual beliefs and values. According to the Constructivist assumption, reality is assumed to be socially constructed giving an opportunity to the research participant to tell their stories describing what they think and for the researcher to understand the participants' way of interpreting the issues (Baxter & Jack, 2008).

From our discussions of how a person generates knowledge, we have already seen basing on Kelly's theory in section 2.9.2.1 that the person generates knowledge through construing

their environment and what they construe is subject to different ways or options, with different people having different ways of construing the same event (Kelly, 1955:8). This is in tandem with Constructivism.

Doolittle & Tech (1999) proposed different forms of Constructivism in form of a continuum; Cognitive Constructivism (emphasizing adaptability of the knowledge acquisition process resulting from active cognizing by the individual) on one extreme end of the continuum, Social Constructivism (seeing knowledge as socially constructed) in between, and Radical Constructivism (agrees that knowledge acquisition is an adaptive process that results from active cognizing by the individual) on another end of the continuum (Doolittle & Camp, 1999; Doolittle & Tech, 1999).

Dowbiggin, (2017) also successfully used the same constructivist approach, in the study of individual risk perceptions of climate risks which further strengthens the preference for the use of the constructivist approach in the current study. The two studies share some common arguments for the use of the constructivist approach:

1. Climate change risk impacts are seen as constructs with multiple potential meanings and perceptions held by the different managers
2. Both studies are based on Kelly's PCT and the use of repertory grid with the intention of understanding the respondent's perceptions.

It is urged that the researcher's philosophical stance (Ontology or Epistemology), and the social science phenomenon to be investigated should determine the type of methodology to be adopted in a given study (Holden & Lynch, 2004).

Therefore, having reviewed the philosophical stance of this study, as being ontologically phenomenological and epistemologically constructivist in nature, using the comparative case study research method, we now look at the other aspects of the research methodology.

3.2 Research Method

It is important at this point to remember that this study is ontologically phenomenological and epistemologically constructivist in nature and uses the comparative case study research method.

There are other possible research methods that the researcher could have considered like: interpretivist, survey, experiment, grounded theory, and action research. However, each of

them is based on varying assumptions and uses varying techniques which may not exactly suit the current study objectives and have their own strength and weaknesses.

- Interpretivist method focuses on personal and public meaning of events as experienced by the people being studied;
- Survey method aims to correct data from a proportion of a population creating difficulty in getting appropriate representative samples;
- Experiment method is possible where a set of variables exists and can be examined, specifically suitable for a positivist orientation where quantitative analysis is more important;
- Grounded theory method, theoretical principles are developed from observed data, tested and amended in the light of further observations over several iterations. These change create challenges of replication for grounded theory method.; and
- Action research method, data gathering is done from a variety of sources and techniques, but the outcomes have to be acceptable by all participants and senior management leading to measurable performance improvements
  (Wallace et al., 2017).

It is further argued that Case study method as opposed to other research methods is most appropriate in a research process where the how and why questions have to be answered, it is not possible to manipulate respondent behaviors, and where the degree of focus in more on contemporary issues (Yin, 1994).

The Researcher's intention is to carry out an in-depth study of climate change risk action by business organizations in the agricultural sector, understanding the effect of manager perceptions and how they drive climate change risk action. This requires some in-depth analysis and is considered a contemporary phenomenon, therefore case study method is a very useful method to adopt.

According to Yin (2018), 'A case study is an empirical method that investigates a contemporary phenomenon (the "case") in-depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident,' (Yin, 2018:45). It's ability to carry out an in-depth examination of the subject was also emphasized by other researchers (Creswell, 2003; Zainal, 2007). Case study research is said to be suitable where 'a "how" or "why" question is being asked about a contemporary set of events over which the investigator has little or no control,'(Yin, 1994:9). The current research questions of 'how' manager perceptions affect climate change risk actions are

therefore considered to be well answered using a case study design. This research method will not only enable the in-depth understanding of manager perceptions of climate change risks and related actions, but also to make comparison among two study groups, the processors and producers along the agriculture value chain.

The intention of the researcher in using a comparative case study design is to elicit personal constructs about climate change risks, and to compare these constructs between the two study groups.

The other intention of using a comparative case study design is also to provide an opportunity for meeting the replication logic used under case study research (Noor, 2008). It is noted that the selection of case study units will follow the replication logic and not necessarily the population logic, as generalization under case study design follows the analytic generalization rationale, 'generalizing from case units to different cases and different situations, drawing on some underlying theory that applies to them'(Jankowicz et al., 2007:3/15). Yin (2014) highlighted that analytical generalization can take the form of lessons learned, working hypothesizes or principles that are applicable to other situations (Yin R.K, 2014).

However, after the case study unit had been selected, within the case study unit, the individual managers to interview were selected following the sampling approach described in section 3.3.

The other attributes related to the use of comparative case study and the rationale for its use are that:

-The research evidence generated is considered to be more compelling, and robust (Baxter & Jack, 2008; Yin, 2018).

-It embraces both quantitative and qualitative data, and to embrace multiple research paradigms (Dooley, 2002).

3.3 Research Design

'A research design is an action plan for getting from here to there, where here may be defined as the initial set of questions to be answered, and there is some set of conclusions (answers) about these questions' (Yin, 1994:19). Having defined the research method employed by this study, we now look at the different actions and processes that we put in place to achieve the research aims within the case study design.

Yin (1994) identifies five components of a research design under case study, namely:

1. The study's questions, already dealt with is earlier discussions.
2. The research propositions. The current study proposition is based on the belief that manager perceptions have an impact on the climate change risk actions in the business organizations and differ among the different study groups along the agriculture value chain. Therefore the study helps to identify how the climate change risk perceptions of managers in the producer companies differ from those in processor companies in influencing climate change risks actions.
3. The units of analysis, dealing with what qualifies as a 'case'. A case can be an individual, an event, or an entity. In the current study, the different production or processing companies will be selected as case study units, but within each of those cases, one senior manager knowledgeable of the climate change risk or strategy formulation processes will be selected to provide his perceptions of climate change risks, leading to the generation of constructs. These constructs will provide the data points to be analyzed.
4. The logic linking the data to the propositions. This can be done through a process called "pattern-matching", looking at the data from the different case study units.
5. The criteria for interpreting the findings. This will be dealt with in details in subsequent sections.

Case studies research accommodates both the qualitative and quantitative evidence (Dooley, 2002; Yin, 1994).

Repertory Grid technique will be used for data capture, and content analysis for data analysis. The details of these techniques are discussed in subsequent sections.

3.4 Justification for case study selection

It has been noted that this study used the comparative case study approach and purposively selected samples. As it is based on the phenomenological orientation, it is recommended to use purposive sampling (Padilla-Díaz, 2015). Two groups of case study participants from 31 case study units were selected (15 from the producers and 16 from the processors), where the unit of analysis is the construct. According to Yin (2014), six to ten case units would provide compelling support. Some studies propose that four to ten cases are normally ideal (Quirk 2013). Therefore, a consideration of 15 cases for each comparative study group is sufficient. As stated in section 3.6.1.3, these are sufficient to provide constructs for a saturated analysis. This also follows the successful use of 20

case study units in the study of electricity power producers' and utilities' climate risk perceptions (Dowbiggin, 2017). It should also be noted that for grid interviews that are used in this research require a lot of time and focus to administer. An interviewer cannot conduct more than five interviews in a day even before consideration of the administrative challenges related to organizing such interviews. It is therefore practical, and sufficient, to use smaller samples for these kinds of in-depth grid interviews.

The researcher purposively selected case study units from various publicly available databases for farmer organizations and businesses in the agriculture sector to identify the case study units. Members of the two replication groups, producers and processors, were to be chosen purposively from different crop types and preferably following the different ecological zones of Uganda likely to be affected negatively by Climate change. These databases were to be sourced from the government ministry websites or offices, like that of ministry of Agriculture, Ministry of water and environment, or the Climate change department of the ministry of water and environment. Farmer organizations and private sector groups were also considered as viable sources of the case study units. It should be emphasized that Companies were to be of a category that has a managed team and of a medium to large scale operation with managers who can appreciate climate change related policy issues or have been involved in strategy formulation in their agricultural businesses. It is reported that over 90% of the private sector establishments in Uganda are classified as micro, small, and medium enterprises, with 18% of these classified as Small, 5% Medium, and 5% large (Ministry of Trade, 2018). The case study companies were planned to be from these three categories as they are considered to have atleast more than 50 managed staff and possibly with managers who can analyze issues related to climate change.

After identifying the case study companies, the researcher was to purposively identify a senior officer in the case unit who is knowledgeable of the strategy formulation processes of the organisation to participate in the Grid interview.

3.5. Maintaining quality in carrying out the research

There are some limitation usually raised against the uses of case study design which affect the quality of its outcomes. These include:

a. The limitation for generalization of results. This arises from the misunderstanding that Case study results can be generalized to a population. However, 'case studies are generalizable with respect to theoretical propositions and not to populations or universes. So the goal for a case study researcher will be to generalize theories (analytic generalizations) and not to enumerate frequencies (statistical

generalization)' (Yin, 1994, 2018; Zainal, 2007). Yin (2018) further notes that 'analytic generalization may be based on either corroborating, modifying, rejecting, or otherwise advancing theoretical concepts referenced in designing the case study, or new concepts that arose upon the completion of the case study' (Yin, 2018; Zainal, 2007). It is further urged that case study research can be generalized in three other ways: through the development of concepts, the drawing of specific implications from the study, and the contribution of rich insight from the study (Walsham, 1995).

b. The second concern is related to the level of rigor for the case study process. This is said to result from a sloppy behavior of the researcher, the lack of systematic procedures, or the use of equivocal evidence or biased views in arriving at the research conclusion (Yin, 1994, 2018; Zainal, 2007). The researcher laid out a clear procedure of respondent identification and conduct of the repertory grid interviews with a clear process of data validation with the respondents prior to the finalization of the interviews to rule out any possibility of biased views.

c. The concern that case study research can take too long and result in massive, unreadable documents. However, there are now more improved ways of doing case study research which would not require such a long duration (Yin, 2018; Zainal, 2007). The current study for example used 31 case study units (15 from the producers and 16 from the processors) resulting into 31 structured interviews with each of such interviews taking about one and a half hours.

In discussing issues of quality assurance under case study research, other key aspects have been emphasized, including: construct validity and reliability (Gibbert et al., 2008; Yin, 1994). These different quality aspects and the related possible measures are detailed in the table below;

Table 6: Quality tests in case study research and the related measures

Quality tests	**Possible measures for ensuring quality**
Construct validity	- Use Multiple Sources of Evidence. - Establish a chain of evidence - Have key informants review the draft case study report.
External validity (Generalizability)	- Use replication logic in multiple case study
Reliability	- Use case study protocols - Develop case study data base.

Source: Extracted from Yin, 1994, p.6.

Construct validity: is about 'establishing correct operational measures for the concepts being studied,'(Yin, 1994:33) or ensuring the quality of the conceptualization or operationalization of the relevant concept during the data collection phase (Gibbert et al., 2008). Researcher in this study ensured that there is an established clear chain of evidence detailing how the data was collected using the grid, documenting every step of the process undertaken, 'to allow readers to reconstruct how the researcher went from the initial research questions to the final conclusions' (Yin, 1994:102).

External validity or generalizability has already been discussed in this section emphasizing that generalization under case study design is based on analytical generalization, the generalization from empirical observations to theory (Gibbert et al., 2008). Using multiple case units provides a good basis for analytical generalization.

Reliability relates to the ability to 'demonstrate that the operations of a study-such as the data collection procedures can be repeated with the same results' (Yin, 1994:33). This is best described in the way the research technique for this study in designed and administered. This is discussed in detail in the next section.

3.6 Research Technique- Repertory Grid Technique

The Grid technique was chosen as the means for eliciting interviewees' constructs because:

- It is considered a useful tool for eliciting constructs that would help us understand the behavior of a person (Kelly, 1955:219).
- Useful in studying personal experiences and agrees with constructivism and phenomenological approaches (Burr et al., 2014).
- A useful tool in discovering how people construe the world around them (Easterby-Smith et al., 1996),
- an excellent way of discovering people's attitudes or beliefs (Honey, 1979) in a structured way (Bauman, 2015).
- It is useful in making tacit knowledge explicit, those deep seated constructs of a person brought out to facilitate decision making (Bourne & Jankowicz, 2018; Jankowicz, 2001)

Repertory grid technique is a respondent driven data collection technique (Burr et al., 2014) as it gives the opportunity to the respondent to air out their views on a particular issues without being contaminated by the researcher (Borell et al., 2003; Tan & Hunter, 2002) and

gives participants an opportunity to reflect on their experience and on their own responses resulting into rich data (Burr et al., 2014).

Jankowicz (2004) defines the repertory grid technique in three ways:

- 'A form of structured interviewing, with ratings or without, which arrives at a precise description uncontaminated by the interviewer's own viewpoint'. The constructs are the interviewees' own and not the interviewer.
- 'An ideal way of conducting a pilot study before using more conventional survey techniques'
- 'A very useful integrating device, that allows you to build bridges between qualitative and quantitative research techniques'.

(Jankowicz, 2004:14-15)

The repertory grid technique is considered a 'powerful way of quantifying people's attitudes and perceptions' (Easterby-Smith et al., 1996:3). This indicates that though the data elicited in qualitative, the tool provides an opportunity for attaching values that are analyzable quantitatively.

The technique has already been used successively in different management evaluations (Easterby-Smith et al., 1996), in consumer research (Littler & Marsden, 2000), used for education research (Yorke, 1978), in business decision making (Díaz De León & Guild, 2003; Hisrich & Jankowicz, 1990), in understanding student development (Hill et al., 2016), the study of policy formulation processes (Moon et al., 2017), studies on climate change risk perception (Dowbiggin, 2017) and the study of the perceptions of corporate disclosure practices (Wachira, 2013), among others.

The section below details the four key components of the repertory grid and the procedure followed by the researcher in administering it in this study.

3.6.1 Repertory Grid Constituents and procedure for its administration.

3.6.1.1 Topic

This is the 'realm of discourse' about which the person's constructs are elicited. The topic must always be clearly defined in advance before the commencement of any grid interviews (Jankowicz, 2004). The topic of the current study used in the grid is: 'To understand the

ways in which you view climate change risks and impacts, and how this influences your climate change risk management decisions.'

3.6.1.2 Elements

Elements are defined as 'objects of thought of the world around us and can be in form of people, places, ideas or inanimate things' (Easterby-Smith et al., 1996:4); they represent instances of the Topic. These can either be developed in agreement with the respondent or developed prior to the grid interviews through Key informant interviews (Bourne & Jankowicz, 2018; Easterby-smith, 1980). Therefore, in order to identify the elements, the researcher carried out Key Informant Interviews (KII) for the pilot. These were analyzed in order to be used for the Grid interviews for the main study (Jankowicz, 2004). However, after the analysis the results did not seem to satisfactorily address the research objectives. The researcher then identified new elements from the literature review that were used in the main study grid. Please refer to chapter 4 below with details of how the pilot was conducted and the outcome. The details of how the final elements were arrived at are also provided.

Though, there is no particular requirement for the number of elements in a RG, it is recommended to have atleast six or seven and not more than twelve elements as this would support the analysis phase (Easterby-smith, 1980). 'Repertory grids are 'richer' if you use a minimum of nine elements,'(Honey, 1979:361). For this study, the number and nature of elements used were outlined in chapter 4 below after carrying out the pilot study.

3.6.1.3 Constructs

A construct is described as a basic unit of meaning, 'an interpretation of a situation' (Kelly, 1955: 109-110). While there are various ways of eliciting constructs (Caputi & Reddy, 1999; Epting et al., 1971; Hagans et al., 2000), this study will use the most commonly used technique, triadic elicitation in which constructs are elicited in triads or groups of three, indicating 'in what way two elements are considered alike and yet different from the third'(Bourne & Jankowicz, 2018; Easterby-smith, 1980; Kelly, 1955). As described by both Kelly (1955) and Jankowicz (2004), in eliciting constructs, the phrase the interviewee offers in describing the similarity between the two elements (termed the 'emergent pole') is placed at the left side of the scale, while the phrase that the respondent provides describing the contrast, applying to the third element (called the 'implicit pole') is then placed on the right

side of the scale in opposition to the two. Taken together, the two poles provide the two ends of a scale. Table 7 below presents this procedure.

Kelly (1955) advises that in order to generate new constructs, it is important to use new triads of elements each time (Kelly, 1955:161). The researcher is also aware that the choice of triads may affect the quality of the final grid (Easterby-smith, 1980), this is the reason why the researcher pre-determined the triads and provided them to the respondent, one at a time.

It is also important to note that on many occasions the respondent may not be able to provide a clear construct. So the researcher has to engage in seeking for clarification from the respondent to be sure that the clear meaning is what has been documented. This is a process termed as 'laddering down', a way of exploring a person's understanding in more depth agreeing with Kelly's notion of constructs having a hierarchical relationship (Easterby-Smith et al., 1996). The researcher made an effort to 'elicit more specific expressions of an initially offered construct,' (Bourne & Jankowicz, 2018:139).

Table 7: Step-by-step repertory grid procedure:

No.	**Activity**
1.	The respondent will be presented with a topic as pre-defined from the literature and the elements as generated from the pilot study.
2.	The researcher will explain to the respodent how the interview is going to be conducted in order to identify the respondent's thinking about the elements
3.	The researcher will then take elements in triads, ask the respondents 'which two of the elements selected are the same in some way, but different from the the third?'
4.	The researcher will then ask what the two have in common– why they are similar– and in what way the third element is a contrast; the two phrases provided by the respondent taken together being the construct.
5.	The researcher will then present the construct as a rating scale, with 1 on the left end of the scale and 5 on the right end of the scale asking the respondent to rate each of the three elements on the scale in relation to the construct provided.
6.	The researcher will then ask the respondent to rate the remaining elements on the construct before seeking for fresh constructs.

Source: Extracted from Jankowicz, (2004), p. 24-26

It was anticipated that at the end of the interview, the researcher would be able to elicit 8 to 12 constructs from each respondent. This would translate to 360 constructs out the 30 case

study units under this study. As stated in section 3.4 that in Grid studies, the unit of analysis is the construct not the individual. It is expected that when content-analysed, these 360 constructs are enough to provide a saturated content analysis, one in which adding more constructs wouldn't appreciably alter the relative frequency/importance of the categories obtained in the subsequent content analysis (Boddy, 2017). This further supports the number of case study units used in this study.

It is important to note that the a construct has a strong attribute that it is elicited from the interviewee as his or her way of making sense of the topic and not imposed by the researcher.

3.6.1.4 Ratings

As stated in section 3.6.1.3 above, the researcher used a '5-point scale in which the emergent pole anchors the '1' end of the scale, and the implicit pole anchors the '5' end of the scale' (Bourne & Jankowicz, 2018:143). The use of these ratings helps to express meaning in a way that is both qualitative and quantitative (Easterby-smith, 1980; Jankowicz, 2004).

The researcher anticipated that each repertory grid interview will last about 60 minutes based on other researchers' experience. Rad et al., (2013) administered grid interviews for 75 respondents and each respondent took under 60 minutes (Rad et al., 2013), so the researcher's projection was considered possible. However, the respondents found the topic and the procedure a bit challenging requiring more time to explain to them. This resulted in more time being taken for one grid of about two hours per grid interview.

3.7 Grid analysis

After the constructs had been elicited and clearly agreed upon by the respondent, a process of analyzing the repertory grid data was undertaken using content analysis as the main technique for aggregating the meanings expressed by the respondents.

In using content analysis, the researcher was trying to identify if there are variations in how the climate change risk perceptions of business managers engaged in downstream agricultural processing differ from those engaged in commercial agricultural production in Uganda and how these variations influence climate change risk action in line with the research objectives (p. 9).

The researcher also sought to understand from the responses provided how the perceptions, tacit and explicit, were represented in the construing of the two managerial groups using the different analysis procedures detailed below.

3.7.1 Content analysis

The current study administered grids for 31 respondents, 15 producers and 16 processors as earlier stated. The elements of the grids were the same and provided by the researcher. However, the constructs were elicited during the interviews and are different bringing out the meaning of each respondent. It has also been stated earlier in this study that each construct is considered a unit of measure of meaning. In this kind of situation, it is advisable to use Content analysis as a technique for data analysis. Weber (1990) describes content analysis as having the ability to use a set of procedures to make valid inferences from text (Weber, 1990:9). Content analysis is seen as a qualitative data analysis technique useful in analyzing texts within their context of communication (Mayring, 2004). Mayring, (2015) further identifies three objectives of content analysis as 'describing texts; drawing inferences from texts to their antecedents; drawing inferences from texts to their effects' (Mayring, 2015:367). Content analysis is described as a technique which helps in 'summarizing the different meanings in the interviewee's grids by categorizing them counting the similarities and differences within each category…'. '…The constructs of all the interviewees are pooled and categorized according to the meanings they express,' (Jankowicz, 2004:146 - 148). It is stated that content analysis can help to systematically compress many words of text generated from an interview into fewer content categories (Stemler, 2000:1) which facilitates easy interpretation.

The constructs can be categorized using either a standardized category system generated from the literature review or derived from the different kinds of meaning discerned in the construct set itself: 'bootstrapping' as will be discussed in the next section. The researcher adopted the later in the data analysis process.

The researcher also carried out a reliability check in which a colleague coded the constructs as part of the content analysis process.

The researcher used a single set of categories and reported the number and proportion of constructs in each category overall, and for each group in a 7-column table with the following headings:

Table 8: 7-column table showing the headings to be used in Content analysis

Category name	number of constructs producers	% of constructs producers	number of constructs processors	% of constructs processors	combined number of constructs	combined % of constructs

These were used by the researcher to analyze the grid data.

3.7.1.1 Bootstrapping technique

There are different ways in which categories can be generated, one can use categories taken from the literature, or by 'bootstrapping'. The researcher used the bootstrapping option, he undertook a bootstrapping procedure (Jankowicz, 2004:148), through a process that required developing categories by looking at the constructs generated from the grid interviews and systematically identifying the various themes they express. All categories were assigned to a set of mutually exclusive and completely exhaustive categories, with a 'Miscellaneous' category comprising fewer than 5% of the total constructs (Jankowicz 2004). In order to establish reliability, the researcher engaged a collaborator with whom a process of agreeing the categories, and the coding of constructs to them was undertaken. The researcher together with the corroborator undertook a process involving:

i. Independently arriving at a set of categories, and comparing the way in which they've coded all the constructs to the categories, in a way piloting the content analysis.
ii. They then argued over the category definitions to arrive at clear agreed definitions
iii. They then repeated the whole process and recorded the final results as the final outcome.

In carrying out the bootstrapping procedure under content analysis, the researcher ensured that appropriate reliability checks existed. Of the three forms of reliability described in the literature, (Stability over time, Reproducibility between coders, and Accuracy in coding constructs to categories) – see Krippendorff 1980, the latter were used.

The researcher used Cohens Kappa statistic to assess the reproducibility and accuracy of the content analysis. Here reliability was measured as the percentage of agreement between the two raters (Stemler, 2000). Cohen's Kappa provides a range of values where 1 is a

representation of perfect reliable or agreement and 0 when there is no agreement giving opportunity for chance (Stemler, 2000).

According to Stemler (2000), Cohens Kappa statistic is calculated as:

$$K = (P_a - P_c) \div (1 - P_c)$$

P_a= proportion of units on which the raters agree calculated as by summing the values found in the diagonals representing the proportion of times that the two raters agreed

P_c= the proportion of units for which agreement is expected by chance calculated by summing the product of the marginal values in the diagonal.

The researcher aimed to achieve a 0.8 level of reliability which is considered as almost perfect using Cohens Kappa statistic (Stemler, 2000).

3.7.1.2 Honey's Procedure

At the moment we have not yet seen how the ratings of the elements on the constructs generated during the grid interviews were utilized. Honey (1979) developed a procedure which is said to 'aggregate different constructs across a sample and provides a way in which we can make use of some of the individual meanings being conveyed by each person's ratings,' (Jankowicz, 2004:171). First, by utilizing ratings as well as the meanings expressed by the constructs themselves, it utilizes more of the information present in the grid. Second, and rather more importantly, it captures personal importance of constructs; the content analysis frequencies in the sample as a whole, as broken down into the producers and processors, capture the general importance of constructs in the sample as a whole but don't reflect personal importance.

Honey (1979) suggested a technique by which the relative importance of each construct to the person who provided it can be determined by *supplying* an 'Overall' construct on which each of the elements is rated, and by measuring the similarity between these ratings and the ratings given to each construct. Honey (1979)'s technique is credited for being able to 'preserve information about *each individual's* views in terms of how he or she severally and personally, thought about a topic….', '…while taking into account both the % similarity value and the individual's personal metric' (Jankowicz, 2004:173).

The researcher used the following approach in agreement with Honey's technique:

1. In the grid interview, the Overall construct "Has a high influence on my climate change risk management decisions- Has minimal influence on my climate change risk management decisions" was supplied and
2. The interviewee was asked to rate all the elements on this construct.
3. In the grid analysis, % Similarity Score was computed for each construct using the formula:

$$\text{Similarity} = 100 - \left(\frac{100.SD}{(LR-1).E}\right)$$

With 'SD' representing the sum of differences between ratings of elements on the given construct and the Overall construct, 'LR' the largest possible rating, and 'E' the number of elements (Jankowicz, 2004:115).

Since constructs are bipolar, ratings on each construct are compared once with the overall ratings, and again with the overall ratings reversed; the higher of the two being used in the subsequent analysis. It is important to note that 'when calculating construct similarity, the ratings have to be done twice with the rating for the second construct of the pair being reversed' (Jankowicz, 2004:110).

Honey (1979) noted that different people have different personal metrics for construct similarity: some people's grids typically show %Similarity of e.g 80 to 100, while others show a wider range of e.g. 60 to 90, and so the bare numeric values do not fully express personal importance.

Grouping each individual's %Similarity scores into 3 categories, High, Intermediate, and Low for that person helps to preserve this personal factor for subsequent interpretation of the group results. It helped the researcher to identify the level of meaning or importance derived from each construct provided by the producers and processors.

Dowbiggin (2017) advises that while 'the content analysis will indicate the different kinds of meaning present in the whole group of interviewees, Honey's procedure, with each construct's %matching score tagged with its H-I-L label, indicate how important that construct is to each individual's personal understanding of the topic,' (Dowbiggin, 2017:77).

The researcher is cognizant of the fact that there are other analysis techniques like cluster and principal component techniques. However, the researcher considers these as more applicable to analyzing relationships within a single grid and propose to focus on the use of content analysis techniques which are helpful in analyzing more than one grid.

3.8 Ethical considerations

In consideration of the constructivist approach that this study is following, the researcher followed Utilitarianist ethical principles as explained by (Denicolo et al., 2016: 70-71) including:

- Respect for autonomy-ensuring that: the participants are provided with the opportunity to decide if they should participate or not; the participants are fully informed about the procedures to be followed and the outcomes.
- Beneficence-emphasizes the importance of informing the participants about the potential benefits of the research to the participants
- Non-maleficence- ensuring that there are appropriate measures to store participants' data and to maintain confidentiality to avoid any harm or coercion to the participant.
- Justice- a reflection of impartial use of resources and respect of all the views.

As well as applying the spirit of the Data Protection Impact Assessment (DPIA) to the substantive (construct) data and to any personal (biographical) data involved, the researcher also followed the research ethics guidelines given in IBR1 sections 6.2 and 6.3, and in IBR3 section 3.3.2.2 as regards the conduct of interviews and access. The researcher ensured the respondents were fully informed of the whole process of the interview, the duration of the interviews, and the expected outcome of the process. The researcher provided an opportunity to each respondent to review the repertory grid sheet at the end of the interview to ensure that the data captured actually represents what they have said, and requested them to consent to use the data. Initially the plan was for the interviewees to sign the grid sheet in the space provided. 'No signature' on the grid sheet was meant the need to give the grid sheet to the interviewee and deleting any data on the hard disc related to that interview. 'Signature present' on the sheet was meant to mean authority from the respondents to retain the sheet for secure storage and use in analysis. However because most of the interviews were conducted online, consent was thought via email or directly in the interview. No respondent declined to use their data.

The researcher also provided detailed procedures on the DPIA form, section 3 step 4 that was to be followed in conforming to the ethical requirements specified under the headings of Principles 1 to 6 of the DPIA form.

Participants were given an opportunity to review the details about the project and clearly understand the expectations from them prior to the interviews and during the interview. A participant information sheet with the details of the project, the use of their personal data and the contact details of the University in case they need to find out more was shared with them. All participants' personal biographical information will be kept for a limited time only to support in contacting the respondents. Any other personal information in terms of the constructs that were elicited from the respondents has be scanned and kept on my computer in an encrypted form.

Each interviewee was given a unique number, the sheet recording these being kept securely. Each completed grid sheet was identified by that number alone. Each construct on the sheet was also numbered, and all records used in analysis and reported in the thesis tables is labelled by interviewee number and construct number.

CHAPTER FOUR: THE PILOT STUDY

The researcher carried out five (5) Key informant interviews. As indicated in section 3.6.1.2 above, the main object of carrying out these interviews was to understand the issues that influence managerial perception to take action against climate change risks from the perspective of key climate change policy makers in the Country.

Policy issues are of particular interest to the institutions the researcher is collaborating with in carrying out this research, so the Key Informant Interviews helped the researcher to understand the particular climate change policy aspects of greatest interest for policy formulation and implementation by the private sector or business organizations.

The identified issues were intended to help in determining the nature of the elements to be used in the repertory grid. The intention of the researcher was to generate at least 8 elements. It is always important to choose elements carefully, and given the focus of this study on policy issues, the pilot was designed to surface the key policy concerns in the form of elements to be used in the main study.

Key informant interviews give the researcher an opportunity to get a detailed description of a given topic given the intensive nature of the interviews (Tremblay, 1957). However, it is particularly important to note that some of the key informant interviewees may be sensitive to what they respond during the interviews as discussed by Gillham (2005) when he was describing what he called 'Elite Interview'(Gillham, 2005). The planned respondents for the main study may fall in the category of elite interviewees, the 'Expert Administrators' who are usually: 'Concerned with policy, finance, public image, power and control; Considered to be politically-aware when responding; and likely to pick whatever they respond during interviews' (Gillham, 2005:57). This requires the researcher to be alert to whatever the respondents say and also triangulate the results.

The researcher followed various steps in identifying the respondents used and in conducting the interviews as detailed in the next section.

4.1 Conduct of the key informant interviews

The key informant interview participants used were high level personnel engaged in climate change policy formulation in Uganda and have been engaged in the development and implementation processes of almost all the available climate change policies in the Country.

As noted in section 2.6, government policy makers play an important role in influencing climate change action in Business organisation and the outcomes of this study are intended to inform them of the likely gaps in policy implementation with a view of improving policy formulation. The researcher works with an institution that supports policy formulation and believes that his close link with policy makers makes it easier to implement the outcomes of this study. This is one of the reasons that Policy makers were considered as the key informant interviewees.

The key informant interviewees were purposively selected using two main approaches:

- Through contact with a senior colleague at Food and Agriculture Organisation of the United Nations in Uganda which supports processes for the formulation of climate change policies especially for the agriculture sector. He was requested to provide his recommendation of names of high level persons involved in climate change policy formulation in the Country.
- Using referrals/recommendations from the first two respondents. At the end of their interviews they were requested to recommend other respondents who can provide valid information on the status of climate change policy formulation and implementation in the Country. The feedback received from the different sources was used to identify the names of the three other respondents whose names received higher recommendation.

The identified participants were contacted through emails and later by phone explaining to them the rationale for the interviews and requesting for their participation. Only one respondent was interviewed face to face. All the other respondents accepted to be interviewed via Zoom in consideration of the challenges related to the COVID-19 pandemic which restricts movements and physical meetings.

A simple key informant interview guide was used (Refer to Appendix 1) to ensure that the interviewer does not forget to ask important questions during the interviews. The outcomes of these key informant interviews are provided in section 4.2 below.

4.2 Results of the Pilot Study-The key informant interviews

The results of the interviews are first presented here in the order of the questions that were in the interview guide. At the end of the section a brief synthesis of the issues will be made

in order to generate the common issues that will be considered in developing grid elements in the empirical work.

4.2.1 Responses from the key informant interviews

Question 1: With your experience, how far has climate change policy developed in Uganda?

The data provided indicates that Uganda as a Country has formulated various policies and regulations to influence climate change mitigation and adaptation among different sectors in the country. However, these processes have had little involvement of the private sector and several of the policies are not yet appropriately implemented.

Table 9: Summary of responses from the key informant interview question 1

Respondent	Responses
K. 1	i. Several policies have already been formulated both National and regional ii. Global policies have also been adapted to the National environments. iii. The private sector has not been properly engaged in most of the climate change policy formulation processes, it is mainly the government departments and civil society organizations leaving the end users out.
K. 2	i. Agrees that there are several policies developed already to address climate change issues in the country. ii. Little contribution from the private sector
K. 3	i. Also indicated a list of climate change policies in the country and agrees that there are sufficient policies
K. 4	i. Agrees with the other respondents that there is appropriate progress in putting in place national policies and strategies to adapt and mitigate climate change risks. ii. Appropriate efforts are made to meet global reporting requirements for climate change policy implementation
K. 5	i. Reinforced the already mentioned climate change laws and guidelines in Uganda and confirmed that there has been low engagement of the private sector in the process. ii. Highlighted the different policy frameworks since 2012, NDC 2015, and the green growth development strategy.

Question 2: Are you aware of specific companies which are actively putting in place strategies for mitigating or adapting to climate change risks in the agriculture sector?

Most respondents did not mention any particular company. However, two of the respondents mentioned the commercial rice farmers (Rice producer in Masindi using drip irrigation), the forest plantation farmers (New forest Company), dairy producers/farmers, Sugar factories (Kakira Sugar factory), and commercial seed farmers.

Question 3: What it is do you think they are doing in terms of putting in place climate change strategies that merited their nomination.

As noted in question 2 above, only two respondents were able to respond to this question and provided the following responses in their order of importance:

a) Tapping into available government programs and support from funding partners to access additional financing.
b) Putting in place measures to help them survive in the market as the crops traded are prone to negative climate impacts.
c) Producing weather resistant seeds and therefore taping into the growing market for resilient seeds.
d) Protecting the communities through corporate social responsibility initiatives
e) Trading in the carbon market

This data indicates the business organizations are influenced by the need for: profitability, maintaining market position, and tapping into funding opportunities.

The responses received from the two participants to Q3 indicate a focus on issues of climate change risk action which suggests a great need to discover what producer/processor managerial perceptions relate to action if we're to achieve the aim of the study of informing the other policy makers.

Question 4: In your opinion what are the key issues affecting climate change policy formulation and implementation especially in business organizations in the agriculture sector?

The responses to this question provided in table 10 form the core of the data required to meet the objectives of the key informant interviews.

The data provided is a reflection of the information provided by the five key informants and is analyzed in more detail in the next section. Overall, most of the responses to Q4 about policy implementation indicate barriers to action at the producer/policy managerial level, an indication again of a need to understand the producer/processor managerial perceptions relating to climate change risk action.

Table 10: Summary of responses from the key informant interview question 4

Respondent	Responses
K. 1	i. Policies are more punitive with no proper description of what the end user benefits out of the said policies. ii. There is a lack of appropriate incentives to encourage voluntary policy implementation. iii. The private sector is more motivated by profitability iv. Policies should be reviewed to include 'benefits for compliance' as this will attract more the private sector. v. Attach monetary value to climate change policy implementation. vi. Need to promote business groupings to correctively develop mitigation strategies. vii. The policies are not well localized to the lower level implementers, they are more academic and with legal jargons which affects implementation.
K. 2	i. Corruption is affecting implementation of the national policies ii. Private sector are more interested in profits and not concerned about the effect of their actions on the climate. iii. Government has not appropriately engaged the private sector yet they are propellers of climate change policy implementation iv. Government has not invested in climate change policy implementation. v. Implementation is affected by lack of ownership and proper dissemination. Only technocrats in the City Centre offices are consulted vi. Lack of appropriate stakeholder mapping vii. Custodian of the policies among the different government agencies is an issue due to conflicting financial interests. viii. Too many policies not communicating to each other and making it difficult to enforce them. ix. A lot of taxes that constrain the private sector from implementing the required mitigation measures. x. A lot of informal private sector, making it difficult to enforce policies. xi. Sensitivity to profitability by the private sector. Can't invest where they will not earn returns. xii. The technical people who formulate the policies are not necessarily the decision makers. The owners of businesses are and therefore have the final decision on what can be implemented.
K. 3	i. Little participation of the private sector in climate change policy formulation. ii. Policy formulation is mainly foreign funded and there is lack of appropriate government financing. iii. There is still a lack of appropriate sensitization for the private sector to have a mindset change, there is still a lack of appreciation of the need to manage climate change risks by the private sector.

Respondent	Responses
	iv. Implementation is still seen as a burden and do not see a reason to invest in it. v. Need for more incentives vi. Private sector still needs to be sensitized on the negative impacts of climate change. vii. Have to clearly show the benefits of implementing the climate change strategies to the private sector.
K. 4	i. Lack of capacity to develop climate change policies internally. ii. Lack of appropriate mechanisms to mainstream climate change in plans and budgets iii. Lack of appropriate technical and financial capacity to implement iv. Climate financing is left to local government budgets which are already in deficit. v. Funding not accessible by the private sector. vi. Lack of appropriate training on climate change. vii. Lack of sensitization on the risks and opportunities viii. Private sector looks at it as an additional cost. ix. Private sector have the resources but are not reached
K. 5	i. Creating incentives to attract private sector investments ii. Access to new technology iii. Appropriate sensitization iv. Use private sector forums

Question 5: Do you think these issues differ among the producers/Farmers and processer?

Only one respondent responded to this question. The other key informants could not provide a distinction between the two groups. This may have an implication for the researcher for the main study. It is likely that the researcher will depend more on the literature review, much more than the key informants, in characterizing the kinds of differences between the producers and processors.

Table 11: Summary of responses from the key informant interview question 5

Respondent	Responses
K. 5	Producers-Interested in measures that can help them maximize production, more concerned with adaptation to climate change risks, more of resilience than mitigation. Processors- more concerned with how to mitigate GHG emissions, efficiency in processing, and reducing the carbon foot print.

This data seems to agree with what has already been discussed in the literature review about the varying characteristics of the different stages of the agriculture value chain discussed in sections 2.3 and 2.8.1.1. It is anticipated that producers will put in place more adaptation related strategies and processors more mitigation related strategies. This may also have an implication on the kind of issue that influence their perceptions to implement climate change risk actions.

Question 6: How do you rate the following issues in terms of how they influence climate change action among business organisation in the Agriculture sector (Ranking from 1 as Not likely to 5 as very likely):

Table 12: Summary of responses from the key informant interview question 6

Influencing issues	**Respondents' responses**						
	K. 1	**K. 2**	**K. 3**	**K. 4**	**K. 5**	**Total Score**	**Overall as % of maximum**
Government incentives and tax regimes	5	5	5	5	5	25	100%
The strength of Business associations and farmer groupings	5	5	4	3	5	22	88%
Organizational technical capacity	3	4	4	4	5	20	80%
Availability of appropriate Government policy	4	3	4	4	5	20	80%
Experience with Climate change impacts	4	4	3	4	4	19	76%
Availability of climate change data	3	4	4	3	5	19	76%
Need for competitiveness	4	5	4	4	2	19	76%
Availability of resources.	4	3	2	3	5	17	68%
Market pressures/Consumer pressures	4	4	3	2	2	15	60%

The ratings above provide the ratings of the key informant interviewees on their perceptions of the issues that influence climate change risk actions. It can also be noted from table 12 where the point is made that Policy makers believe Government policy and government incentives play a critical part in influencing private sector climate change action and though in question one, they did express concern that though several climate change policies were already put in place, implementation was still low. Research is therefore important to inform policy makers about the possible causes of the low uptake of the existing government climate change policies, which this study partly aims to address.

4.2.2 Analysis of the responses from the key informant interviews

The analysis below is presented in the order of the responses from question 5 that got the highest scores arranged in the order of the highest to the lowest. Reference is then made to the other responses from the other questions as a justification for the choice of the proposed elements.

Table 13: Choice of elements and the rationale for their consideration.

Dominant issues/Proposed elements	**References.**	**Element No**
Government incentives	The following responses relate to this issue from question 4: K 1. ii, v K2. iv, ix K3. iv, v K4. ii, v K5. i	E1
Business associations and farmer groupings	The following response relate to this issue from question 4: K5. iv	E2
Organizational technical capacity	The following responses relate to this issue from question 4: K4. i, iii, vi	E3
Government policy	The following responses relate to this issue from question 4: K 1. i, iv, vii K2. vii, viii	E4
Profitability	K1. iii, K2. ii, xi K3 iv K4 vi	E5

Climate change impacts	This is based on the scores from question 6	E6
Climate change data	This is based on the scores from question 6	E7
Market pressures/Consumer pressures	This is based on the scores from question 6	E8
Engagement of the private sector in climate change policy formulation.	This is based on the responses given by all the respondents in question one.	E9

This table provides the list of 9 elements that the researcher initially intended to use in the empirical work. The need for competitiveness and profitability have been summed up into 'Profitability' because it is not possible to make profits when the company is not competitive. The 'availability of resources' is covered by the two issues on 'technical capacity and government funds or incentives' so was not added to the list of potential elements.

4.3 Proposed structure of the repertory grid for the empirical work

The feedback from the key informants highlighted a need to design a grid with a focus on action. This was considered in structuring the initial repertory grid. This type of grid was proposed to help the researcher to meet the study objectives in section 1.7, in particular ii and iii:

- To understand how the perceptions of business managers towards climate change risks in the agricultural sector in Uganda affect climate change risk action.
- To assess whether and how the climate change risk perceptions of business managers engaged in downstream agricultural processing differ from those engaged in commercial agricultural production in Uganda and how they drive risk action.

The researcher proposed to structure the grid with the following key components with a focus on climate change risk action:

a) The grid aim: understand how the perceptions of business manager influence climate change risks action in the agriculture sector.
b) Topic: 'The influence of climate change risk on manager perception of future climate change risk action'

c) The focus of the interview: Understand how the elements predefined by the researcher influence manager perception of future climate change risk action among the private sector.
d) The researcher had proposed to use 9 elements as summarized in the table in the previous section 4.2.2.
e) The researcher intended to provide the respondents three issues/elements at a time and request them to indicate, '*In what way are two of them the same, and one different, in terms of their importance to you in influencing what you might be able to DO ABOUT climate change risks'*.

f) At the end of the interview, the researcher would provide an overall construct and request the respondent to rate it as earlier explained in section 3.6.1.3.
g) The rightmost column, 'IMPORT', will be included in the grid to record the Honey similarity score- a much more precise indicator of importance during analysis of all the grids.

Refer to Appendix 2 with the details of the grid sheet showing these elements.

4.4 Initial Trial Grid: Procedural Implications

As stated at the start of chapter 4, the pilot study was used to generate elements used in designing the initial grid. The researcher undertook another step of checking the procedural steps as highlighted in section 4.3 from a) to e) above by conducting a single grid on a practicing manager. The outcome of this grid interview is provided as Appendix 3. The researcher made a preliminary review of the outcome of the repertory grid interview. The results of the interview indicated that the grid will not properly address the study objectives by oversimplifying the construing involved. The results were focused more on assessing business manager perceptions of issues that influence climate change action. Yet the objective of the research was to understand business manager perception of climate change risk in itself, before examining the implications for action.

The researcher therefore undertook another process of identifying grid elements that can better address the research objectives.

4.5 Consideration of an alternative grid

In consideration of the research objectives, the researcher considered it important to revise the grid elements to focus more on perceptions of risks. Therefore, the elements were revised to include the risks based on the literature review in this study that are likely to affect the producers and processors. Detailed below are the components of the new grid:

i. **Our Topic is:** To understand the ways in which you view Climate risks and impacts, and how this influences your climate change risk management decisions

ii. **The Focus:** 'Discussing your view of the climate change risks and impacts in terms of how they influence your climate change risk management decisions'

iii. **Eliciting statements:** In what way are two of these risks similar in some way but different from the third 'in terms of how they influence your climate change risk management decision'

iv. **New Elements:**

A list of risks were identified by the research based on the literature review as possible risks that different business in the agriculture sector face. These are highlighted below together with the respective literature review sections where they were sourced. These were considered as the new element for the final grid.

1. Changes in market demands/needs-Section 2.9 (vi)
   Changes in legislation and government policies-Section 2.9 (vi)
2. Variability of cost/supply of production inputs-Section 2.9 (vi).
3. Increased plant pests and diseases- Section. 2.9(ii) and (vi).
4. Variability and extreme weather conditions- Section. 2.9(ii), 2.9 (vi).
5. Damaged production infrastructure (Machines, Buildings or land)
6. Effect on production distribution systems (like roads)- Section 2.9 (vi)
7. Changes in the cost of financing (Busch et. al, 2013: 125)
8. Increased cost of production and maintenance (Busch et. al, 2013: 125)

v. **The supplied construct or overall statement was:** Overall, has a high influence on my climate change risk management decisions- Overall has minimal influence on my climate change risk management decisions

The final grid is attached as appendix 4. The researcher proceeded to administer the new grid on himself and one other respondent to confirm that it will be able to generate the constructs helpful in addressing the research objectives. The self-administered grid is attached as appendix 5. The new trial grid resulted in constructs that promised to be

informative with respect to research question i) on pp.62. In the process of conducting the trial grids, the researcher noted the importance of using a good 'in terms of' eliciting statement and by careful 'laddering down' of the emergent and implicit pole of each construct as its offered. This is helpful in eliciting good constructs. The researcher was confident that the new grid was suitable for the next stage of the empirical work.

CHAPTER FIVE: FINDINGS AND ANALYSIS

5.1 Introduction

This chapter details the processes undertaken in the generation of the data from the field. It will cover the sampling procedures, the data interview processes, the data analysis process and a summary of the main study findings. The purpose is to detail the steps taken to collect the data and analyze it in order to respond to the empirical questions. The empirical questions are detailed in section 2.9 as:

i. How do the perceptions of business managers towards climate change risks in the agricultural sector in Uganda affect the choice of climate change risk action?
ii. Are there variations in how the climate change risk perceptions of business managers engaged in downstream agricultural processing differ from those engaged in commercial agricultural production in Uganda? How do these variations influence climate change risk action?
iii. How are these perceptions, tacit and explicit, represented in the construing of the two managerial groups?

5.2 Sampling procedures

The researcher worked with the collaborating institution to receive their recommendations for the suitable candidates who met the profile provided to them. The researcher had generated a profile of the type of respondents needed and availed this profile to the contacts from the two key collaborating institutions. The contacts after reviewing the profile proposed a list of several potential respondents. The respondents were identified from several different institutions, one person per institution. These lists were very helpful in accessing several of the respondents. Consideration was given to respondents who were in and around the city center for ease of access or those upcountry but ready to access internet to facilitate a virtual interview. Consideration was also made for the managerial level and level of understanding of the selected managers for climate change related issues.

The researcher succeeded in contacting several of the respondents recommended by the collaborating institutions, however, many of them did not either respond to the messages or kept promising but not honoring their appointments. The researcher had to exploit other approaches like asking respondents to recommend other potential respondents at the end of each interview. This proved to be the most successful approach. Most of the respondents

were got through referrals from the respondents themselves at the end of their interviews. Each of the respondents was contacted via the phone and for some who required an email via email providing to them all the details related to the study. Each potential respondent was given an opportunity to confirm if they would like to participate in the study or not. It is only after getting their acceptable that I proceeded to agree a date, time, location, and the interview approach to be used, either virtual or face to face. The researcher conducted all the interviews.

A total of 31 respondents were interviewed and 281 constructs were elicited. See appendix 7 for details. Out of these 51% came from processors and 49% came from producers. See also table 14 below.

5.3 Construct elicitation procedures

The initial intention was to conduct all the interviews physically or face to face. However, this was not possible due to challenges related to travelling from one interview location to another, plus the time and cost constraints. The respondents and the researcher had also learnt lessons from the possibilities of conducting meetings virtually as the field work took place just as COVID restrictions in the Country were being eased. Some of the offices for the respondents still had ongoing restrictions and others were still working from their homes. The researcher had also learnt from Yamnitsky & Jankowicz (2020)'s study several benefits that come with a remote grid administration approach (Yamnitsky & Jankowicz, 2020) and actually exploited these advantages. The researcher used Excel based spreadsheets to record and rate the constructs with computer based screen sharing. This gave both the respondent and the researcher an opportunity to monitor both the constructs recorded and the ratings to ensure they are well recorded as elicited from the respondent. This also increased the respondent's ownership and participation in the interview. As detailed in table 14 below, 62% of the interviews were conducted virtually and 38 % were conducted physically.

It should also be noted that even for the physical meetings, the researcher found it convenient to record the constructs directly into the excel template with the permission of the respondent. This eased the analysis of the data since it was already in an excel spreadsheet. Only one interview was recorded on a printed grid, but was later transferred onto an excel template and the respondent given an opportunity to agree on its validity.

Table 14: Proportion of interviews by their interview modes, Physical or Virtual

	No.	No. of Constructs	Physical	Virtual
Processors	16	142	50	92
Proportion	52%	51%	35%	65%
Producers	15	139	56	83
Proportion	48%	49%	40%	60%
Total	31	281	106	175
Proportion	100%	100%	38%	62%

For the triads, the researcher used PowerPoint slides to share elements with the respondent during interviews where the meetings were conducted virtually, sharing three elements at a time on each slide in a procedure already illustrated in Table 7, section 3.6.1.3**.**

At the start of each interview, the researcher repeated the same explanation related to the rationale for the study, the confidentiality protocols, the expected duration for the interview and the respondent's choice not to participate in the interview. To help the respondents easily understand the research technique, the researcher used an example of a grid for identifying the most suitable vehicle brand for the African market as illustrated in appendix 6. The researcher also ensured that each of the constructs recorded has been agreed to by the respondent after it has been recorded and any variation was visible to the respondent and was corrected immediately.

5.4 Construct analysis

5.4.1 Categorisation procedures

The process for construct analysis begun with reviewing all the constructs as recorded in Excel to ensure that they are all well recorded and that each of the codes given to each of the constructs were accurate in comparison with the respondents' tracker records. It should be noted that all respondents accepted that their responses be recorded in Excel as the interview progressed, but each of them was given an opportunity to review their grid and confirm that the constructs recorded were in line with their elicited perceptions. The researcher then undertook a process of categorization as described in section 3.7.1.

The researcher working together with the collaborator undertook a bootstrapping procedure as described in section 3.7.1.1, aimed at ensuring a high level of reliability. The grids were printed in three copies, one for the researcher, the second one for the collaborator and the third one as a spare copy. The researcher and collaborator then separately had to cut and separate each construct, separated between the producer and processor. The researcher and the collaborator then had to spare at least three different days to arrive at the final categorization.

5.4.1.1 First attempt for categorisation

The researcher and the collaborator then arranged the constructs in different categories as per their own individual understanding or interpretation. They both had to get a free wide table and lay all the constructs on the table before proceeding to group them in the different categories. After they had finished, they then had to compare the categories to see if they are comparable and to understand how each of them had coded the constructs. Indeed, the first attempt was not comparable. The researcher had 20 categories, 19 of which were closely matching with 23 of the collaborator (See table 15 below). In terms of proportion to the total constructs, 97.9% of the constructs were categorized in the 19 categories by the researcher however, only 57.7% of the categories were categorized by the collaborator in the 23 categories closely matching with those of the researcher. Another 42.3% of the constructs were not yet categorized by the collaborator in appropriate categories matching with those of the collaborator.

Table 15: First attempt for categorization of constructs

	First attempt for categorization of constructs				
	Researcher			**Collaborator**	
No.	**Categories**	**Freq. Of Constructs**	**No.**	**Categories**	**Freq. of Constructs**
1	Within own control	36	1	Impact is within my control / influence	16
2	Impact on production capacity	28	2	Level of production / productivity	13
3	Marketing decisions	23	3	Buying and selling decisions	5
4	Level of Investment	23	4	Cost of choice of climate change risk management	3
5	Production costing considerations	20	5	Cost of production	12

	First attempt for categorization of constructs				
	Researcher			**Collaborator**	
No.	**Categories**	**Freq. Of Constructs**	**No.**	**Categories**	**Freq. of Constructs**
6	Profitability Consideration	20	6	Profitability	18
7	Business continuity	20	7	Threat to Business survival	6
			8	Influence of sustainability / continuity of the business	5
8	Availability of response options	18	9	Alternatives to manage the risks	9
			10	Selecting response strategies / adaptation strategies	4
9	Influence on the type of response strategy	16	11	Influence the choice of response	5
10	Volatility or Predictability of the risk	12	12	Predictability of the risks in business	11
11	Manageable through Pricing	11	13	Final pricing of products	12
12	Production quality	11	14	Type, quality and quantity of products	3
13	External role in risk control	9	15	External influence of the stakeholders	4
			16	Aggregation of efforts with others to manage the risks	15
			17	Government influence	2
14	Coarsed to act	8	18	Forced action	1
15	Market accessibility	7	19	Product delivery	3
16	Sourcing Decisions	6	20	Where and how to source inputs	3
17	Long or Short-term effects	4	21	Immediate or short-term affect	9
18	Multiplier effect	2	22	Multiplier effect	2
19	Past experience of the risks	1	23	No experience about the risk	1
	Total	**275 (97.9%)**			**162 (57.7%)**
20	Agency of Actions	6	24	Climate friendly strategy	1
			25	Input of internal expertise	2

	First attempt for categorization of constructs				
	Researcher			**Collaborator**	
No.	**Categories**	**Freq. Of Constructs**	**No.**	**Categories**	**Freq. of Constructs**
			26	Capacity to implement	2
			27	Skilled labour	1
			28	Market needs	18
			29	Quality of products	8
			30	Impact is outside my control / influence/ volatile	8
			31	Create jobs	1
			32	Planting season	2
			33	Influence on cash flow	3
			34	Effect on the health of the birds	1
			35	Effect on the species selection	1
			36	Time factor	2
			37	Incentives	1
			38	Power to bargain	1
			39	New innovations / Resource allocation	4
			40	Activities undertaken to manage the risks	1
			41	Customer satisfaction	4
			42	Materialization of risks/ events	2
			43	Quality inputs	5
			44	Cost of business	7
			45	Personal preparedness to mitigate climate change risks	6
			46	Influence of funds in risk mitigation / management	5
			47	Technology in climate change	3
			48	Interventions	9
			49	Output volumes / level of output	4
			50	Crop varieties to plant	3

	First attempt for categorization of constructs				
	Researcher			**Collaborator**	
No.	**Categories**	**Freq. Of Constructs**	**No.**	**Categories**	**Freq. of Constructs**
			51	Processing costs	1
			52	Availability of raw materials	1
			53	Business environment	3
			54	Level of revenue	5
			55	Adjustment requirement	1
			56	Land uses	1
			57	Method of processing	1
			58	Planning mitigation actions	1
		6 (2.1%)			**119 (42.3%)**
	Total Constructs	**281**			**281**

The collaborator had 35 more categories which could not be matched with any other category generated by the researcher adding up to 58 categories as seen in table 15.

Table 16 show a specific example of the researcher category closely matched with those of the collaborator in terms of their meaning.

Table 16: First attempt -sample of closely matching categories

	Researcher			**Collaborator**	
No.	**Categories**	**Freq. Of Constructs**	**No.**	**Categories**	**Freq. of Constructs**
1	External role in risk control	9	1	External influence of the stakeholders	4
			2	Aggregation of efforts with others to manage the risks	15
			3	Government influence	2

The outcome of the above analysis of the categories demonstrated that the researcher and collaborator needed to review the categories and negotiate their meaning because the level of agreement was still not acceptable. The researcher and the collaborator had to repeat the process which is frequently the case as the researcher and collaborator strive to clarify and

present a unified category system developed by bootstrapping rather than one based on previously researched and published categories.

5.4.1.2 Second attempt for categorisation

The researcher then had to negotiate or urge with the collaborator on the category definitions to help both of them arrive at a reduced number of categories on which they agreed. Both of them were able to agree and reduced the categories to 13. It was then agreed that they both undertake a second attempt to code the constructs to the new categories. A percentage agreement of 98% was reached. This was considered an acceptable level of agreement. Figure 4 below provides the details of the categories and the percentage agreement.

Upon further discussions with the collaborator, it was agreed that one of the categories had an excessively high number of constructs (Production decisions- 70 out of 281) and needed to be reviewed leading to the third attempt.

Figure 4: Second attempt for data categorization

COLLABORATOR	RESEARCHER													
	PRODUCTION DECISIONS	PROFITABILITY	BUSINESS SURVIVAL	CAPABILITY TO MANAGE	MARKETING DECISIONS	RESPONSE OPTIONS	INVESTMENT	EXTERNAL STAKEHOLDER INFLUENCE	PREDICTABILITY	IMMEDIATE/ SHORT TERM EFFECT	MULTIPLIER EFFECT	PAST EXPERIENCE	MISCILLENEOUS	Total
PRODUCTION DECISIONS	70	PC007.7			PC012.3, PC013.1	PC006.1, PC005.5			PC001.2					76
PROFITABILITY		21												21
BUSINESS SURVIVAL			30											30
CAPACITY TO MANAGE				35										35
MARKETING DECISIONS					38									38
RESPONSE OPTIONS						27							PC010.1	28
INVESTMENT							19							19
EXTERNAL STAKEHOLDER INFLUENCE								11						11
PREDICTABILITY									11					11
IMMEDIATE / SHORT TERM EFFECT										6				6
MULTIPLIER EFFECT											2			2
PAST EXPEREIENCE												1		1
MISCILLENEOUS													3	3
Total	70	22	30	35	40	29	19	11	12	6	2	1	4	281
Number of agreements	70	21	30	35	38	27	19	11	11	6	2	1	3	274
% agreement (P)														98%
Pe	18.9	1.6	3.2	4.4	5.4	2.9	1.3	0.4	0.5	0.1	0.0	0.0	0.0	0.1
Cohen Kappa (K)													K=(P-Pe)/(1-Pe)	97%

5.4.1.3 Third attempt for categorisation

The researcher renegotiated with the collaborator to arrive at possible additional categories out of the 'production decisions' category that had been created in the second attempt. In order to break down this category, the researcher considered the different issues that managers seem to be concerned about in the production process. These mainly related to the inputs, the costs related to the production process, and how they will ensure production of quality products in the appropriate quantities needed by their market. This was the background upon which they both agreed to split the category into three different categories and reallocate all the constructs to the new categories. Table 17 below shows some of the constructs in the old category matched to the new categories. At the end of the process, they were able to agree to have 15 categories. They both undertook a third attempt with the final negotiated categories. A percentage agreement of 99% was reached. This was considered an acceptable level of agreement (See figure 5).

As discussed in section 3.7.1.1, the researcher used Cohen's Kappa statistic to assess the reproducibility and accuracy of the content analysis. Reliability was measured as the percentage of agreement between the two raters in both the 2nd attempt and the 3rd attempt. During the 2nd attempt a percentage of 97% Cohen's Kappa's score was achieved and 99% after the third attempt. This was considered by the researcher as a good level of agreement. Cohen's Kappa was studied to be a good measure of reliability for multivariate categorical data involving agreement among more than two observers (Landis & Koch, 1977a) and considered a score of 0.81 and above to be almost perfect (Landis & Koch, 1977b).

Table 17: 'Production decision' category breakdown

Construct Code	Emergent Pole	Implicit Pole	
	Old Category: Production Decision		**New Category**
PC003.5	Have a direct effect on my production levels/quantities	Has an impact but not directly related to my production quantities.	Quality and quantity of production
PD001.2	Both have an effect on the quality of my products or plantation	Does not necessarily have an impact on the quality of the products.	
PD001.6	Have an effect on my day to day production decisions	Has an effect but it is one off or more long term.	
PC001.7	Has an effect on my decisions on how and where to source my inputs	It more about the how to sale and no close connection to the input sourcing decisions.	Impacts on Production inputs
PC003.2	They have an influence on the quantity of inputs supplied by the producers indirectly affecting the environment	Has a limited role or not effective in influencing what can be supplied by the farmers.	
PD005.4	They have a direct relationship with your choice of plant materials to use	It has an influence on planting decisions but not necessarily on the choice of plant materials.	
PC002.8	Has an effect on the unit cost of production, if this is high I cannot proceed with production	The effect on the unit cost of production is very remote.	Effect on Cost of production
PC003.3	Have a more direct impact on my cost of production	No relationship to my cost of production.	
PD002.3	Influences my production formulas and cost of production	Is important but does not necessarily affect my production costing and formula decisions.	
PD006.8	Have direct effect on your cost drivers in the business	The effects on the business costs is more remote or indirect.	

Figure 5: Third data categorization attempt

		RESEARCHER															
		QUALITY AND QUANTITY OF PRODUCTION	PRODUCTION INPUTS	COST OF PRODUCTION	PROFITABILITY	BUSINESS SURVIVAL	CAPABILITY TO MANAGE	MARKETING DECISIONS	RESPONSE OPTIONS	INVESTMENT	EXTERNAL STAKEHOLDER INFLUENCE	PREDICTABILITY	IMMEDIATE/ SHORT TERM EFFECT	MULTIPLIER EFFECT	PAST EXPERIENCE	MISCILLENEOUS	Total
COLLABORATOR	QUALITY AND QUANTITY OF PRODUCTION	40															40
	PRODUCTION INPUTS		15									PC001.2					16
	COST OF PRODUCTION			20													20
	PROFITABILITY				21												21
	BUSINESS SURVIVAL					30											30
	CAPACITY TO MANAGE						35										35
	MARKETING DECISIONS							38									38
	RESPONSE OPTIONS								27							PC010.1	28
	INVESTMENT									19							19
	EXTERNAL STAKEHOLDER INFLUENCE										11						11
	PREDICTABILITY											11					11
	IMMEDIATE / SHORT TERM												6				6
	MULTIPLIER EFFECT													2			2
	PAST EXPEREIENCE														1		1
	MISCILLENEOUS															3	3
	Total	40	15	20	21	30	35	38	27	19	11	12	6	2	1	4	281
	Number of agreements	40	15	20	21	30	35	38	27	19	11	11	6	2	1	3	279
	% agreement (P)																99%
	Pe	5.69	0.85	1.42	1.57	3.20	4.36	5.14	2.69	1.28	0.43	0.47	0.13	0.01	0.00	0.04	0.07
	Cohen Kappa (K)														K=(P-Pe)/(1-Pe)		99%

5.5 Content Analysis results

This section provides the summary about the different categories, their description, and an analysis of the type of constructs contained in each category. Appendix 8 provides more detail on constructs included in each resulting (and henceforth – definitive) category. This has been summarized in table 18. It can be seen from this table that the top eight categories account for the highest number of constructs overall. These include the following arranged in the order of frequency of constructs:

1. Affects the quality and quantity of production (14.2%)
2. Influences marketing decisions (13.4%)
3. Capacity to Manage Risks (12.5%)
4. Affects business survival or business continuity (10.7%)
5. Availability of response options (9.6%)
6. Impacts profitability (7.5%)
7. Effects on the cost of production (7.1%)
8. Influences investment decisions (6.8%)
9. Impacts Production inputs (5.3%)

These nine categories include 245 constructs overall which is 87.1% of all the constructs elicited**.** It can be noticed from these 9 categories that managers perceive climate change risks as having an impact on their corporate strategic decision making processes as most of the issues that would impact strategic decision making in companies are highlighted here. Corporate strategy is usually concerned about: internal analysis of strength and weaknesses (company capacity), Strategic choice (profitability, production decisions, marketing decisions, investment decisions, business continuity decisions), and External analysis of opportunities and threats. Production inputs (Input sourcing) is part of production decision making (Hills and Jones, 2001).

Table 18: Proportion of constructs elicited from producers compared to processors

Category name	Number of constructs overall	% of constructs overall	Number of constructs producers	% of constructs producers	Number of constructs processors	% of constructs processors
Affects the quality and quantity of production	40	14.2%	21	52.5%	19	47.5%
Influences marketing decisions	38	13.5%	21	55.3%	17	44.7%
Capacity to Manage Risks	35	12.5%	21	60.0%	14	40.0%
Affects business survival or business continuity	30	10.7%	15	50.0%	15	50.0%
Availability of response options	27	9.6%	11	40.7%	16	59.3%
Impacts profitability	21	7.5%	10	47.6%	11	52.4%
Effects on the cost of production	20	7.1%	7	35.0%	13	65.0%
Influences investment decisions	19	6.8%	10	52.6%	9	47.4%
Impacts production inputs	15	5.3%	5	33.3%	10	66.7%
Predictability	12	4.3%	7	58.3%	5	41.7%
External stakeholder influence	11	3.9%	9	81.8%	2	18.2%
Immediate or short term effects	6	2.1%	4	66.7%	2	33.3%
Miscellaneous	4	1.4%	2	50.0%	2	50.0%
Multiplier effect	2	0.7%	2	100.0%	0	0.0%
Past experience	1	0.4%	1	100.0%	0	0.0%
Total	**281**	**100%**	**146**	**52%**	**135**	**48%**

The remaining categories with only 36 or 12.8% of the constructs overall do not include any strategic decisions. These remaining six categories (Predictability, external stakeholder influence, Immediate or short term effects, Multiplier effect, Past experience, Miscellaneous) were not very important to the respondents if considering the frequency of constructs overall or group construing. They all relate to issues that are none strategic in nature based on the description of the business strategy formulation process detailed above.

It can also be noted that 146 (52%) of overall constructs are from producers while 135 (48%) were elicited from processors. This represents a difference of only 4%. This can be considered a small difference.

If categories are ranked with producers separate from processors as presented in table 19 below, it can be seen that both groups are concerned with the likely effect of climate change on what they can be able to produce and the likely changes in their marketing decisions. Respondents highlighted the fact that climate change affects the consumer needs requiring them to rethink their product design, input sourcing, and the marketing strategies. The two categories were given the same level of importance by both groups. For the producers, the concern for own capacity to manage the risks came number three, while for the processors, it came in as number five in terms of the number of constructs overall. This still tells us that the two groups place company capacity close among the key concerns that they perceive as likely to affect their climate change decision making. The consideration for business survival comes as number four for both groups. They are concerned that climate change risks can threaten the survival/continuity of their business and this will push them to take action if they are to remain in business. The importance placed on this category by both groups is the same. This still indicates that there seems to be no big variation in the perception of the two reference groups.

Again from table 19, it can be noted that five out of the six none strategic categories or the least important categories are all similar for both groups. It can therefore be concluded based on the construct frequencies overall that there are no marked variation in the construing of both the producers and processors.

Table 19: Showing the category rankings for producers and processors

Producers' Ranking						Processors' Ranking		
Category name	**Number of constructs overall**	**% of constructs overall**	**Number of constructs producers**	**% of constructs producers**		**Category name**	**Number of constructs processors**	**% of constructs processors**
Affects the quality and quantity of production	40	14.2%	21	52.5%		Affects the quality and quantity of production	19	47.5%
Influences marketing decisions	38	13.5%	21	55.3%		Influences marketing decisions	17	44.7%
Capacity to Manage Risks	35	12.5%	21	60.0%		Availability of response options	16	45.7%
Affects business survival or business continuity	30	10.7%	15	50.0%		Affects business survival or business continuity	15	50.0%
Availability of response options	27	9.6%	11	40.7%		Capacity to Manage Risks	14	51.9%
Impacts profitability	21	7.5%	10	47.6%		Effects on the cost of production	13	61.9%
Influences investment decisions	19	6.8%	10	52.6%		Impacts profitability	11	57.9%
External stakeholder influence	11	3.9%	9	81.8%		Impacts production inputs	10	90.9%
Effects on the cost of production	20	7.1%	7	35.0%		Influences investment decisions	9	45.0%

Producers' Ranking						Processors' Ranking		
Category name	**Number of constructs overall**	**% of constructs overall**	**Number of constructs producers**	**% of constructs producers**		**Category name**	**Number of constructs processors**	**% of constructs processors**
Predictability	12	4.3%	7	58.3%		Predictability	5	41.7%
Impacts production inputs	15	5.3%	5	33.3%		External stakeholder influence	2	13.3%
Immediate or short term effects	6	2.1%	4	66.7%		Immediate or short term effects	2	33.3%
Miscellaneous	4	1.4%	2	50.0%		Miscellaneous	2	50.0%
Multiplier effect	2	0.7%	2	100.0%		Multiplier effect	0	0.0%
Past experience	1	0.4%	1	100.0%		Past experience	0	0.0%
Total	**281**	100.0%	**146**			**Total**	**135**	

5.5.1 Individual construing of climate change risks

The discussion we have had so far related to table 18 and 19 gives us a fair understanding of how the group of respondents as a whole (in general and as broken down into Producers and Processors) thinks. It captures the general importance of constructs in the sample as a whole. However, as part of content analysis, we also need to understand how the individual respondents think/feel. Honey's procedure helps us to understand how strongly the managers feel as individuals as illustrated in chapter 3, section 3.7.1.2. Honey's procedure captures personal importance of constructs.

The high salience constructs reflect the kind of constructs that the respondents found to be more closely related to the supplied construct, '*Overall, has a high influence on my climate change risk management decisions- Overall, has minimal influence on my climate change risk management decisions*'.

Table 20 below shows the categories with high salience based on H codes in the Honey Analysis, presented in order of importance of overall frequencies, from highest to the lowest. The information in the table gives us an idea of the critical issues that business managers are concerned with when they think of climate change risks and therefore have a high influence on their climate change risk management actions. However, it needs to be noted that the salience data as proposed by Honey's approach, while very valuable as an indication of personal salience, are just a subset of the whole. Therefore, the % data in particular, as shown below, should be interpreted by keeping an eye on the frequency. For example, in Table 20, 'Impacts production inputs', 66% of the high-salience constructs come from the processors (PC) group and only 33% from the producer (PD) group: but it's just 2 out of 3 constructs, which really isn't very meaningful.

Top on table 20 is the concern for business survival or business continuity. When managers consider climate change risks a threat to their business survival, they will have to take action if they are to remain in business. This seems to be a key concern for the managers as it has also come out in table 18 as one of the nine high frequency categories with the highest number of constructs overall. It can be noticed that this category was moderately high in the overall ranking of Table 18, but when asked how strongly people feel, it's number 1 as indication that of how respondents feel very strongly about it.

Table 20: Summary of the High Salience Constructs

			High Salience Constructs		
Category	**Category Description**	**Total Constructs**	**Total constructs**	**Producers**	**Processors**
Affects business survival or business continuity	Necessity to respond immediately; Coerced to take action against the risk; it is not possible to continue in business unless action is taken against the risk; Business have to respond to the risk or lose their businesses	30	15	8 53.3%	7 46.7%
Affects the quality and quantity of production	Production decisions related to quantity, quality and type of product is affected; ability to affect what can be produced in terms of production lines	40	14	7 50%	7 50%
Availability of response options	The existence of various climate change response options that businesses can consider to choose from; the choice of an option will be affected by the cost related to adopting the related response option; Manager have technologies, strategies and other options they can choose from to respond to climate change risks.	27	14	7 50%	7 50%
Impacts profitability	The level of profitability of the business is impacted by the occurrence of the risk; business cash flows are affected; profitability is the reason businesses exist and therefore is put into consideration before a response option is chosen	21	11	4 36.4%	7 63.6%
Influences investment decisions	The decision to invest in dependent on how much money the business is able to invest in the different response strategies; affects investing decisions in the business; affects the levels of investment; determines what productions line to invest in.	19	9	7 77.8%	2 22.2%

			High Salience Constructs		
Category	**Category Description**	**Total Constructs**	**Total constructs**	**Producers**	**Processors**
Influences marketing decisions	Pricing decisions are affected; how to deliver the product to the final consumer is affected by the risks; the timing of the selling and buying of the products in impacted; marketing approaches need to be reviewed in view of the risks occurring; all producers and processors in the market as affected by the same risks and therefore levelling the playing ground.	38	8	3 37.5%	5 62.5%
Effects on the cost of production	Occurrence of the risk can affect the costs incurred in the production or processing of products; affects business costs; day to day costing decisions for the business are affected	20	7	3 42.9%	4 57.1%
Capacity to Manage Risks	Possession of the required capacity in terms of personnel and financial resources to put in place strategies to respond to the risk; Not having ownership of the responsibility to respond to the risks when they occurs; within own mandate to manage the risk; can affect the company's capacity to respond; possession of the capacity to influence the others external to the business to respond to the risk.	35	6	3 50%	3 50%
Predictability	It is easy to predict the occurrence of the risk; the business manager has the capacity to predict the occurrence of the risk; the business has experienced similar risks and is able to predict the patterns of it's occurrence; occurrence is more real or certain; volatility or likelihood of occurrence is considered high.	12	5	2 40%	3 60%

			High Salience Constructs		
Category	**Category Description**	**Total Constructs**	**Total constructs**	**Producers**	**Processors**
Impacts production inputs	Ability to access quality inputs is affected; the quality of inputs is compromised as a result of the risks occurring; processors can use low quality inputs in order to manage the impacts of the risks thus affecting the quality of the final product; the production inputs can become more scarce; sources of production of processing inputs are affected.	15	3	1 33.3%	2 66.7%
External stakeholder influence	Collective efforts required to address or respond to the risk; the responsibility to respond to the risks in not on the company alone but also the external other external parties; the mandate to manage the risks is with external parties external to the business; a successful response is dependent on the business managers power to influence other external parties.	11	1	0	1 100%
Multiplier effect	The occurrence of one risks or it's management can have an effect on the occurrence of another climate change risk.	2	1	1 100%	0
Past experience	Past experience of the manager is considered relevant in determining risks response action	1	1	1 100%	0
Immediate or short term effects	The risk impact is expected to be immediate; The time horizon is important in defining impact and expected action; the risk is more fluid or volatile; affects both short term and long term business decisions.	6			
Miscellaneous	Defines the level of importance of the risk in influencing the manager's actions to respond to a given risk	4	1	0	1 100%
	Total Constructs.	**281**	**96**	**47**	**49**

Note: The table is arranged in order of categories with the highest frequency of constructs, arranged from the highest to the lowest.

Table 20 also highlights four other categories with the highest number of high salience constructs, which include:

1. Affects the quality and quantity of production
2. Availability of response options
3. Impacts profitability
4. Influences investment decisions

Managers expressed considerable concerns for the effect of climate change risks on the 'quality and quantity of production' and the availability of 'response options'. These two categories have the same number of high salience constructs an indication that the managers attach the same level of importance to each of them. Respondents indicated that the available climate change response option have a high implication on the quality and quantity of the product that can be produced.

5.5.2 Detailed analysis of the categories

The section below provides a detailed analysis of the categories based on the data provided in table 20 ranked based on the number of frequencies for the high salience constructs.

Affects business survival or business continuity

This construct has the highest number of high salience constructs (See table 20). This describes the respondents' concerns that climate change risks can have a negative effect on the survival or business continuity of their businesses. Respondents indicated that when climate change risks occur, one has to respond or lose their businesses. There are no choices between responding or not, one just has to take action. The forced nature of putting in place a climate change response strategy or getting out of business. In terms of overall number of constructs, 10.7% of the constructs come from this category, 50% of these are from producers and 50% from processors. This same proportion is more or less repeated when considering the high salience constructs, 53.3% for producers and 46.7% for processors. This implies that both the producers and processors have closely related perceptions of how climate change risks can affect their business survival and therefore they are forced to take action. A few examples of the High salience constructs are detailed below:

- Have a direct effect on the Company's cash flow or ability to survive-Has a close relationship to the Company's survival or cash flow.

- Its occurrence may cripple my production and affect my business continuity-I can survive even with the risks materializing
- Have a very immediate adjustment requirement-Takes time to adjust and does not have an immediate adjustment requirement.
- Production can continue when the risks materializes -It is not possible to continue with production if the risks materializes.
- Has a very high impact on the survival of my business-I can always find a way around, so business can still continue.
- Has an impact on the sustainability/Continuity of my business-Has little relationship to the survival of my business.

Putting in place climate change risk management strategies in this case is considered an issue of business survival for both groups of respondents.

Affects the quality and quantity of production

This category has the highest frequency of constructs overall (14.2%) of all the constructs elicited from the respondents as per table 18 and is one of the eight categories with the highest number of high salient constructs as reflected in table 20 ranked second in terms of importance. The respondents believe that the occurrence of the risks has a high likelihood of affecting the quality and quantity of their production both from the processor and producer's perspective and this is likely to influence their climate change risk actions. Others believe that climate change risks affect the factors upon which the quality and quantity of production decisions are based, like changes in customer demand and the quality of the inputs supplied, therefore affecting the capacity to produce quality products at both levels (Producer/processors). There are concerns too that production lines can also be affected. See examples below of some of the high salience Constructs:

- Directly affect my production operations and decisions-More less on a higher level and may take some time to affect my operations
- High impact on my level of productivity and therefore impacting my ability to meet my client targets-Less or low likelihood to affect my level of productivity.
- Can easily affect my level of productivity- The risk does not necessarily affect the level of production.
- The possibility to influence my ability to satisfy my Customers-Not likely to impact my ability to satisfy my customers.

- Have an effect on my day to day production decisions-Has an effect but it is one off or more long term.
- Direct effect on my production output-Effect is not directly related to my production output.
- You have to get it right from the start if you are to successfully produce. A key driver of production-Not necessarily a factor of production, or a key driver of production.

Looking at the high salience composition, both producers and processors have an equal share of the total high salience constructs in this category. This seem to imply that the concerns for both producers and processor about their quality and quantity of production have the same influence on their climate change risks action.

Availability of response options

This category captures the respondents' perceptions about the existence of various climate change risk response options that business managers can consider to choose from. The perception that the choice of an option will be affected by the cost related to adopting the related response option. The belief that managers already have technologies, strategies and other options they can choose from to respond to climate change risks. In table 20, it is noted that managers seem to attach the same value to this category as the previous one related to the quality and quantity of production.

The number and proportion of high salience constructs in this category is the same as that in the previous category. This may indicate that this category is considered of equal importance when thinking about responding to climate change risks to both groups (producer/processor). A few of the high salience constructs are listed below:

- There are already available alternatives to deal with the risk-The options to deal with the risks are limited or not available.
- I can easily influence the choice of response options to consider-I have no role in influencing the choice of response decisions to consider.
- I look at minimizing the cost of production, the cost effectiveness of the option, and therefore affects my choice of options-Has less influence of my choice of response options that I have to consider.
- Have an effect on the adaptation strategies and options-Has no direct effect on the adaptation options.

- Has an effect on my choice of Climate change management options in terms of which one to consider-Has no effect on which climate change management options to consider.

Impacts profitability

The respondents perceive that the level of profitability of the business is impacted by the occurrence of climate change risks yet profitability is the reason businesses exist. Consideration of profitability is also a major factor in determining an appropriate climate change risk response strategy as this involves costs and therefore having an impact on profits. Profitability is one of the top eight categories with the highest number of high salient constructs (see table 20). This also agrees with the concerns of policy makers in Table 12 of the pilot study where they emphasized the fact that profitability was a key driver for climate change risk action. The proportions of high salience constructs from processors are higher than those from producers. This may indicate that processors are more concerned with profitability than producers. See below some of the high salient constructs:

- All related to operational costs and have direct effect on company profitability-Has no direct effect on Company profitability in the short run.
- Have a close effect on my cash flow in the business-Product can be stored for a longer time and redistributed later when the distribution infrastructure improves, therefore the business cash flow challenge can be differed.
- Have an immediate effect on the profit margin-Does not affect profit margins because the cost can be spread over a longer period of time.
- Has a high impact on my costing and therefore my profitability-One off and therefore may not necessarily impact my day to day costing decisions.
- Can have an effect on the level of profitability of the business-The effect on my profitability is not as high.

Influences investment decisions

The decision to invest in a given climate change risk response strategy dependent on how much money the business is able to invest in the different response strategies. This category captures the respondents' perceptions about the role the available finances as a resource affects investment decisions in the business. It affects the level of investment into climate change risk response, but also determines what production line to invest in that can be financially supported. The producers were more concerned about this than processors based

on the frequency of the high salience constructs. Examples of some of the high salience constructs in this category include:

- Has a direct effect on how I choose to use my funds - Does not have a direct influence on how I decide to invest my funds or the magnitude of investment.
- Affects how much I can be able to invest in the product as a result of climate change risks - Does not exactly determine the level of investment that I have to make.
- Have an influence on my resource allocation decisions, and innovation - More long term and does not influence my day to day resource allocation decisions.
- Has a direct influence on budget allocation decisions within the company - Has less influence on the budget allocation decisions with the company.

Influences marketing decisions

Marketing decisions typically include aspects related to pricing, packaging, advertising or product promotion, means of delivery, and an understanding of the market needs. Respondents expressed their concerns on how climate change can influence their marketing decisions related to pricing, product promotion, packaging, selection of specific market niches, and mode of product delivery. Some of these high salience constructs are:

- Have a close relationship to my selling and buying decision-Can be in place but does not necessarily influence my buying and selling decisions because of the free economy in the Country.
- Have a direct relationship on my pricing decisions- Has no connection to internal decisions on pricing.
- Can easily impact the pricing of my final product. If the response option can help to lower the pricing of the product, then we will go for that-Has no direct effect on my product costing and therefore pricing.
- Has an influence on how I have to market my final products-No much linkage to my marketing decisions.
- Impacts how I will market my products or get them to the final consumers-Does not have any particular impact on my strategies for reaching the final consumers.
- Has an effect on my competitiveness and relevance in the market-Will always happen or change

It needs to be noted that though the proportion of constructs in this category from producers was higher (55.2%), the proportion of salient constructs from processors was higher at 63%

of the total high salient constructs in this category. This partly supports the argument made in the literature review section 1.6 about the concerns of processors being more on the marketing side of the value chain.

Effects on the cost of production

The perception that the occurrence of climate change risks can affect the costs incurred in the production or processing of products and the day to day costing decisions for the business. There does not seem to be a big difference in how the two groups, processors and producers attach importance to these constructs. Examples of the high salience constructs are highlighted below:

- Have a more direct impact on my cost of production-No relationship to my cost of production.
- Have a high implication on the cost which is a key driver on my response decisions-The effect is slower and has a longer-term implication on the business costs.
- Directly impacts my production costs therefore requiring me to consider option to reduce these costs-Has little or no impact on my production costs.

Capacity to Manage Risks

This is one of the eight categories with the highest number of constructs in terms of overall frequencies (See table 18), though it is ranked number eight when we consider the number of frequencies for the high salience constructs (See table 20). This may imply that it is not one of those highly values by respondents when they consider what influences their climate change risk actions. It highlights the importance of the Company's internal capacity in terms of personnel, machinery, and technical skills needed to respond to climate change risks. This also covers the company's capacity to influences other parties external to the company to respond to climate change risks. There is no difference between the number of high salience constructs between producers and processors. If we consider the high salience constructs, both the producers and processors have the same number of high salience constructs an indication that both groups have related concerns related to internal capacity to manage climate change risks. Some of the constructs highlighted under this construct include:

- I can easily find a way around the risk if it occurs- This is not necessarily within my control.
- I have to look at my capacity and ask myself if I have the capacity to implement an appropriate response-Not within my capacity to implement an appropriate response.

- Within my own control as a company in terms of mitigating the risk-Requires several other external stakeholders to manage the risk.
- Have an influence on my ability to create jobs and the number of people that I can engage in my company-Not necessarily, does not affect my ability to engage people.
- I have the ability to respond/control the risk on my own-There is no way I can come in to manage the risk. You can't chip in.
- Has a high influence on my capacity to adopt a specific intervention to respond to the risk-Has little relationship with my ability or capacity to adopt a given intervention.

Other Categories:

There are six other categories highlighted in the different Appendices (6, 7, 8, 9). These include; predictability, external stakeholder influence, immediate or short term effects, multiplier effect, past experience, miscellaneous. These account for a total of 13.9% of all constructs. However, none of them has more than five high salient constructs. This may imply that though they were considered independent categories, they were not considered of very high importance in the climate change response decisions of the individual respondents based on the high salience scores and in group terms. Important to note is that it is possible sometimes that just one or two respondents have a lot of H salient scores, which distorts the overall picture.

5.6 Cognitive complexity analysis for the producers and processors

The researcher analyzed the different constructs elicited from both the producers and processors in order to identify any variation in their way of thinking or cognitive complexity using the rep grid software and specifically the Principal Component Analysis reports for each of the respondents. The results are detailed in table 21 below:

Table 21: Mean Variance Accounted for by the First 2 Principal Components for Producers and for Processors.

	Producers	**Processors**
1st Component %	47.2	42.6
2nd Component %	23.3	24.0
Total %	**70.6**	**66.6**

The results seem to indicate that there are no appreciable variations in the way of thinking for both the producers and processors. The difference between 70.6% and 66.6% is not substantial implying that there are no variation in the cognitive complexity of the two groups, producers and processors.

5.7 Summary of main study findings and analysis

The researcher looked at the information coming out of the data collected using the repertory grid interviews. The researcher also carried out a content analysis and also used Honey's method to understand the implication of the constructs as a group and as individual respondents or managers. Finally, the researcher analyzed the cognitive complexity of the two reference groups. This section draws some of the conclusions coming out of the data analysis so far and responds to the study objectives and questions.

It should be remembered that the study set out to achieve the following study objectives:

i. To understand the level of awareness of business managers in the agricultural sector in Uganda of the potential climate change risk mitigation and adaptation strategies.
ii. To understand how the perceptions of business managers towards climate change risks in the agricultural sector in Uganda affect climate change risk action.
iii. To assess whether and how the climate change risk perceptions of business managers engaged in downstream agricultural processing differ from those engaged in commercial agricultural production in Uganda and how they drive risk action.
iv. To draw out the implications of the varying risk perceptions of these two groups, for theory and practice.

To address these objectives, the following empirical questions were set out as detailed in section 2.10 as:

i. How do the perceptions of business managers towards climate change risks in the agricultural sector in Uganda affect the choice of climate change risk action?
ii. Are there variations in how the climate change risk perceptions of business managers engaged in downstream agricultural processing differ from those

engaged in commercial agricultural production in Uganda? How do these variations influence climate change risk action?

iii. How are these perceptions, tacit and explicit, represented in the construing of the two managerial groups?

Reviewing table 21 which summarizes both table 18 which illustrates how the group of respondents think/feels, and table 20 which shows how individual respondents think/feel based on Honey's procedure, capturing the personal importance of constructs, it can be noticed that all the nine categories ranked as highest based on the total number of constructs elicited also appear as the top nine categories with the highest frequency of high salience constructs though with varying degrees of importance.

Individual managers perceive climate change risks as having an effect on 'business survival or business continuity' and 'quality and quantity of production' as highest on the list in terms of high salience constructs. However, 'business survival' is ranked number four in terms of frequency of constructs overall. 'Profitability' and 'availability of response options' are also considered of high importance based on high salience constructs (3rd and 4th place), but the two are ranked 5th and 6th place in table 18 for the total constructs overall.

Table 22: Comparing table 18 (showing group construing) with table 20 (showing the Individual respondent construing):

No.	Ranking in table 18	No.	Ranking in table 20
1	Affects the quality and quantity of production	1	Business survival or business continuity
2	Influences marketing decisions.	2	Affects the quality and quantity of production
3	Capacity to manage risks	3	Availability of response options
4	Affects business survival or business continuity	4	Impacts profitability
5	Availability of response options	5	Influences investment decisions
6	Impacts profitability	6	Influences marketing decisions
7	Effects on the cost of production	7	Effects on the cost of production
8	Influences investment decisions	8	Capacity to manage risks
9	Impacts production inputs	9	Predictability

The comparison between the two tables helps us arrive at a conclusion that these nine key categories constitute the key issues that managers perceive as important in influencing their climate change risk decisions especially the consideration for business survival and the effects on what the company can be able to produce/production decisions. This helps to respond to research objective (ii) and research question (i).

In terms of proportions between producers and processors, there does not seem to be considerable differences in the number of high salience constructs.

To the processors, four categories seem to have the same level of importance as they all have the same number of high salience constructs:

1. Affects business survival or business continuity
2. Affects the quality and quantity of production
3. Availability of response options
4. Impacts profitability

While to the producers three categories seem to be of similar importance:

1. Affects the quality and quantity of production
2. Availability of response options
3. Influences investment decisions

Production decisions and availability of response options seem to be common in both cases emphasizing their importance for both categories.

It needs to be noted that the high salience constructs (96) constitute only 34% of the total (281) constructs (see table 20). Therefore, it is important that while using the information generated from table 20 to also compare with the information provided in table 18 which reflects trends in all the constructs. With this comparison, we note that there are no appreciable variations between the two reference groups. This responds to the research objective (iii) and research question (ii) and (iii).

The following chapter will go into details to discuss the implications of these findings for both policy formulation and theory.

CHAPTER SIX: DISCUSSIONS AND CONCLUSIONS

6.1 Introduction

This chapter covers a discussion of the findings generated in the previous chapter, the implications for practice and theory are discussed, limitations and suggestions for further research are presented.

6.2 Discussion of the findings:

It was noted in section 4.2.1. that; 'It is anticipated that producers will put in place more adaptation related strategies and processors more mitigation related strategies. This may also have an implication on the kind of issues that influence their perceptions to implement climate change risk actions.' However, the data analysis results so far does not indicate a significant variation in the construing of the two reference groups and therefore their likely actions. This would rather agree with the statement made in section 2.10, (vii) that, 'the relationship between adaptation and mitigation in climate change risk management is considered complementary' (Jones et al., 2007). It can also be stated that different climate change response strategies can have various blends of adaptive and mitigation capacity. When managing climate change risks, there are many instances where adaptation and mitigation can be integrated (Jones et al., 2007). Therefore, managerial perceptions cannot be seen to be different for producers or processors based on the distinction of adaptation or mitigation. Which also agrees with the study results showing both reference groups having almost similar climate change risk construing. In the literature, we noted that, at the agricultural processor level, companies seek to reduce greenhouse gas emissions during their business processes, reducing their carbon footprint to achieve sustainable or "green" value chain development (Dekens & Bagamba, 2014). Whereas agricultural producers strive to look out for better farming methods and sustainable crop varieties that can adapt easily with the changing climate. It should also be noted that the common agricultural adaptation strategies used by farmers or producers included the use of drought resistant crop varieties, crop diversification, changes in cropping pattern and calendar of planting, use of appropriate tillage methods, use of irrigation, afforestation and strengthening of human capital (Akinnagbe & Irohibe, 2014) emphasizing the importance of both production decisions and the capacity to manage risks to the producer. From table 3, it can be seen that indeed both the producers and processors have concerns related to production inputs, product quality and quantity, and marketing of their products. However, these are described differently

because of the stages of the value chain at which they operate. Referring back to table 21 it was noted that among the top nine categories considered of highest importance in terms of how both producers and processors construe climate change risks, ‘affects quality and quantity of production’ was considered as highest on the list.

Therefore, the concerns for quality and quantity of production applies to both producers and processors but needs to be put into context considering that the two groups are at different stages of the agriculture value chain.

6.3 Implications for theory

6.3.1 The theory of risk amplification

Managerial risk perceptions play a role in determining what is amplified and therefore considered as great risk to influence risk behaviors in organization and what is attenuated (Duckett & Busby, 2013; Kasperson et al., 1988; Renn, 2011). Both producers and processors are able to identify climate change risks in their environment and choose to amplify some of them as perceived to be very risky to their businesses while leaving out the others (attenuate) with a view that such risks are less risky. An example is where some managers noted that, the occurrence of the risks does not pose a threat to their business as they can continue even with the risk materializing. From table 20, managers expressed high concerns for business survival or business continuity indicating that when managers consider climate change risks a threat to their business survival, they will have to take action if they are to remain in business. Examples of constructs in support of this observation are:

PC001.8- Have a direct effect of the Company's cash flow or ability to survive; Has a close relationship to the Company's survival or cash flow.

PC003.4 - Its occurrence may cripple my production and affect my business continuity; I can survive even with the risks materializing

PD003.7 - Has a high threat to the business and can easily lead to its collapse or closure; Has a threat but does not have a high risk of business closure.

So risks are amplified by managers if they are perceived in this way or attenuated which agree with the theory of risk amplification.

6.3.2 The theory of planned behavior

On the other hand **the theory of planned behavior** by Ajzen (1991) also strengthens the role of perception in achieving a desired behavior. The theory asserts that, 'Intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior, subjective norms, and perceived behavioral control; and these intentions, together with perceptions of behavioral control, account for considerable variance in actual behavior'(Ajzen, 1991:179). The intentions to of managers to take action against climate change risks can indeed be predicted if we can understand the perceptions and attitudes of the managers towards these risks. We have already noted that managers consider or perceive some climate change risks as of less impact on their businesses and therefore their behavior towards those risks is expected to be different. We have also noted from the constructs provided by the different managers or respondents that climate change risks are perceived differently by different managers and therefore their likely responses are expected to be different. To the extent that they perceive these climate change risks differently, their risk management behaviors are prone to be different.

6.3.3 Other relevant theories of risk perception

The other theory of risk perception discussed in section 2.8.2 is **the Protection motivation theory (PMT)** proposed by Rogers & Prentice Dunn (1997) focusing on the risk-reducing behavior of individuals. It specifically emphasizes that individuals are motivated to undertake protective measures when a real or perceived threat is manifested to them. Individuals evaluate the threat and possible means of either coping with or averting the threat before they determine if they need to take action or not (Shabana, 2007). The findings from this study agree with this theory. Managers have indicated that they are likely to take action if they perceive the climate change risks as having an effect on their business continuity or survival, if it is expected to affect their profitability, or if it is to impact the quality and quantity of products that they can produce. Managers indicated in their responses that in some instances they are coerced to take action against climate change risks when their business survival is threatened.

As discussed also in the literature review section 2.8.2, Wildavsky et al., (1990) highlighted six theories of risk perception. Among these are the **political theory** which suggests that risk is seen as influenced by power related needs, and the **cultural theory** which suggests that individuals choose what to fear and how much to fear (and how much to fear it), in

order to suit their way of life as influenced by one's cultural biases (Wildavsky et al., 1990:43). The data generated from this study does not have any indication that power had a role to play in influencing managerial perceptions or the variation in perceptions between producers and processors. However, it can be noted that managers have a choice in what to fear and the extent to which they fear it. This was clear in the way they rated different elements or risks against the overall construct provided. Some risks were considered to be highly likely to affect their climate change risk action because of the perceived nature of effect on their businesses while others were not. The nine categories with the highest frequencies overall illustrate that respondents were ready to take action as long as they had a fear that the risks will affect their profitability, their markets, their survivor or their quality and quantity of production. There are other studies which agreed with this finding that cultural worldviews influence environmental risk perceptions, which influences climate change risks response or behavior (Xue et al., 2016).

One more theory that Sidortsov (2014) highlighted was the **Rational Action Paradigm (RAP)** which asserts the individualistic nature of choices, the fact that people pursue actions where they are aware of the expected values and benefits. As long as these values and benefits are known by individuals to result in maximum payoff, individuals will tend to have preference of those actions (Sidortsov, 2014). We note from the current study that managers tend to take climate change risk action in situations where they believe that there will be benefits in terms of profitability, business continuity, facilitation of productions decisions among others. Value and benefits out of the planned action indeed seem to be a factor in influencing risk management decisions.

6.3.4 Kelly's Personal Construct Theory

The relevance of PCT to this study has already been highlighted in section 2.9.2. The study has demonstrated the applicability of several of the corollaries presented by Kelly's PCT. Construction Corollary (to take just one example) was indeed helpful in understanding the way in which the respondents drew on prior knowledge, and on their past experience of government policies. PCT states that managers have to recognize a possibility of recurring patterns in their experiences in order to make appropriate internal representations to help them anticipate future occurrences (Construction Corollary) (Kelly 1955:50). In this study, though respondents indicated that it was difficult for them to forecast and predict the occurrence of climate change risks based on their past experience of the risks, it was clear

that what managers expressed as their perception of the risks was based on some prior knowledge of such risks and how they may have an effect on their possible climate change risk management actions. When managers were asked for example what perceptions they have on a risk of changes in government regulations, several of them were keen to indicate that government policies take long to be formulated and implemented and therefore do not pose an immediate risk for their businesses. Or alternatively that they can always find a way around those policies and therefore continue in business. These perceptions are formed based on their past experience of government policies and regulations which demonstrates the applicability of Kelly's *Construction corollary.*

6.3.5 Section summary

It is therefore valid to say that the study provides an opportunity to review the usefulness of different risk perception theories as discussed in this section, like Kelly's PCT, the theory of risk amplification by Renn (2011), Ajzen (1991)'s theory of planned behavior and others but more needs to be done where relevance has not been justified in order to better understand managerial perceptions of climate change risks, and how these affect climate change risk related actions.

6.4 Implications for practice

One of the study objectives was to draw out the implications of the varying risk perceptions of the producers and processors for theory and practice. This section seeks to provide the implications of the study findings for policy formulation or practice.

6.4.1 The Implications for Policy

Referring to table 12 and 13 in the pilot study section, the key policy makers highlighted nine issues of concern which influence the business manager climate change risk action as listed again in table 23. When these are compared to the information provided in table 18, it can be noted that only a few of the highest frequency categories based on the overall constructs relate to what the key informants were concerned about. Five out of the nine issues raised by the key informants as seen from table 23 were not considered of great concern. The researcher identified three issues that were highlighted by both the policy

makers and the business managers as relevant in influencing climate change risk action of business managers. These issues include:

i. The consideration of profitability
ii. Organizational capacity to manage the risks (Resources and technical capacity)
iii. Influence on marketing decisions.

Table 23: Comparing key informant concerns and the categories

From Table 12 and 13.	**Equivalent category in table 18**
Government incentives and tax regimes	External stakeholder influence
The strength of Business associations and farmer groupings	External stakeholder influence
Organizational technical capacity	Capacity to Manage Risks
Availability of appropriate Government policy	External stakeholder influence
Experience with Climate change impacts	Past experience
Availability of climate change data	Miscellaneous
Need for competitiveness or profitability	Impacts profitability
Availability of resources	Capacity to Manage Risks
Market pressures/Consumer pressures	Influences marketing decisions

This therefore seems to indicate that there is convergence of thinking between the respondents' (producers and processors) and that of the key policy makers in terms of what influences climate change policy formulation for the private sector. It seems to imply that government can influence climate change risk action for the private sector if they address business manager concerns related to profitability, company capacity to manage risks and matters related to the markets for company products. As long as managers perceive that there is a benefit from taking action in terms of gained profitability, and they have the required capacities, in terms of financial resources and technical manpower, they are likely to respond to the climate change risks. Cornelius et al., (2006)'s work also supported the importance of profitability in influencing business manager decisions especially producers but also government's responsibility to set up programmes that will be perceived by business managers as having a positive impact on their revenue earning and therefore their profitability (Cornelius et al., 2006).

A further analysis of the key informant interview responses in table 10 analyzed in appendix 11, seems to indicate that the government policy makers are predominantly inward looking when they are thinking about the issues of concern for private sector engagement in climate change risk response. Most of the issues highlighted rotate around government policies, other sector or industry players' roles, roles played by external funders, taxation regimes, extra and these were all categorized as external stakeholder influence in the analysis. It is very interesting to note that external stakeholder influence (covering issues like, government incentives and taxes, influence of business associations, government policy) was not included as one of the high salience constructs or the constructs with the highest frequency of constructs overall. The thinking of business managers is that government interventions for example, though effective, take time to have an effect on business operations therefore have a low effect on business climate change risk actions. Policy makers need to make the process of policy formulation more adaptable to the needs of the business managers or private sector if these policies are to be considered effective.

Respondents also noted that policies are sometimes formulated but not implemented and this partly accounted for the low scores for the category related to external influence. Government needs to put in place better strategies for climate change policy implementation if these are to be considered effective in influencing private sector climate change response.

There is a possibility that the private sector is not well engaged in the climate change policy formulation process leading to low ownership or buy-in and a disconnect between the central government who usually formulate these climate change policies and the lower level structures. This has been noted by several researchers as one of the reasons why there may be low climate change policy implementation in Uganda (Ampaire et al., 2017). Government policy makers need to engage the private sector both in urban locations but also in the producer communities to better understand the implementation context. Climate change policies formulated by governments are also noted to be adopted from the developed world without consideration of the context of the implementing communities. Policy makers need to understand the context of the relevant stakeholders responsible for the implementation of the climate change policies. As stated in earlier sections, the Ugandan market is medium to small scale, and most producers are still categorized as subsistence farmers. Therefore, policies that are adopted from the more developed world without consideration of the local context would not be applicable and would continue to be considered by the business managers as not effective in influencing their climate change risk decisions. A similar concern was raised from Nigeria related to the lack of domestication of

the climate change policies as one of the causes of the lack of implementation of climate change policies, and proposed the need for African countries to set policies that are implementable and domesticated to the implementation environment (Ajulor, 2018). It is also noted that National climate change adaptation plans (NAPs) are still mainly state-centered and mainly reflect a global agenda paying less attention to the national contexts (Alves et al., 2020) accounting for the low implementation of climate change policies in various Countries like Uganda. (Alves et al., 2020). Crosby, (1996) also highlighted key challenges for policy implementation include; developing policies which are external or donor driven done to please or receive funding/ the needed resources, policy decisions and implementation becoming highly political, the varying intentions of the technocrats who actually draft the policies but have no connection with the constituents who are to be affected by the policies and called for a better engagement of stakeholders in policy formulation (Crosby, 1996). Ilukor et al., (2014) too recommended that Climate change policy need to be seen as beneficial to the various stakeholders and responsive to their needs, like cost reduction (Ilukor et al., 2014). As long as government policy is seen by the producers and processors as facilitative to their efforts for climate change risk response, there is better engagement in policy formulation, and institutions are in place to actualize the implementation of these policies, the business managers will be likely to respond positively. As stated by Kelly's PCT, people's perceptions change and therefore their priorities also change. If government can make an effort to show the managers the benefits that they gain from responding to climate change risk, they are likely to respond.

There could also be an information gap between the government climate change policy formulators and the private sector, the producers and processors (Hassan, 2015) and therefore leading to the under rating of the role of government policy in influencing private sector climate change policy response. Grace, (2018) attempted to understand the perception of Ugandans' of Climate Change originating from Air Transport Carbon Emissions and concluded that there was still a high level of information gap related to climate change (Grace, 2018) requiring government to put in place realistic measures to encourage individual climate change behavior change. The effectiveness of communication of the government climate change policies may also be a reason for the failure to implement climate change policies (Howes et al., 2007). It can be proposed that policy makers' messages should be tailored to raising manager's awareness of the risks that climate change has on business survival, profitability, changes on customer demands, input sourcing, and production decisions. It can be urged that relevant climate change information can be of use

in helping managers re-examine their climate change risk response priorities. Therefore, government in Uganda needs to do more to bridge the information gap to influence business manager perceptions and therefore influence their climate change risks action.

The lack of appropriate structures to enforce climate change policies needs to also be addressed in order to make government climate change policies more effective (Ampaire et al., 2015). At the moment there are gaps between development policies and plans at the local levels, the adaptation practices adopted by smallholder farmers, and the Central government climate change policy requirements (Twinomuhangi, 2019) which need to be bridged in order to achieve effective climate change policy implementation at all levels.

It needs to be noted that despite the fact that the study results did not highlight government policy as a key factor in influencing private sector climate change risk action, it is still believed that Government policy has a role to play in incentivize private sector investment in climate change responsive measures by communicating risks, offering incentives for resilience enhancing measures, and where necessary by putting in place regulation to avoid shifting risks onto the public' (Biagini & Miller, 2013:242). Government policy that promote stronger public–private partnerships would also be useful in enhancing private sector engagement (Biagini & Miller, 2013).

Table 23 shows that policy makers also highlighted market pressures/consumer pressures as one of the key concerns for the private sector's engagement in climate change risk mitigation. This also corroborates with the responses that business managers gave related to 'Influences marketing decisions' and 'affects the quantity and quality of production'. As discussed in section 2.6, consumer demands are gradually moving to influence the types of products produced, the way they are produced, and the way such products are packaged and marketed. This is evidenced by the changing consumer behaviors (Milfont & Markowitz, 2016; Trudel, 2018) and the increasing demand for green products. Research shows that green consumers can use their buying power to influence better climate change risk action from the private sector (Young et al., 2010:3). Changes in consumer preferences has been noted to have an influence on business response decisions (Girod et al., 2020). Therefore, policy makers and business managers should tap into this changing consumer market to adapt their strategies in order to meeting these changing needs but also enhance climate change risk action.

In an effort to inform key policy makers, the researcher will make a presentation of the study findings in an executive summary to the policy makers to help them make use of the study

findings in designing the climate change risk response messages and related policies to help influence private sector climate change risk action in the agriculture sector in Uganda.

6.4.2 Managing the value chain dynamics.

The study highlights the fact that there are no significant variations in the way producers and processors construe climate change risks, thus shaping their climate change risk responses. This is an important finding for the policy makers. Though literature in section 2.7.1.1 indicate varying perceptions along the value chain, this has not been confirmed from the study only if looked at from the fact that what a producer classifies as 'quantity and quality of production' differs from that of the processors because of the inherent characteristics of the different stages of the agriculture value chain. Producers are at the beginning stages of the chain while processors come later in the chain. This implies that policy makers should approach business managers (producers and processors) in the same way as their concerns seem to be related, but taking into consideration that what production decisions for a producer means is not necessarily the same for a processor. This variation in meaning could not be identified easily from the constructs but can be derived from the characteristics of the agriculture value chain. Similarly, what the producer identifies as products are unprocessed, while for a processor, these are the finished products. This creates a distinction, but the category remains the same, 'quality and quantity of production'.

Indeed it is clear from the research findings that both producers and processors are concerned about what they can offer to their customers and therefore survive in business. Business managers should therefore focus their efforts on understanding the opportunities available in the market as customers' needs and demands keeps changing with the changing customer awareness of climate change related risks and implications on their consumption and way of living. If businesses are to survive, which is one of their climate change risk concerns as highlighted in this study, then they have to adapt to the changing needs of their markets linking with the other key concern of 'marketing considerations'.

6.4.3 Section summary

This study helps the policy makers to understand and appreciate the key issues of concerns from the minds of the business managers themselves and not necessarily their own perception of them. This will help policy makers to develop or improve policy formulation

with the concerns of business managers as part of their consideration. The policy makers should aim to put in place systems that build capacities of the private sector/business managers to respond to climate change risks, protect companies from collapse by offering alternatives for affected companies to consider, but also ensure that company managers view climate change related actions as economically viable for their businesses.

Business managers should also be dynamic to respond to changes in government policies and information shared as the requirements for businesses to operate in an environmentally friendly manner keeps changing. The study reports perceptions of managers as they existed at the time of the study but these keep changing and therefore every player needs to be attentive to changes in the market if they are to remain relevant and competitive.

Government should be keen to understand why business managers perceive government formulated climate change policies as ineffective in influencing their related climate change action and therefore move to address those gaps. Critical among them is the formulation of policies which do not take into consideration the Country's Agricultural producers and processors' contexts but only adopted from the more developed world and only to respond to resource partner interests.

6.5 Limitations of the study

The researcher made an effort to mitigate all the possible limitations related to the use of the case study research method, like researcher bias, reliability, and the limitations for generalizability as indicated in section 3.5 and 3.6 of the literature review section. The use of the repertory grid as the data collection tool provided the researcher with an opportunity to limit researcher bias as the interviews were respondents driven and gave the respondent an opportunity to review and validate the recorded responses before the interviews were considered concluded. It is also important to note that many of the respondents were not familiar with the use of the repertory grid and the conduct of such an interview procedure which affected the duration of the interviews as the researcher made efforts to ensure the respondents understood and were comfortable to participate in the interviews.

There are a few other limitations that are worth noting but not necessarily influencing the validity of the study results as highlighted below.

The managers interviewed are not necessarily business professionals. They were mainly having agriculture related technical backgrounds. This may affect the way they perceive risk

and their discussions related to climate change risks. An emphasis on managers who are specifically having a business or risk management related qualification may provide varying results.

The study could only focus on nine climate change risks in the conduct of the repertory grid interviews. However, there are more other risks that could have been included. These are the ones that were considered critical from the literature, and the tool could not accommodate a higher number of risks as elements. If another research method was to be used, it could be possible to assess several other climate change risks.

The study methodology considered only 31 respondents due to the limited time scope and the type of research method used. Though this is considered sufficient for this study approach, it would be interesting to see how the use of another research approach, like the survey method would develop the findings.

A higher percentage of the constructs (62%) were elicited via online interviews as highlighted in section 5.3. In a few instances the flow of the interviews was interrupted by the lack of reliability of the internet connections and the changes of screens from the repertory grid sheet to the PowerPoint slide with the triads. However, the researcher made an effort to ensure that these are mitigated through proper preparations and briefing of the respondents on how the interviews were to be conducted before the actual interviews and prior to the commencement of the interviews. The researcher also had an opportunity to confirm with the respondents the completeness of all the constructs documented.

6.6 Areas for further research

6.6.1 Areas related to enhancing the study results:

The research results have indicated a role that can be played by changes in consumer preferences and the green consumerism that is gradually being considered by the researchers. However, the study did not specifically the level at which green consumption has taken shape in Uganda and how government policy is being shared to enhance or influence consumer behavior towards this sustainable consumption and therefore production. It would therefore be a subject worth exploring in the Ugandan context.

The study also focused more on medium to large scale producers, but the Uganda agricultural sector is predominantly subsistence. It is possible that the subsistence producers may have varying perceptions from those who are more large scale. It would therefore be

good to further explore the perceptions of the subsistence producers and understand how they perceive climate change risks. This will help to enhance the outcomes of this study.

A key finding in Dowbiggin, (2017)'s work suggested that government policy was viewed as the most influential factor affecting the respondent views of future climate risk management (Dowbiggin, 2017). However, as noted in this study external stakeholder influence which includes government interventions, was not considered one of the key business manager concerns. It is possible that this is because the respondents industries or sectors for both studies are different, but this may merit further study as policies formulated by government need to be able to cover several sectors and not necessarily sector specific policies.

It was noted that, 'a changing climate can affect the entire chain of value-adding activities for agricultural commodities, from production and processing to marketing and consumption of the final product'(Dekens & Bagamba, 2014:2). This study only focused on two stages of the value chain, production and processing due to the resource and time restrictions. There is need to understand how the players at the other stages of the agriculture value chain perceive climate change risks to better inform policy makers policy formulation processes.

The study results are based on the outcome of the repertory grid interviews. These are known to be for a lower number of participants or respondents. It is possible, where resources allow, to consider to conduct a survey of the producers and processors basing on the outcome of this study to access the kind of agreement to the key issues identified as having an effect on the perception of business managers and therefore with the ability to influence managerial climate change decision making.

It is also interesting to note that past experience with climate change events or risks was not highlighted by the respondents as being a key factor in influencing their perceptions of risks and therefore their climate change response actions. It would therefore be good to explore why this is the case.

6.6.2 Generic areas for consideration not specific to the study results:

One might consider carrying out a similar study but with a specific focus on finance professionals or persons specifically trained in risk management. This may be an interesting study using the same methodology with two reference groups, those specifically trained in

risk management compared with those not having a professional background in risk management.

This study concentrated on respondents who were from within or around the city center due to logistical constraints. However, with appropriate funding, it would be interesting to widen this study to cover the different ecological zones of Uganda and understand if there are any variations in perception between managers based around the city Centre and those based in the rural settings.

What actually drives climate change investments? Botelho et al. (2023) highlighted some motivations for green investment (Botelho et al., 2023). This study also highlighted 'investment decisions' as a key concern that influences climate change risk decision. It may be of value to understand better what specifically motivates investing in climate change related innovations in the agricultures sector in Uganda.

Another area of interest would be in assessing how Companies in the agriculture sector are incorporating climate risk management actions in their annual reports.

The study also did not specifically review the variations in perceptions between managers in government owned processors or producers companies in comparison with the purely private owned. This could also be another area that provides good information for policy makers.

The use of fossil fuel–based energy systems, and energy demand by producers and processors in agriculture has been documented globally to be a limiting factor to climate change risk management action. It is important to investigate how this is affecting the response behaviors of both the producers and processors in Uganda.

6.7 Conclusion

This study has made strides in addressing the present study aim and objectives. However, there is still much that remains to be learnt by other researchers in addressing related objectives in this important field of climate change risk action. The researcher has proposed some other areas of possible research; more can be done especially in Uganda where climate change action is still in its infancy compared to several other developed Countries.

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Appendix 1: Pilot Study-Key Informant Interview Guide

1.0 Give an introduction:

As already communicated to your via email, I am carrying out a Doctoral study to understand the role of business manager attitudes and perceptions in driving climate change risk action in the agricultural sector in Uganda, specifically to inform climate change policy formulation and implementation. It is therefore important for me to ensure that the study is responding to the current needs as regards climate change policy formulation in Uganda. Therefore, as a key player in policy formulation, I would like to ask you a few questions which will inform the structure of my study before proceeding to the field.

1. With your experience, how far has climate change policy developed in Uganda?
2. Are you aware of specific companies which are actively putting in place strategies for mitigating or adapting to climate change risks in the agriculture sector?
3. What it is do you think they are doing in terms of putting in place climate change strategies that merited their nomination.
4. In your opinion what are the key issues affecting climate change policy formulation and implementation especially in business organizations in the agriculture sector?
5. Do you think these issues differ among the producers/Farmers and processer?
6. How do you rate the following issues in terms of how they influence climate change action among business organisation in the Agriculture sector (Ranking from 1 as Not likely to 5 as Most likely):

Influencing issues	Not Likely				Most likely
	1	2	3	4	5
Organizational technical capacity					
Availability of resources.					
Availability of appropriate Government policy					
Experience with Climate change impacts					
Availability of climate change data					
Need for competitiveness					
Market pressures/Consumer pressures					
Government incentives and tax regimes					
The strength of Business associations and farmer groupings					

2.0 Conclusion:

Advise the interviewee about the next phases and also appreciate them for their participation.

Appendix 2: Repertory Grid template

1. **Our Topic is:** To understand the ways in which you view different factors in **terms of their importance to you in influencing what you might be able to DO ABOUT** climate change risks

2. **Our focus is on:** What factors influence what managers might be able to DO ABOUT climate change risks

3. List of Elements

6. ELICIT CONSTRUCTS	Government incentives	Business associations and farmer groupings	Organisational technical capacity	Government policy	Profitability	Climate change impacts	Climate change data	Market pressures/Consumer pressures	Engagement in climate change policy formulation.	RATE CONSTRUCT BY CONSTRUCT	IMPORTANT
	E1	E2	E3	E4	E5	E6	E7	E8	E9		

Notes:

Research Involvement and Informed Consent Record

At the end of this interview, review what's recorded, and ask interviewee to sign over this space to confirm agreement to participate, and for the researcher to retain this completed data sheet for analysis.
(No signature: give this sheet to interviewee and delete any data on hard disc.
Signature present: retain the sheet for secure storage and analysis.)

Appendix 3: Example of a completed repertory grid

1. **Our Topic is:** To understand the ways in which you view different factors in **terms of their importance to you in influencing what you might be able to DO ABOUT** climate change risks

2. **Our focus is on:** What factors influence what managers might be able to DO ABOUT climate change risks

3. List of Elements

Notes:

Research Involvement and Informed Consent Record

At the end of this interview, review what's recorded, and ask interviewee to sign over this space to confirm agreement to participate, and for the researcher to retain this completed data sheet for analysis.
(No signature: give this sheet to interviewee and delete any data on hard disc.
Signature present: retain the sheet for secure storage and analysis.)

6. ELICIT CONSTRUCTS	Government incentives	Business associations and farmer groupings	Organisational technical capacity	Government policy	Profitability	Climate change impacts	Climate change data	Market pressures/Consumer pressures	Engagement in climate change policy formulation.	RATE CONSTRUCT BY CONSTRUCT	IMPORTANT
	E1	E2	E3	E4	E5	E6	E7	E8	E9		
These are external to the company and not within easy influence by the company	1	2	5	1	5	1	3	1	2	Considering that it is internal to the organisation, you can be able to inernally built the required capacity to respond.	
Have a direct effect or implication for the survival of the business	2	3	1	3	1	2	5	1	4	Government policy may not necessarily consider if the company's need to survive.	
Climate risk decison can be taken even witout climate data and engageent in climate	4	3	5	3	5	5	2	5	1	Has to be considered before taking any climate change risks decisions	
Define the environment in which companies operate	1	3	5	1	1	2	5	1	2	Has no influence on the operating environment of the Company	
Market pressures direct company decision to adapt if they are to remai profitable	1	5	2	4	1	2	3	1	4	Can affect decision to adapt but not necessarily for purposes of profitability.	
Has a direct relationship with the adaptability of the company to climate change risks	1	4	1	3	1	1	2	1	4	Can engage in policy formulation, but it does not directly define the adaptability of the company	
They have a direct effect on the company image/brand	5	3	1	5	1	1	4	1	5	Engangement in policy formulation does not directly affect company image/brand.	
Direct effect on the company's course of action to remain viable in business	4	3	1	5	1	1	3	1	5	The effects of participation in policy formulation are indirect.	
Outcome of actions are seen in a short time	1	5	2	4	1	4	5	2	5	The outcomes of engaging in policy formulation are more long term and with no direct linkage to profitability	
Provide evident that drives company strategies	2	5	2	5	1	6	1	1	5	Facilitate lobying for better business environment	

Appendix 4: Final grid template

1. **Our Topic is:** To understand the ways in which you view Climate risks and impacts, and how this influences your climate change risk management decisions.	Changes in Market demands and needs	Changes in legislation and government policies	Variability of cost and supply of production inputs	Increased plant pests and diseases	Variability and extreme weather conditions	Damaged production infrastructure	Effect on product distribution systems	Changes in the cost of financing	Increased cost of production and maintenance	**Notes:**
2. **Our focus is on:** Discussing your view of the climate change risks and impacts **in terms of how they influence your climate change risk management decisions.**										**Research Involvement and Informed Consent Record** At the end of this interview, review what's recorded, and ask interviewee to sign over this space to confirm agreement to participate, and for the researcher to retain this completed data sheet for analysis. (No signature: give this sheet to interviewee and delete any data on hard disc. Signature present: retain the sheet for secure storage and analysis.)
3. List of Elements										
6. ELICIT CONSTRUCTS	E1	E2	E3	E4	E5	E6	E7	E8	E9	RATE CONSTRUCT BY CONSTRUCT / IMPORTANT
Overall, has a high influence on my climate change risk management decisions										**Overall,** has minimal influence on my climate change risk management decisions

Appendix 5: Self-administered grid

1. **Our Topic is:** To understand the ways in which you view Climate risks and impacts, and how this influences your climate change risk management decisions.

2. **Our focus is on:** Discussing your view of the climate change risks and impacts **in terms of how they influence your climate change risk management decisions.**

3. List of Elements

Notes:

Research Involvement and Informed Consent Record

At the end of this interview, review what's recorded, and ask interviewee to sign over this space to confirm agreement to participate, and for the researcher to retain this completed data sheet for analysis.
(No signature: give this sheet to interviewee and delete any data on hard disc.
Signature present: retain the sheet for secure storage and analysis.)

6. ELICIT CONSTRUCTS	Changes in Market demands and needs (E1)	Changes in legislation and government policies (E2)	Variability of cost and supply of production inputs (E3)	Increased plant pests and diseases (E4)	Variability and extreme weather conditions (E5)	Damaged production infrastructure (E6)	Effect on product distribution systems (E7)	Changes in the cost of financing (E8)	Increased cost of production and maintenance (E9)	RATE CONSTRUCT BY CONSTRUCT	IMPORTANT
Have a direct impact on the profitability of the Company	1	5	1	2	3	1	2	3	1	Can affect company profitability but the relationship is indirect.	
Requires quick reaction from Company if it happens	1	5	1	2	2	2	3	4	3	Company action can be delayed since there are possibilities of re-negotiating changes in favour of the	
Possible to remidy the risk if it exists	2	3	2	1	5	1	3	4	3	Company has little to do to remidy its occurance.	
Solutions are available on the market and within reach of the company.	4	4	3	2	5	3	4	2	3	No readily available solutions within the reach of the company.	
Has an effect on own resources and less impact on the competitors and therefoere affecting our ability to compete	4	5	4	4	5	1	5	5	1	Has an effect on the whole market affecting even our competitors leveling the competing field.	
Company can continue with operations without consideration of this risk	1	4	1	2	3	1	1	4	1	Company cannot continue with operations without consideration of this risk	
Has a direct effect on the company's capacity to produce and deliver a product	5	3	1	1	2	1	1	3	1	Has no direct effect on the company's capacity to produce and deliver a product	
Has a high relationship to company survival, you either adapt or leave the business.	2	3	1	2	1	1	2	5	2	Company survival is threatened but not at a high level. Company can survive even without adapting.	
Internal to the Company and therefore the Company can easily influence it.	5	5	5	5	5	1	4	4	1	Determined by forces external to the company, and therefore not withoin the Company's control.	
Outcome of the climate change risk mitigation action can be achieved in the short term	4	4	3	2	5	1	3	3	1	Outcome of the climate change risk action can only be achieved in the long run	
Climate change risk is possible to assess and forecast	4	4	1	4	5	2	4	4	1	Climate change risk is difficult to assess and forecast	
Related to natural conditions and therefore more difficult to influence	5	4	5	2	1	4	3	4	1	Not necessarily natural in nature and can easily be influenced by the Company.	
Has an overall effect on mainly one side of the production process (Either the input or output side).	5	5	1	1	5	5	2	5	5	Affect both the input and output side of the production process.	
Overall, has a high influence on my climate change risk management decisions	2	4	1	2	2	1	3	5	1	**Overall,** has minimal influence on my climate change risk management decisions	

Appendix 6: Sample grid used to illustrate the interview technique

1. **Our Topic is:** Identify which vehicle brand is most suitable for the African Market.										**Notes:**	
2. **Our focus is on:** Discussing your view the different vehicle brands **in terms of thier effectiveness on the African Market**										**Research Involvement and Informed Consent Record** At the end of this interview, review what's recorded, and ask interviewee to sign over this space to confirm agreement to participate, and for the researcher to retain this completed data sheet for analysis. (No signature: give this sheet to interviewee and delete any data on hard disc. Signature present: retain the sheet for secure storage and analysis.)	
3. List of Elements	Toyota	Hyundai	Nissan	Kia	Honda	Tata	BMW	Mercedeci	Ford		
6. ELICIT CONSTRUCTS	E1	E2	E3	E4	E5	E6	E7	E8	E9	RATE CONSTRUCT BY CONSTRUCT	IMPORTANT
1										5	
Their spare parts are readily available on the african market	1	4	2	5	3	5	5	2	4	The spare parts are not readily availble and have to be mainly imported.	
Consumption is more friendly	1	4	2	3	3	5	2	3	2	consumption for the vehicle is high and not sustainable.	

Appendix 7: Constructs by respondent

This appendix provides the details of all the 281 constructs elicited during this study grouped by respondent.

The different headings in the table indicate the following:

Construct Code: This is the unique number given to each construct elicited from each of the respondents in order to meet the confidentiality requirements. **PC** stands for a respondent who is a processor and **PD** stands for a respondent who is a producer/**001** the number in the squence of interviews/**.1** is the first construct. For examples: **PC003.5** means that this is the fifth construct that was elicited from the third processor interviewed.

Emergent Pole: this indicates the first pole of the construct elicited during the interviews.

Implicit pole: this indicates the second pole of the construct elicited.

%Similarity Score: Stands for the similarity score as described in section 3.7.1.2 developed as per Honey's analysis.

H-I-L Code: Shows the ranking of the construct as per Honey's analysis.

Rev.: Ratings on each construct are compared once with the overall ratings, and again with the overall ratings reversed as described in section 3.7.1.2. 'YES' describes where the higher of the score being used is the reversed % similarity score.

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC001.1	They directly affect my production operations and decisions	More less on a higher level and may take some time to affect my operations	81%	NO	H
PC001.2	They influence my ability to forecast interventions for the production facility and distribution	Mainly affects the producers and therefore the input side of processing.	69%	NO	I
PC001.3	This is where am able to control best the action to adapt	Not necessarily within my reach or even an option.	56%	NO	L
PC001.4	More related to the marketing side of my decision making can be handled simultaneously	Out of scope for my marketing decisions.	67%	NO	L
PC001.5	Operate within their scope, if they change, I must adapt the business too	The changes or occurrence of the risk, can be accommodated without making immediate changes.	69%	NO	I
PC001.6	All related to operational costs and have direct effect on company profitability	Has no direct effect on Company profitability in the short run.	86%	NO	H
PC001.7	Has an effect on my decisions on how and where to source my inputs	It more about the how to sale and no close connection to the input sourcing decisions.	75%	NO	I
PC001.8	Have a direct effect of the Company's cash flow or ability to survive	Has a close relationship to the Company's survival or cash flow.	81%	NO	H
PC001.9	Can be controlled by other stakeholders other than me or my business	Within your own responsibility or mandate to control and manage.	61%	NO	L
PC002.1	Once it happens the impact in immediate. It has an immediate effect on my production and sales	Not necessarily affected by the occurrence of the risk.	72%	NO	I
PC002.2	Have a close relationship to my selling and buying decision	Can be in place but does not necessarily influence my buying and selling decisions because of the free economy in the Country.	83%	NO	H

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC002.3	Have a close effect on my cash flow in the business	Product can be stored for a longer time and redistributed later when the distribution infrastructure improves, therefore the business cash flow challenge can be differed.	81%	NO	H
PC002.4	Has a direct correlation with my production decisions	Does not necessarily have much impact on my production decision consider my type of product.	72%	NO	I
PC002.5	This is outside my control	As a believer of self-regulation, this is within my control.	75%	NO	I
PC002.6	Have an immediate effect on the profit margin	Does not affect profit margins because the cost can be spread over a longer period of time.	86%	NO	H
PC002.7	Have a direct relationship on my pricing decisions	This has no connection to internal decisions on pricing.	81%	NO	H
PC002.8	Has an effect on the unit cost of production, if this is high I cannot proceed with production	The effect on the unit cost of production is very remote.	75%	NO	I
PC002.9	This has a more direct effect on how my products access the market or reach the final consumer	The effect on how my products access the market in a bit remote.	58%	NO	L
PC003.1	Focus on profitability, have an influence on my profitability	Has a limited effect on my profitability.	83%	NO	I
PC003.2	They have an influence on the quantity of inputs supplied by the producers indirectly affecting the environment	Has a limited role or not effective in influencing what can be supplied by the farmers.	75%	NO	L
PC003.3	Have a more direct impact on my cost of production	No relationship to my cost of production.	92%	NO	H

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC003.4	Its occurrence may cripple my production and affect my business continuity	I can survive even with the risks materializing	86%	NO	H
PC003.5	Have a direct effect on my production levels/quantities	Has an impact but not directly related to my production quantities.	83%	NO	I
PC003.6	Have to be considered when selecting the response strategies	Not a key consideration when selecting the response strategies.	83%	NO	I
PC003.7	Have an effect on how I can reach my market or can restrict my abilities to serve my market	Has no relationship with the marketing decisions.	67%	NO	L
PC004.1	May affect access or availability of a given technology in response to climate change	Does not necessarily affect my access and availability to given technologies in response to climate change risks.	64%	NO	L
PC004.2	Affect the costing of the given response option	Has no close relationship to the costs of a given response option.	61%	NO	L
PC004.3	There is a high impact on my level of productivity and therefore impacting your ability to meet your client targets	Has less or low likelihood to affect my level of productivity.	75%	NO	H
PC004.4	Is more complex and the likelihood of reoccurrences is high	One off and with a less likelihood of reoccurrence.	72%	NO	H
PC004.5	There are available alternatives to consider on the market to respond to the risks	It is more challenging to manage the risk as there are limited or no alternatives to consider on the market to respond to the risk.	75%	NO	H
PC004.6	Have a high likelihood of impacting my cost of operations upwards	Has an effect on the cost of operations but this can go both ways, negative or positive to benefit the Company.	61%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC004.7	Have the capacity internally to manage the risk	I do not necessarily have the right resources or capacities internally to manage the risk.	69%	NO	I
PC004.8	Response is impacted by how much money I am able to invest in a given intervention	Response does not necessarily depend on my investment ability or how much I can invest.	67%	NO	I
PC004.9	Response is dependent on my ability to lobby other external stakeholders	Management of the risk is controlled internally and there is no need for external lobbying.	69%	NO	I
PC005.1	There is a high likelihood of pushing me out of business as a result of this risk - I have some ability to influence the response to the risk and therefore the threat to my survival in minimal.	I have some ability to influence the response to the risk and therefore the threat to my survival in minimal.	67%	NO	I
PC005.2	Can easily affect my level of productivity	The risk does not necessarily affect the level of production.	69%	NO	H
PC005.3	Have a high effect on my ability to access reliable inputs, without inputs it means I have nothing to process	Has little or no effect on how I can access my inputs.	61%	NO	I
PC005.4	Has a high likelihood of it occurring and therefore impacting my business	Has a low likelihood of occurrence.	69%	NO	H
PC005.5	These relate to the costing aspect of my business and therefore my ability to adapt a given climate change response option	Is not necessarily on of the critical considerations when deciding on a given response option.	67%	NO	I
PC005.6	There are alternative options for me to consider to adapt to the risk in case it occurs	I have little or no alternatives to go around the risk if it manifests.	56%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC005.7	Likely to affect my level of sales or the ability to reach the final consumers	Has little or no relationship to my ability to reach the final consumers.	56%	NO	L
PC005.8	Impact my operating costs and therefore my level of profitability which is the reason I am in business	It is still possible mitigate the risk so its effect on my operating costs and profitability become minimal.	67%	NO	I
PC005.9	I have little I can do to influence changes or to adapt to the risk. Response is outside my control	I am able to respond without much involvement of external parties.	50%	NO	L
PC006.1	Have a high implication on the cost which is a key driver my response decisions	The effect is slower and has a longer-term implication on the business costs.	81%	NO	H
PC006.2	Needs aggregation of efforts with others in order to influence change or to adapt to the risk	I can manage on my own without the efforts of other external stakeholders.	75%	YES	I
PC006.3	Has a direct implication on my production line and therefore I have to respond quickly	I can find ways to continue in business even when the risk occurs.	72%	NO	I
PC006.4	There are already available alternatives to deal with the risk	The options to deal with the risks are limited or not available.	83%	NO	H
PC006.5	I can easily influence the choice of response options to consider	I have no role in influencing the choice of response decisions to consider.	81%	NO	H
PC006.6	Cost implication is more direct and easily transferable	The costing is more indirect and not easily be absorbed.	72%	NO	I
PC006.7	It is easier to plan an appropriate response	Not so easy to project the occurrence of the risk.	78%	NO	I
PC006.8	Affect my categorization of the market, and influence the strategies I have to adapt to access the market	Is more on the producer's side and does not have an influence on the way	61%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
		or the strategies I employ to access the market.			
PC006.9	Has a direct effect on how I choose to use my funds	Does not have a direct influence on how I decide to invest my funds or the magnitude of investment.	89%	NO	H
PC006.10	Directly influence my business environment	Has no relationship to my business environment.	56%	NO	L
PC006.11	Affect the quality of the product I can offer on the market	Does not change the quality of the product you can offer.	64%	NO	L
PC006.12	Have a direct cost implication of can easily influence my cost of production	Does not necessarily impact my cost of production.	69%	NO	L
PC006.13	Have a very immediate adjustment requirement	Takes time to adjust and does not have an immediate adjustment requirement.	86%	NO	H
PC006.14	The implication for the resource requirement is large and requires external support	The risk is manageable using internal resources	69%	YES	L
PC007.1	They are critical to my business and effect my ability to continue in business	I can always find my way around the risk if it has occurred.	75%	NO	I
PC007.2	Have a more direct effect on my ability to process or produce outputs	Has no direct effect on my production ability.	64%	NO	L
PC007.3	Can easily influence the price of my products	It is important to consider the risks but its effect can easily be passed on to external practices without affecting my pricing.	75%	NO	I
PC007.4	These have an impact on the decisions I take to move my good to the market. Basically, impacting how my goods reach the market	Has no linkage to the decisions I take on delivering my products to the market.	56%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC007.5	Can impact on my ability finance a given climate change risk intervention	Has a minimal or no relationship to my ability to finance a given intervention.	72%	NO	I
PC007.6	Has a direct effect on which intervention I need to take	Has nothing to do with my decision or choice of a given intervention.	58%	NO	L
PC007.7	Has a direct impact on my overall cost of production therefore affecting my level of profitability	The effects on my cost of production are minimal and may not have a high impact on profitability. It is not a variable.	64%	NO	L
PC007.8	I can easily find a way around the risk if it occurs	This is not necessarily within my control.	100%	NO	H
PC008.1	I look at minimizing the cost of production, the cost effectiveness of the option, and therefore affects my choice of options	Has less influence of my choice of response options that I have to consider.	86%	NO	H
PC008.2	Can cause a scarcity of raw materials, therefore requiring me to take the least affected alternatives	Is more on the production side and not the input side of production.	64%	NO	L
PC008.3	Influences the level of investment as it increases the cost of doing business	Has less or no effect on my cost of doing business and therefore level of investment.	69%	NO	I
PC008.4	The possibility to influence my ability to satisfy my Customers	Not likely to impact my ability to satisfy my customers.	86%	NO	H
PC008.5	Can impact the quality of my final products	Has little influence on the quality of my final product.	64%	NO	L
PC008.6	Can easily impact the pricing of my final product. If the response option can help to lower the pricing of the product, then we will go for that	Has no direct effect on my product costing and therefore pricing.	78%	NO	H

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC008.7	Can disrupt my production line, or the ability to continue or discontinue the production of a given product	Has no direct effect on my production line or decision to continue production of a given product.	67%	NO	L
PC008.8	As businesses we always think of profitability, so whatever has a negative influence on my profits I will not consider	Does not directly affect my level of profitability.	75%	NO	I
PC008.9	My response decision to the risk are based on the other external stakeholder influence like donors or government	I do not need to consider external stakeholder influence to respond to the risk.	75%	NO	I
PC008.10	I have to look at my capacity and ask myself if I have the capacity to implement an appropriate response	Not within my capacity to implement an appropriate response.	100%	NO	H
PC009.1	Affects the quality of the inputs I can use in the production of my final products	It's an end result and has no or less effect on the determination of the quality of my inputs.	89%	NO	H
PC009.2	Requires negotiations or lobby with external stakeholders in order to respond to the risk	Does not necessarily require engagement of external stakeholders in order to respond to the risk.	86%	NO	H
PC009.3	Can affect the quality of the product that I can be able to offer to the market	Not necessarily related to the quality of the product that I can be able to produce.	64%	NO	L
PC009.4	Triggers innovation in the Company in order to find an appropriate response	Requires maintenance of the traditional way of doing business and not necessarily new innovations.	94%	NO	H
PC009.5	Certain interventions may not be effectively considered, unless the risks is considered therefore affecting the kind of interventions I can consider	Does not necessarily affect the type or kind of interventions I can consider.	92%	NO	H

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC009.6	As an enterprise I will always strive to remain profitable. Influences your decision making in order to remain profitable	Has little influence on my strategy formulation in order to remain profitable.	67%	NO	L
PC009.7	Has an influence on my cost burden as a business. If I can lower this, then the better for the business	Does not necessarily impact my costing as a business.	78%	NO	I
PC009.8	Can impact on how much I can invest for a given intervention	My level of investment for a given intervention is not necessarily impacted by the risk.	81%	NO	I
PC009.9	Can influence how I can be able to deliver my final product or access the market. The story of the Customer who demanded transportation by rail	Has little or no effect on how I can deliver my product.	64%	NO	L
PC009.10	If I do not find an appropriate response to the risks, it means I lose business which can affect my business survival	Not a big threat to my business survival.	72%	NO	I
PC010.1	Influences my decision to adopt a given climate friendly strategy or response	Does not necessarily impact my decisions to adopt a given climate friendly strategy.	75%	NO	H
PC010.2	I have can always find a way to manage the risk	I have minimal influence over the risk.	58%	NO	L
PC010.3	The occurrence is more predictable as the business usually deals with it	Occurrence in more unpredictable and difficult to deal with of plan for.	69%	NO	I
PC010.4	Directly impacts my production costs therefore requiring me to consider option to reduce these costs	Has little or no impact on my production costs.	81%	NO	H

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC010.5	There are new and innovative ways of dealing with the risk for my consideration on the market. Eg. Digital marketing	There are little options on the market for me to consider to responds to the risk.	64%	NO	I
PC010.6	Can have a direct impact on my business and therefore I have to respond	Does not directly impact my business, but rather my suppliers.	61%	NO	L
PC010.7	Impacts on my investment decisions into a particular response strategy	Does not necessarily contribute to my investment decisions while deciding to respond to climate change risks.	61%	NO	L
PC010.8	Has a high impact on my costing and therefore my profitability	One off and therefore may not necessarily impact my day to day costing decisions.	83%	NO	H
PC010.9	Can affect my decision to switch or diversify into different production lines or even completely terminating production of a given product	Has little of no effect on my decisions to diversify or remain in the production of a given product.	81%	NO	H
PC010.10	The risk impacts my ability to access quality inputs which later affects production costs	Has no relationship with my ability to access quality inputs	69%	NO	I
PC010.11	I have some control in managing the risk	Control is more on the side of other external parties.	64%	NO	I
PC011.1	Having an influence, the method of processing from the traditional ways to more specialty ways	Does not have an influence on the choice of processing method.	61%	NO	L
PC011.2	The response to the risk requires collective effort	I can response to the risk on my own without the contribution of others outside my business.	69%	NO	L
PC011.3	Can have an impacting on my overall processing cost	Does not directly impact my processing costs.	67%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC011.4	Can have an effect on the level of profitability of the business	The effect on my profitability is not as high.	83%	NO	H
PC011.5	I can be in control in terms of mitigating the occurrence of the risk	I have little to do to stop the occurrence of the risk.	81%	NO	I
PC011.6	There are available options for me to consider in response to the risk	There is little I can to in response to the risk.	83%	NO	H
PC011.7	I have to consider the risk when determining how to reach the final consumers	Has less or no effect on my product distribution decisions.	78%	NO	I
PC011.8	I either respond to the risks or I cannot continue in business	Does not necessarily have a high impact on my business survival.	89%	NO	H
PC011.9	The occurrence of the risk is more predictable, and therefore I can think ahead how to respond	It is difficult to predict the occurrence of the risk and therefore to think ahead how to manage it.	83%	NO	H
PC012.1	Has a high bearing on how and where to source my inputs	A little or no effect on how I source my inputs.	75%	NO	H
PC012.2	They have a high bearing on my level of profitability	Is important but not one of the first consideration when taking decisions related to profitability	69%	NO	H
PC012.3	Affects my overall cost of processing and therefore the product pricing	Does not necessarily have a direct effect on my final processing costs	64%	YES	L
PC012.4	Can easily affect my continuity/survival in business	Does not have a strong effect on my ability to continue in business.	72%	NO	I
PC012.5	Has a direct bearing on my ability to process and deliver the final product timely	Has no direct effect on my ability to process the final products timely.	67%	NO	I
PC012.6	The occurrence of the risk demands that I have to find a way to respond	I can continue in business even if I have to necessarily responded to the risk.	61%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC012.7	This is within my control in terms of managing the risk	This is outside my control in terms of managing the risk.	58%	NO	L
PC012.8	Has an influence on how I have to market my final products	No much linkage to my marketing decisions.	75%	NO	H
PC012.9	I have the internal capacity to deal with the risk	The response requires other external stakeholder to respond.	64%	NO	I
PC013.1	Affects the overall costing of the product with an implication on the price of the final product	Does not have a direct impact on the product costing and therefore the final pricing.	69%	NO	L
PC013.2	Impacts the quantity and the quality of the product that I can be able to produce	Has little or not relationship to the quality and quantity of the product that I can produce.	83%	NO	H
PC013.3	Affects how much I can be able to invest in the product as a result of climate change risks	Does not exactly determine the level of investment that I have to make.	86%	NO	H
PC013.4	Determines which segment of the market or social classes that I can serve	Does not influence my decisions to invest in given social classes or market segments.	75%	NO	I
PC013.5	Affect the input side of my production process which can affect my product costing	Has no effect on the input side of the production process.	72%	NO	L
PC013.6	There are alternative response options for me to consider to respond to the risk	There are limited alternatives/response options for me to consider.	75%	NO	I
PC013.7	Having own capacity to respond to the risk, eg. Like the use of innovations in response to the risks	I do not necessarily have the necessary capacity to respond to the risk.	72%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC013.8	Can influence my ability to continue the production of a given product or switching to a new product	Has little effect on my decisions to continue the production of a given product.	81%	NO	H
PC014.1	The occurrence of the risks has an influence on how I have to manage my overall costs in order to meet the market needs	Does not have much or direct effect on the overall costing of my products.	81%	NO	H
PC014.2	Have an influence on the availability of raw materials or sourcing decisions	Does not necessarily affect the input or law material sourcing decisions.	69%	NO	L
PC014.3	Can easily impact the continuity of my business	Not necessarily a threat to my business survival.	78%	NO	H
PC014.4	Can affect the final pricing of my product and its affordability for the Consumers	There are alternatives ways for me to avoid the related cost and therefore may no impact my final pricing.	64%	NO	L
PC014.5	Can affect my supply decisions, how I will supply my final product	Does not have a particular effect on my supply decisions.	75%	NO	I
PC014.6	I can have alternative to deal with the risk when it occurs	There are little of no alternatives to deal with the risk.	75%	NO	I
PC014.7	Can impact the level of revenue that I can be able to generate	Has little or no direct effect on my level of revenue generated.	86%	NO	H
PC014.8	Can easily impact the capacity of my production	Has no direct effect on the capacity of my production.	75%	NO	I
PC015.1	Both have an influence on the way I have to manage the sourcing of my inputs	Has a less influence on my input sourcing decisions.	75%	NO	I
PC015.2	It is possible for me to find solution or alternatives to managing the risk	It is not necessarily within my means to control the risk.	69%	NO	L
PC015.3	The effect on my business can be significant and therefore, I have to find alternative solutions	The effect is not as high, and therefore I am not as bothered to find alternatives.	89%	NO	H

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PC015.4	The response to the risk requires external intervention, like government	The response to the risks can be managed internally without external intervention.	64%	NO	L
PC015.5	Impacts how I will market my products or get them to the final consumers	Does not have any particular impact on my strategies for reaching the final consumers.	89%	NO	H
PC016.1	Their impact on your business is felt more on a short term or is more immediate	The impact takes a bit of time to materialize, more long term.	64%	NO	L
PC016.2	It triggers my preparedness to do something to mitigate other climate change risks	Has less triggering effect on my preparedness to mitigate risks.	64%	NO	L
PC016.3	Can easily affect the quality of my products	Does not necessarily have an effect on the quality of my products.	64%	NO	L
PC016.4	Can affect my ability to meet the needs on my market	Has less or no impact on my ability to meet my market needs.	75%	NO	H
PC016.5	Can affect the available funding that I can use to invest in mitigating the risks	Has no influence on the funds at my disposal for investing in the different risk mitigating action.	67%	NO	I
PC016.6	Within my own control as a company in terms of mitigating the risk	Requires several other external stakeholders to manage the risk.	72%	NO	H
PC016.7	Can affect my ability to invest in other company processes or development projects as the funds will be on climate change risks mitigation	Does not necessarily have an effect on my investment abilities or impact on my funding level.	67%	NO	I
PD001.1	Has an effect on my competitiveness and relevance in the market	Will always happen or change	89%	NO	H
PD001.2	Both have an effect on the quality of my products or plantation	Does not necessarily have an impact on the quality of the products.	72%	NO	I

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD001.3	Money is a fundamental component, therefore has an impact on costing and pricing of the product	The costing can be deferred or not so closely related to the day to day operational costs.	67%	NO	L
PD001.4	Have an influence on my decision on when to sale and not to sale my product or selling decisions	Have no relationship with the selling decisions.	67%	NO	L
PD001.5	Within my own influence	Have little that I can do to influence the status.	75%	YES	I
PD001.6	Have an effect on my day to day production decisions	Has an effect but it is one off or more long term.	78%	NO	H
PD001.7	Both have an effect on the number of competitors on the market	Has no particular connection to the number of players.	83%	NO	H
PD002.1	Have an influence on your resource allocation decisions, and innovation	More long term and does not influence my day to day resource allocation decision.	81%	NO	H
PD002.2	Have a more direct influence on my pricing	Does not necessarily affect my pricing decisions.	86%	NO	H
PD002.3	Influences my production formulas and cost of production	Is important but does not necessarily affect my production costing and formula decisions.	64%	NO	I
PD002.4	Require immediate decision making or response when it occurs	Action can be delayed as its effect is more long term.	86%	NO	H
PD002.5	Have a direct impact on my sales and revenue	It's effect is more slow and gradual in relation to my revenues.	81%	NO	H
PD002.6	Have an influence on my ability to create jobs and the number of people that I can engage in my company	Not necessarily, does not affect my ability to engage people.	92%	NO	H

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD002.7	Both have an implication on both my supply and demand side requiring more intervention from my side	More on the demand side and may change even without my own intervention	58%	NO	L
PD002.8	There is a possibility for me to bargain and influence as an individual or collectively as groups	There is little that I can do to prevent its occurrence	69%	YES	I
PD002.9	Affects the level of my production efficiencies and day to day working capital investment	Is more long term and affects your capital investment.	61%	NO	L
PD003.1	Has a more direct impact on the decision to continue in production	Has an impact but is not as direct as the others.	64%	NO	I
PD003.2	Have a direct effect on the health of the birds	Does not necessarily affect the health of the birds.	61%	NO	L
PD003.3	Has a direct effect on the my production output	The effect is not directly related to my production output.	75%	NO	H
PD003.4	Have a direct effect on production decisions	They do not necessarily contribute to the production decision	75%	NO	H
PD003.5	Have a direct relationship with Company profitability	Has an effect but not closely related to profitability.	64%	NO	I
PD003.6	Related more to the external environment in terms of how the product will be delivered and consumed	Does not necessarily have an effect on how the product will be distributed and consumed	72%	YES	I
PD003.7	Has a high threat to the business and can easily lead to its collapse or closure	Has a threat but does not have a high risk of business closure.	75%	NO	H
PD003.8	More within my ability to manage	Is not easily managed within my own internal abilities.	67%	NO	I
PD003.9	Has an effect on which enterprise to undertake	Has no effect on the decisions on enterprises to consider.	75%	NO	H

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD003.10	You have to get it right from the start if you are to successfully produce. A key driver of production	Not necessarily a factor of production, or a key driver of production.	81%	NO	H
PD004.1	Has an effect on the type, quantity, and quality of the product produced	Doesn't have a direct relationship with the type, quantity and quality of the product produced	78%	NO	H
PD004.2	Has an effect on the price of the end product and therefore the ability of the market to buy the product	Doesn't have a direct relationship with the price of the product produced	75%	NO	I
PD004.3	Have an effect on the skill set of labor that has to be engaged in the production processes	Does not necessarily has a direct relationship with the type of labor force employed in the production process.	69%	NO	I
PD004.4	Affects the accessibility of the product to the end user therefore influence its promotion	Has no direct effect on the accessibility of the product to the end user therefore influence its promotion	75%	NO	I
PD004.5	Within the control or influence of the Company	Not within the control of the company.	56%	NO	L
PD004.6	Considered as incentives for climate change action	Can deter climate change action	64%	NO	L
PD004.7	Has a direct influence budget allocation decisions within the company	Has less influence on the budget allocation decisions with the company.	83%	NO	H
PD004.8	Has a direct impact on the company survival or continuity of a given product. If changes occur, the company must act	Has an effect on the company or product continuity, but company can survive amidst the changes.	75%	NO	I
PD004.9	Can easily be influenced in the short term with short term results	The outcome of actions are more long term.	58%	YES	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD005.1	Have a direct effect on the volume of production. They have a high influence of how much volume that you can produce as a producer	The effect on production volumes is remote.	75%	NO	I
PD005.2	The level of volatility or likelihood of occurrence is high	Take some time to change or occur.	81%	NO	H
PD005.3	Limited control over the risk	Have some control and can do something to mitigate its occurrences.	75%	NO	I
PD005.4	They have a direct relationship with your choice of plant materials to use	It has an influence on planting decisions but not necessarily on the choice of plant materials.	61%	NO	L
PD005.5	Internal to the company and can be controlled internally	These are external to the producer or company and there is not much control over them.	72%	YES	L
PD005.6	The variation within a given period on time is lower	The variation within a given period on time is high	72%	YES	L
PD005.7	The occurrence of the risks or impact requires an immediate response	The response to the risks/impact does not necessarily have to be immediate, it can take some time.	78%	NO	H
PD005.8	Production can continue when the risks materializes	It is not possible to continue with production if the risks materializes.	83%	NO	H
PD006.1	Have an effect on my species selection	Is at the tail end and has not direct effect on my decision on which species choices	61%	YES	L
PD006.2	These risks are more important for consideration while planning the mitigation actions	This has an effect on your financial ability to implement mitigation measures.	67%	NO	I

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD006.3	The effects on my business are more long term and required multi-faceted kind of actions or approach	This has a shorter term or immediate effect on my business and requires immediate action.	64%	YES	I
PD006.4	These are direct spending items and have a direct effect on business cash flow	Its effect is remote and has no immediate effect on business cash flow.	61%	NO	L
PD006.5	The possibility occurrence in more certain or real with a high possibility of occurrence	The occurrence in more uncertain and the likelihood of occurrence is lower.	67%	NO	I
PD006.6	Requires low cost of investment to mitigate or respond to	High cost of capital investment will be required to respond.	61%	NO	L
PD006.7	Can be handled on your own without the engagement of several stakeholders	Is more on a larger landscape and you need several stakeholders to respond	64%	NO	I
PD006.8	Have direct effect on your cost drivers in the business	The effects on the business costs is more remote or indirect.	78%	NO	H
PD006.9	Has a more direct effect on company profitability	The effect on profitability is more remote and may not manifest.	69%	NO	H
PD007.1	It is basically about cost, these drive the cost incurred in the business	Not necessarily having an effect on costing as occurrence is not as frequent.	83%	NO	H
PD007.2	The response to the risks when is occurs must happen rapidly	I can continue in business even when this risk occurs. I can find ways around the risks.	75%	NO	I
PD007.3	These can easily impact my revenue	Does not necessarily affect my revenue or not considered when determining my revenues.	75%	NO	I
PD007.4	Has a very high impact on the survival of my business	I can always find a way around, so business can still continue.	94%	NO	H

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD007.5	Not had an experience of the risk and therefore it has no effect on my response decision	I have experienced the risks and it has had some effect on my response decisions.	94%	NO	H
PD007.6	For me I am in business as long as I can make a profit, these risks impact may profitability	Not necessarily considered on the day to day basis when making decisions impacting my profitability.	75%	NO	I
PD007.7	It is easier for me to respond to the risks when it occurs	The response action is more complex for me.	81%	NO	I
PD007.8	The occurrence of these risks is more predictable, and therefore I can plan ahead how to mitigate or adapt to the risks	It is less predictable and I cannot easily plan how to respond to the risk.	75%	NO	I
PD007.9	I can directly influence the response because it in on my farm	This is external to my farm and therefore I have no direct influence to the required response.	72%	NO	L
PD007.10	Affects the type of interventions or response I have to consider, because of the cost implications	Not one of the considerations made when deciding on the type of interventions or response.	83%	NO	H
PD008.1	The management of one risk has an effect or direct relationship on the management of another	Even when the risk is management, it has no impact on the management of another climate change risk.	81%	NO	H
PD008.2	Has an impact on the sustainability/Continuity of my business	Has little relationship to the survival of my business.	81%	NO	H
PD008.3	Influences the kind of production formula used on my farm and in effect affect the quality of the product on the market	Has no effect on how i produce or the quality of my production.	69%	YES	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD008.4	All impact my cost of production, and therefore push me to find ways to manage my costs	Is not one of the factors considered when determining your cost of production.	69%	YES	L
PD008.5	Affect my decisions on when to sale or the marketing strategies to consider to sale my products	Not part of the issues considered when deciding when to sale or developing my marketing strategies.	72%	YES	I
PD008.6	Have an effect on how much I can invest or the level of investment to be made	Not necessarily a determinant on my ability to invest.	81%	NO	H
PD008.7	Has an effect on the value of my products and therefore affecting your ability to sale and stocking	Has little or no relationship with the value of my product or any influence of my ability to sale and stock/restock	64%	NO	L
PD008.8	Impacts my profitability more directly	Does not necessarily impact my profitability.	75%	NO	I
PD008.9	Influence the kind of land uses to consider	Does not necessarily influence the land uses decision.	81%	NO	H
PD008.10	Has an effect on the kind of technology to consider or response option to respond to Climate change	Does not impact my choice of technology and response options.	72%	NO	I
PD008.11	Directly affect my performance or the level of my production	Minimal or no effect on my performance of level of production.	64%	NO	L
PD009.1	Both have an influence on the choice of plant varieties to consider in response to the given risks	Has no direct influence at the time I make a choice of plant varieties.	67%	NO	I
PD009.2	Have an influence on your choice of planting time	Has no influence on the planting times.	67%	NO	I

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD009.3	Have an influence on my choice of response strategies as any choice depends on the related costs	Has limited or no influence on my choice of response strategies.	78%	NO	H
PD009.4	They have an influence on how I will sale my products or get my products to the customers	Have less relationship with how I plan to sale my products.	64%	NO	L
PD009.5	Have an influence on the level of investment to make for a specific strategy	Not considered as part of investment decision making for specific response strategies.	61%	NO	L
PD009.6	Determines if I should go for a niche market or which market to target	Is not necessarily considered when deciding on which market to consider.	69%	NO	I
PD009.7	Influences how I can package my products suitable for specific markets	Have little relationship with my packaging decisions.	64%	NO	L
PD009.8	Has the ability to affect your ability to continue in that same enterprise or move out to another agriculture enterprise	Is relevant but not necessarily considered when deciding to continue in a given agriculture enterprise.	83%	NO	H
PD009.9	Within my own influence or I can possibly influence	There are several external stakeholders who are involved and therefore not within my own influence.	64%	YES	L
PD010.1	They directly influence the costing decisions in the company	Does not necessarily influence costing decisions in the Company.	83%	NO	H
PD010.2	Has a high impact on production	The impact on production in the short run is mild.	69%	NO	I
PD010.3	They have an effect on the available climate change risk management options as each of the choices has a cost element	Does not necessarily have an influence on the risk response choices.	61%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD010.4	Direct impact on the profitability of the company which is the ultimate target of the business	Does not directly affect profitability.	81%	NO	H
PD010.5	Has an effect on my farm efficiencies and the quality of the end product	Has no relationship with the efficiency and quality of the end product	58%	YES	L
PD010.6	Impacts the output volumes	Has little relationship with the output volumes.	67%	NO	I
PD010.7	Within my own control. Eg. Can delay investment until conditions change	I have no control over the risk, just have to adjust accordingly.	64%	NO	L
PD010.8	Has an impact on how my product reaches the market which results into reduced sales	Has little impact on how the final product reaches the market.	61%	NO	L
PD010.9	Have a direct influence on my investment decisions	The influence on my investment decisions are not immediate or direct.	75%	NO	H
PD010.10	Has a direct effect on my pricing decisions	Does not necessarily impact my pricing decisions in the short run.	69%	NO	I
PD011.1	The two will affect my pricing or the price at which I sell my final product	May not directly affect me as a producer, not felt directly.	75%	NO	I
PD011.2	Have a direct influence on the amount of money I have to invest to produce or to get the final product	Have less effect on my production, I can persevere when it occurs.	83%	NO	H
PD011.3	Have an effect on the quality of my products	Does not have a direct impact on the quality of the producers.	75%	NO	I
PD011.4	Have an effect on the adaptation strategies and options	Has no direct effect on the adaptation options.	86%	NO	H
PD011.5	When the risks or event materializes, I have to respond. There is no other option	When the risks occur, you may delay the response or not even respond.	75%	NO	I
PD011.6	There are available adaptation option on the market to consider within my reach	The response options are not within my own control or reach.	61%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD011.7	Influences quantity of the product	Does not have a close effect on the quantity of my outputs.	83%	NO	H
PD011.8	They have a direct influence on the costing decisions of the Company on the day to day basis	The linkage to costing decisions is not immediate especially for the day to day transactions.	78%	NO	I
PD011.9	Affects the choice of varieties of crops to plant or produce	Has some influence on the choice of varieties of crop, but not necessarily strong.	72%	NO	L
PD011.10	Has an effect on my profitability which can either be negative or positive	Has a negative effect on my profitability	61%	NO	L
PD011.11	Has a more immediate or short-term effect on my production	The effect on my production in more long term or remote.	72%	NO	L
PD012.1	Influence my decision to invest in a particular adaptation measure -	I may not even know about the risk and therefore has no effect on my investment decision in the type of measures to adapt.	81%	NO	H
PD012.2	You can't play with the risk, you either act or you cannot survive in business	You can easily find a way around the impact, or improvise without risking business continuity.	83%	NO	H
PD012.3	This affects how much capital you can or I have to put into a particular response option	Has no particular relationship with the decision on how much capital I have to invest.	72%	NO	I
PD012.4	These both impact my ability to market or on how to access the market for my products. As long as I can sale, then I can consider the response	Has a less effect on my ability to sale my products.	61%	NO	L
PD012.5	Changes with or without my own influence. It is outside my own control	A bit within my control or I can act on the risk and mitigate its impact.	61%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD012.6	Has an effect on my cost of production	Is more long term and has no short term effect on my cost of production.	61%	NO	L
PD012.7	As long as I know I can make profits and recover my money, then I will consider adaptation. In otherwise, has a strong effect on my level of profitability -	Does not affect my level of profitability.	81%	NO	H
PD012.8	Has an effect on how much I can produce or the level of my output	Does not necessarily impact my production levels.	69%	NO	I
PD012.9	Has an effect on my choice of Climate change management options in terms of which one to consider	Has no effect on which climate change management options to consider.	81%	NO	H
PD012.10	It is within government's own mandate to influence appropriate climate change response	Not within specific government mandate to influence appropriate response.	64%	YES	L
PD013.1	I have the ability to respond/control the risk on my own	There is no way I can come in to manage the risk. You can't chip in.	81%	YES	H
PD013.2	There are available response options on the market for me to consider to manage the risk	There is little I can do to manage this risk.	83%	YES	H
PD013.3	The response action requires the input of expert advice available internally	I do not have the appropriate expertise to respond internally.	75%	NO	I
PD013.4	These impact my selling decisions	Has no relationship to my selling decisions.	78%	YES	I
PD013.5	The occurrence of the risk forces you to take action. Action is forced	You can accommodate the impact of the risk.	78%	NO	I
PD013.6	The risk is more volatile in terms of occurrence	More predictable in terms of occurrence.	75%	NO	I
PD013.7	High likelihood of occurrence	Less likely to occur.	69%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD013.8	Has a high impact on my production outputs	Consider the risk to be a better evil, and does not necessarily impact my production output.	72%	YES	L
PD014.1	Affects you for some time but keeps changing. These are more fluid, affect short term decisions	Can affect you more on a long term basis, affects long term decisions	72%	NO	I
PD014.2	Affects my planting season requiring you to plant in a different season	Does not have an effect on my planting seasons.	86%	NO	H
PD014.3	Occurrence is real and happens often	Occurrence is rear and does not happen often. You may not even experience this on your farm	83%	NO	H
PD014.4	Affects me more when planting, therefore affects my decision on how much I can invest	Affects me at the stage of harvesting and no particular connection on the level of investment I can make.	83%	NO	H
PD014.5	Easier to plan an appropriate response decision	Not so easy to deal with the risk.	78%	YES	I
PD014.6	I can lobby and influence an appropriate response	You can only deal with the impacts, you can't stop the occurrence of the risk.	64%	NO	L
PD014.7	Affect my profitability but cannot put me out of business	Can easily put me out of business in case it happens.	72%	NO	I
PD014.8	I have various ways I can deal with the risk, it is within my own control	This is outside my own control or the control of a producer.	67%	NO	L
PD015.1	Everyone in the market is affected by the same risk creating the same playing field	The risk create an unbalanced playing ground as it does not affect every one equally.	72%	NO	I
PD015.2	Affects the decision to continue in production or not	Does not necessarily have an effect on my decisions to continue in production.	69%	NO	L

Construct Code	Emergent Pole	Implicit Pole	%similarity score	Rev.	H-I-L code
PD015.3	Has to be considered to determine the kind of activities to be undertaken in order to manage the risk	Has little or no influence on my decision in terms of the activities I have to undertake to manage the risk.	83%	NO	H
PD015.4	Overall cost related to the risk can be covered in the final pricing	Not necessarily possible to capture this cost in the final pricing	72%	NO	I
PD015.5	It is more difficult to control this risk	I can control the risk or put resources to control the risk.	61%	NO	L
PD015.6	The risk is controlled by a bigger body like government	The risk can be managed or controlled at Farm or Company level.	72%	NO	I
PD015.7	There are already available interventions for the Company to consider on the market	It's more difficult to find alternatives to consider to respond to the risk.	72%	YES	I
PD015.8	Has a direct impact on the level of output/yields on the farm or company and yet this is the main	Does not have any relationship with the level of output/yields on the farm objective of the Company.	69%	NO	L
PD015.9	The occurrence of the risk has a multiplier effect on the occurrence of other risks	The risks is more independent of other risks, therefore has a lower multiplier effect.	72%	NO	I
PD015.10	Has a high influence on my capacity to adopt a specific intervention to respond to the risk	Has little relationship with my ability or capacity to adopt a given intervention.	75%	NO	H

Appendix 8: Constructs by Category and H-I-L ranking

		All Constructs		High Salience Constructs			
CATEGORY	**DEFINITION**	**Construct Number**	**Total constructs**	**Construct Number**	**Total constructs**	**PD**	**PC**
Affects the quality and quantity of production	Production decisions related to quantity, quality and type of product is affected; production volumes are affected; ability to affect what can be produced in terms of production lines	PC001.1, PC002.4, PC003.5, PC004.3, PC005.2, PC006.3, PC006.11, PC007.2, PC008.4, PC008.5, PC008.7, PC009.3, PC010.9, PC011.1, PC012.5, PC013.2, PC014.8, PC016.3, PC016.4, PD001.2, PD001.6, PD002.9, PD003.2, PD003.3, PD003.4, PD003.10, PD004.1, PD005.1, PD008.3, PD008.11, PD009.2, PD010.2, PD010.5, PD010.6, PD011.3, PD011.7, PD012.8, PD013.8, PD014.2, PD015.8	40 14%	PC001.1, PC004.3, PC005.2, PC008.4, PC010.9, PC013.2, PC016.4, PD001.6, PD003.3, PD003.10, PD003.4, PD004.1, PD011.7, PD014.2	14 15%	7 15%	7 14%

		All Constructs		High Salience Constructs			
CATEGORY	**DEFINITION**	**Construct Number**	**Total constructs**	**Construct Number**	**Total constructs**	**PD**	**PC**
Influences marketing decisions	Pricing decisions are affected; how to deliver the product to the final consumer is affected by the risks; the timing of the selling and buying of the products in impacted; marketing approaches need to be reviewed in view of the risks occurring; all producers and processors in the market as affected by the same risks and therefore levelling the playing ground.	PC001.4, PC002.2, PC002.7, PC002.9, PC003.7, PC005.7, PC006.8, PC007.3, PC007.4, PC008.6, PC009.9, PC011.7, PC012.8, PC013.4, PC014.4, PC014.5, PC015.5, PD001.1, PD001.3, PD001.4, PD001.7, PD002.2, PD002.7, PD003.6, PD004.2, PD004.4, PD008.5, PD008.7, PD009.4, PD009.6, PD009.7, PD010.10, PD010.8, PD011.1, PD012.4, PD013.4, PD015.1, PD015.4	38 14%	PC002.2, PC002.7, PC008.6, PC012.8, PC015.5, PD001.1, PD001.7, PD002.2	8 8%	3 6%	5 10%

		All Constructs		High Salience Constructs			
CATEGORY	**DEFINITION**	**Construct Number**	**Total constructs**	**Construct Number**	**Total constructs**	**PD**	**PC**
Capacity to Manage Risks	Possession of the required capacity in terms of personnel and financial resources to put in place strategies to respond to the risk; Not having ownership of the responsibility to respond to the risks when they occurs; within own mandate to manage the risk; can affect the company's capacity to respond; possession of the capacity to influence the others external to the business to respond to the risk.	PC001.3, PC002.5, PC004.7, PC005.9, PC006.7, PC007.8, PC008.10, PC010.11, PC010.2, PC011.5, PC012.7, PC012.9, PC013.7, PC016.6, PD001.5, PD002.6, PD002.8, PD003.8, PD004.3, PD004.5, PD005.3, PD005.5, PD006.7, PD007.7, PD007.9, PD009.9, PD010.7, PD012.5, PD013.1, PD013.3, PD014.5, PD014.6, PD014.8, PD015.10, PD015.5	35 12%	PC007.8, PC008.10, PC016.6, PD002.6, PD013.1, PD015.10	6 6%	3 6%	3 6%

		All Constructs		High Salience Constructs			
CATEGORY	**DEFINITION**	**Construct Number**	**Total constructs**	**Construct Number**	**Total constructs**	**PD**	**PC**
Affects business survival or business continuity	Necessity to respond immediately; Coerced to take action against the risk; it is not possible to continue in business unless action is taken against the risk; Business have to respond to the risk or lose their businesses	PC001.8, PC003.4, PC006.13, PC011.8, PC013.8, PC14.3, PC015.3, PD002.4, PD003.7, PD005.7, PD005.8, PD007.4, PD008.2, PD009.8, PD012.2, PC001.5, PC005.1, PC007.1, PC009.10, PC012.4, PD003.1, PD004.8, PD007.2, PD011.5, PD013.5, PD014.7, PD010.6, PC012.6, PC016.2, PD015.2	30 11%	PC001.8, PC003.4, PC006.13, PC011.8, PC013.8, PC14.3, PC015.3, PD002.4, PD003.7, PD005.7, PD005.8, PD007.4, PD008.2, PD009.8, PD012.2,	15 16%	8 17%	7 14%
Availability of response options	The existence of various climate change response options that businesses can consider to choose from; the choice of an option will be affected by the cost related to adopting the related response option; Manager have technologies, strategies and other options they can choose from to respond to climate change risks.	PC003.6, PC004.1, PC004.2, PC004.5, PC005.6, PC006.4, PC006.5, PC007.6, PC008.1, PC009.4, PC009.5, PC010.5, PC011.6, PC013.6, PC014.6, PC015.2, PD003.9, PD007.10, PD008.10, PD009.3, PD010.3, PD011.4, PD011.6, PD012.9, PD013.2, PD015.3, PD015.7	27 10%	PC004.5, PC006.4, PC006.5, PC008.1, PC009.4, PC009.5, PC011.6, PD003.9, PD007.10, PD009.3, PD011.4, PD012.9, PD013.2, PD015.3	14 15%	7 15%	7 14%

		All Constructs		High Salience Constructs			
CATEGORY	**DEFINITION**	**Construct Number**	**Total constructs**	**Construct Number**	**Total constructs**	**PD**	**PC**
Impacts profitability	The level of profitability of the business is impacted by the occurrence of the risk; business cash flows are affected; profitability is the reason businesses exist and therefore is put into consideration before a response option is chosen	PC001.6, PC002.3, PC002.6, PC003.1, PC005.8, PC008.8, PC009.6, PC010.8, PC011.4, PC012.2, PC014.7, PD002.5, PD003.5, PD006.4, PD006.9, PD007.3, PD007.6, PD008.8, PD010.4, PD011.10, PD012.7	21 7%	PC001.6, PC002.3, PC002.6, PC010.8, PC011.4, PC012.2, PC014.7, PD002.5, PD006.9, PD010.4, PD012.7	11 11%	4 9%	7 14%
Effects on the cost of production	Occurrence of the risk can affect the costs incurred in the production or processing of products; affects business costs; day to day costing decisions for the business are affected	PC002.8, PC003.3, PC004.6, PC005.5, PC006.1, PC006.12, PC007.7, PC009.7, PC010.4, PC011.3, PC012.3, PC013.1, PC014.1, PD002.3, PD006.8, PD007.1, PD008.4, PD010.1, PD011.8, PD012.6	20 7%	PC003.3, PC006.1, PC010.4, PC014.1, PD006.8, PD007.1, PD010.1	7 7%	3 6%	4 8%

		All Constructs		High Salience Constructs			
CATEGORY	**DEFINITION**	**Construct Number**	**Total constructs**	**Construct Number**	**Total constructs**	**PD**	**PC**
Influences investment decisions	The decision to invest in dependent on how much money the business is able to invest in the different response strategies; affects investing decisions in the business; affects the levels of investment; determines what productions line to invest in.	PD008.6, PC004.8, PC006.9, PC007.5, PC008.3, PC009.8, PC010.7, PC013.3, PC016.5, PC016.7, PD002.1, PD004.7, PD006.6, PD009.5, PD010.9, PD011.2, PD012.1, PD012.3, PD014.4	19 7%	PD008.6, PC006.9, PC013.3, PD002.1, PD004.7, PD010.9, PD011.2, PD012.1, PD014.4	9 9%	7 15%	2 4%
Impacts production inputs	Ability to access quality inputs is affected; the quality of inputs is compromised as a result of the risks occurring; processors can use low quality inputs in order to manage the impacts of the risks thus affecting the quality of the final product; the production inputs can become more scarce; sources of production	PC001.7, PC003.2, PC005.3, PC008.2, PC009.1, PC010.10, PC012.1, PC013.5, PC014.2, PC015.1, PD005.4, PD006.1, PD008.9, PD009.1, PD011.9	15 5%	PC009.1, PC012.1, PD008.9	3 3%	1 2%	2 4%

		All Constructs		High Salience Constructs			
CATEGORY	**DEFINITION**	**Construct Number**	**Total constructs**	**Construct Number**	**Total constructs**	**PD**	**PC**
	of processing inputs are affected.						
Predictability	It is easy to predict the occurrence of the risk; the business manager has the capacity to predict the occurrence of the risk; the business has experienced similar risks and is able to predict the patterns of it's occurrence; occurrence is more real or certain; volatility or likelihood of occurrence is considered high.	PC001.2, PC004.4, PC005.4, PC010.3, PC011.9, PD005.2, PD005.6, PD006.5, PD007.8, PD013.6, PD013.7, PD014.3	12 4%	PC004.4, PC005.4, PC011.9, PD005.2, PD014.3	5 5%	2 4%	3 6%

		All Constructs		High Salience Constructs			
CATEGORY	**DEFINITION**	**Construct Number**	**Total constructs**	**Construct Number**	**Total constructs**	**PD**	**PC**
External stakeholder influence	Collective efforts required to address or respond to the risk; the responsibility to respond to the risks in not on the company alone but also the external other external parties; the mandate to manage the risks in with external parties external to the business; a successful response is dependent on the business managers power to influence other external parties.	PC001.9, PC004.9, PC006.2, PC006.10, PC006.14, PC008.9, PC009.2, PC011.2, PC015.4, PD012.10, PD015.6	11 4%	PC009.2	1 1%	0	1 2%
Immediate or short term effects	The risk impact is expected to be immediate; The time horizon is important in defining impact and expected action; the risk is more fluid or volatile; affects both short term and long	PC002.1, PC016.1, PD004.9, PD006.3, PD011.11, PD014.1	6 2%				

		All Constructs		High Salience Constructs			
CATEGORY	**DEFINITION**	**Construct Number**	**Total constructs**	**Construct Number**	**Total constructs**	**PD**	**PC**
	term business decisions.						
Miscellaneous	Defines the level of importance of the risk in influencing the manager's actions to respond to a given risk	PC006.6, PC010.1, PD004.6, PD006.2	4 1%	PC010.1	1 1%	0	1 2%
Multiplier effect	The occurrence of one risks or it's management can have an effect on the occurrence of another climate change risk.	PD008.1, PD015.9	2 1%	PD008.1	1 1%	1 2%	0
Past experience	Past experience of the manager is considered relevant in determining risks response action	PD007.5	1 0.1%	PD007.5	1 1%	1 2%	0
			281		96	47	49

Appendix 9: Constructs with high salience as per H-I-L scores.

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
Affects business survival or business continuity	Necessity to respond immediately; coerced to take action against the risk; it is not possible to continue in business unless action is taken against the risk; Business have to respond to the risk or lose their businesses	PC001.8	Have a direct effect of the Company's cash flow or ability to survive	Has a close relationship to the Company's survival or cash flow.	81%	9	6
		PC003.4	Its occurrence may cripple my production and affect my business continuity	I can survive even with the risks materializing	86%		
		PC006.13	Have a very immediate adjustment requirement	Takes time to adjust and does not have an immediate adjustment requirement.	86%		
		PC011.8	I either respond to the risks or I cannot continue in business	Does not necessarily have a high impact on my business survival.	89%		
		PC013.8	Can influence my ability to continue the production of a given product or switching to a new product	Has little effect on my decisions to continue the production of a given product.	81%		
		PC014.3	Can easily impact the continuity of my business	Not necessarily a threat to my business survival.	78%		
		PC015.3	The effect on my business can be significant and	The effect is not as high, and therefore I	89%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
			therefore, I have to find alternative solutions	am not as bothered to find alternatives.			
		PD002.4	Require immediate decision making or response when it occurs	Action can be delayed as its effect is more long term.	86%		
		PD003.7	Has a high threat to the business and can easily lead to its collapse or closure	Has a threat but does not have a high risk of business closure.	75%		
		PD005.7	The occurrence of the risks or impact requires an immediate response	The response to the risks/impact does not necessarily have to be immediate, it can take some time.	78%		
		PD005.8	Production can continue when the risks materializes	It is not possible to continue with production if the risks materializes.	83%		
		PD007.4	Has a very high impact on the survival of my business	I can always find a way around, so business can still continue.	94%		
		PD008.2	Has an impact on the sustainability/Continuity of my business	Has little relationship to the survival of my business.	81%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
		PD009.8	Has the ability to affect your ability to continue in that same enterprise or move out to another agriculture enterprise	Is relevant but not necessarily considered when deciding to continue in a given agriculture enterprise.	83%		
		PD012.2	You can't play with the risk, you either act or you cannot survive in business	You can easily find a way around the impact, or improvise without risking business continuity.	83%		
Affects the quality and quantity of production	Production decisions related to quantity, quality and type of product is affected; production volumes are affected; ability to affect what can be produced in terms of production lines	PC001.1	They directly affect my production operations and decisions	More less on a higher level and may take some time to affect my operations	81%	7	7
		PC004.3	There is a high impact on my level of productivity and therefore impacting your ability to meet your client targets	Has less or low likelihood to affect my level of productivity.	75%		
		PC005.2	Can easily affect my level of productivity	The risk does not necessarily affect the level of production.	69%		
		PC008.4	The possibility to influence my ability to satisfy my Customers	Not likely to impact my ability to satisfy my customers.	86%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
		PC010.9	Can affect my decision to switch or diversify into different production lines or even completely terminating production of a given product	Has little of no effect on my decisions to diversify or remain in the production of a given product.	81%		
		PC013.2	Impacts the quantity and the quality of the product that I can be able to produce	Has little or no relationship to the quality and quantity of the product that I can produce.	83%		
		PC016.4	Can affect my ability to meet the needs on my market	Has less or no impact on my ability to meet my market needs.	75%		
		PD001.6	Have an effect on my day to day production decisions	Has an effect but it is one off or more long term.	78%		
		PD003.3	Has a direct effect on the my production output	The effect is not directly related to my production output.	75%		
		PD003.4	Have a direct effect on production decisions	They do not necessarily contribute to the production decision	75%		
		PD003.10	You have to get it right from the start if you are to successfully produce. A key driver of production	Not necessarily a factor of production, or a key driver of production.	81%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
		PD004.1	Has an effect on the type, quantity, and quality of the product produced	Doesn't have a direct relationship with the type, quantity and quality of the product produced	78%		
		PD011.7	Influences quantity of the product	Does not have a close effect on the quantity of my outputs.	83%		
		PD014.2	Affects my planting season requiring you to plant in a different season	Does not have an effect on my planting seasons.	86%		
Availability of response options	The existence of various climate change response options that businesses can consider of choose from; he choice of an option will be affected by the cost related to adopting the related response option; Manager have technologies, strategies and other options then can choose	PC004.5	There are available alternatives to consider on the market to respond to the risks	It is more challenging to manage the risk as there are limited or no alternatives to consider on the market to respond to the risk.	75%	7	7
		PC006.4	There are already available alternatives to deal with the risk	The options to deal with the risks are limited or not available.	83%		
		PC006.5	I can easily influence the choice of response options to consider	I have no role in influencing the choice of response decisions to consider.	81%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
	from to respond to climate change risks.	PC008.1	I look at minimizing the cost of production, the cost effectiveness of the option, and therefore affects my choice of options	Has less influence of my choice of response options that I have to consider.	86%		
		PC009.4	Triggers innovation in the Company in order to find an appropriate response	Requires maintenance of the traditional way of doing business and not necessarily new innovations.	94%		
		PC009.5	Certain interventions may not be effectively considered, unless the risks is considered therefore affecting the kind of interventions I can consider	Does not necessarily affect the type or kind of interventions I can consider.	92%		
		PC011.6	There are available options for me to consider in response to the risk	There is little I can to in response to the risk.	83%		
		PD003.9	Has an effect on which enterprise to undertake	Has no effect on the decisions on enterprises to consider.	75%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
		PD007.10	Affects the type of interventions or response I have to consider, because of the cost implications	Not one of the considerations made when deciding on the type of interventions or response.	83%		
		PD009.3	Have an influence on my choice of response strategies as any choice depends on the related costs	Has limited or no influence on my choice of response strategies.	78%		
		PD011.4	Have an effect on the adaptation strategies and options	Has no direct effect on the adaptation options.	86%		
		PD012.9	Has an effect on my choice of Climate change management options in terms of which one to consider	Has no effect on which climate change management options to consider.	81%		
		PD013.2	There are available response options on the market for me to consider to manage the risk	There is little I can do to manage this risk.	83%		
		PD015.3	Has to be considered to determine the kind of activities to be undertaken in order to manage the risk	Has little or no influence on my decision in terms of the activities I have to	83%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
				undertake to manage the risk.			
Impacts profitability	The level of profitability of the business is impacted by the occurrence of the risk; business cash flow are affected; profitability is the reason businesses exist and therefore is put into consideration before a response option is chosen	PC001.6	All related to operational costs and have direct effect on company profitability	Has no direct effect on Company profitability in the short run.	86%	4	7
		PC002.3	Have a close effect on my cash flow in the business	Product can be stored for a longer time and redistributed later when the distribution infrastructure improves, therefore the business cash flow challenge can be differed.	81%		
		PC002.6	Have an immediate effect on the profit margin	Does not affect profit margins because the cost can be spread over a longer period of time.	86%		
		PC010.8	Has a high impact on my costing and therefore my profitability	One off and therefore may not necessarily impact my day to day costing decisions.	83%		
		PC011.4	Can have an effect on the level of profitability of the business	The effect on my profitability is not as high.	83%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
		PC012.2	They have a high bearing on my level of profitability	Is important but not one of the first consideration when taking decisions related to profitability	69%		
		PC014.7	Can impact the level of revenue that I can be able to generate	Has little or no direct effect on my level of revenue generated.	86%		
		PD002.5	Have a direct impact on my sales and revenue	It's effect is more slow and gradual in relation to my revenues.	81%		
		PD006.9	Has a more direct effect on company profitability	The effect on profitability is more remote and may not manifest.	69%		
		PD010.4	Direct impact on the profitability of the company which is the ultimate target of the business	Does not directly affect profitability.	81%		
		PD012.7	As long as I know I can make profits and recover my money, then I will consider adaptation. In otherwise, has a strong effect on my level of profitability	Does not affect my level of profitability.	81%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
Influences investment decisions	The decision to invest in dependent on how much money the business is able to invest in the different response strategies; affects investing decisions in the business; affects the levels of investment; determines what productions line to invest in.	PC006.9	Has a direct effect on how I choose to use my funds	Does not have a direct influence on how I decide to invest my funds or the magnitude of investment.	89%	7	2
		PC013.3	Affects how much I can be able to invest in the product as a result of climate change risks	Does not exactly determine the level of investment that I have to make.	86%		
		PD002.1	Have an influence on your resource allocation decisions, and innovation	More long term and does not influence my day to day resource allocation decision.	81%		
		PD004.7	Has a direct influence budget allocation decisions within the company	Has less influence on the budget allocation decisions with the company.	83%		
		PD008.6	Have an effect on how much I can invest or the level of investment to be made	Not necessarily a determinant on my ability to invest.	81%		
		PD010.9	Have a direct influence on my investment decisions	The influence on my investment decisions are not immediate or direct.	75%		
		PD011.2	Have a direct influence on the amount of money I have to invest to	ave less effect on my production, I can	83%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
			produce or to get the final product	persevere when it occurs.			
		PD012.1	Influence my decision to invest in a particular adaptation measure	I may not even know about the risk and therefore has no effect on my investment decision in the type of measures to adapt.	81%		
		PD014.4	Affects me more when planting, therefore affects my decision on how much I can invest	Affects me at the stage of harvesting and no particular connection on the level of investment I can make.	83%		
Influences marketing decisions	Pricing decisions are affected; how to deliver the product to the final consumer is affected by the risks; the timing of the selling and buying of the products in impacted; marketing approaches need to be reviewed in view of the risks	PC002.2	Have a close relationship to my selling and buying decision	Can be in place but does not necessarily influence my buying and selling decisions because of the free economy in the Country.	83%	3	5
		PC002.7	Have a direct relationship on my pricing decisions	This has no connection to internal decisions on pricing.	81%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
	occurring; all producers and processors in the market as affected by the same risks and therefore levelling the playing ground.	PC008.6	Can easily impact the pricing of my final product. If the response option can help to lower the pricing of the product, then we will go for that	Has no direct effect on my product costing and therefore pricing.	78%		
		PC012.8	Has an influence on how I have to market my final products	No much linkage to my marketing decisions.	75%		
		PC015.5	Impacts how I will market my products or get them to the final consumers	Does not have any particular impact on my strategies for reaching the final consumers.	89%		
		PD001.1	Has an effect on my competitiveness and relevance in the market	Will always happen or change	89%		
		PD001.7	Both have an effect on the number of competitors on the market	Has no particular connection to the number of players.	83%		
		PD002.2	Have a more direct influence on my pricing	Does not necessarily affect my pricing decisions.	86%		
Effects on the cost of production	Occurrence of the risk can affect the costs incurred in the production or	PC003.3	Have a more direct impact on my cost of production	No relationship to my cost of production.	92%	3	4

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
	processing of products; affects business costs; day to day costing decisions for the business are affected	PC006.1	Have a high implication on the cost which is a key driver my response decisions	The effect is slower and has a longer-term implication on the business costs.	81%		
		PC010.4	Directly impacts my production costs therefore requiring me to consider option to reduce these costs	Has little or no impact on my production costs.	81%		
		PC014.1	The occurrence of the risks has an influence on how I have to manage my overall costs in order to meet the market needs	Does not have much or direct effect on the overall costing of my products.	81%		
		PD006.8	Have direct effect on your cost drivers in the business	The effects on the business costs is more remote or indirect.	78%		
		PD007.1	It is basically about cost, these drive the cost incurred in the business	Not necessarily having an effect on costing as occurrence is not as frequent.	83%		
		PD010.1	They directly influence the costing decisions in the company	Does not necessarily influence costing decisions in the Company.	83%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
Capacity to Manage Risks	Possession of the required capacity in terms of personnel and financial resources to put in place strategies to respond to the risk; Not having ownership of the responsibility to respond to the risks when they occurs; within own mandate to manage the risk; can affect the company's capacity to respond; possession of the capacity to influence the others external to the business to respond to the risk.	PC007.8	I can easily find a way around the risk if it occurs	This is not necessarily within my control.	100%	3	3
		PC008.10	I have to look at my capacity and ask myself if I have the capacity to implement an appropriate response	Not within my capacity to implement an appropriate response.	100%		
		PC016.6	Within my own control as a company in terms of mitigating the risk	Requires several other external stakeholders to manage the risk.	72%		
		PD002.6	Have an influence on my ability to create jobs and the number of people that I can engage in my company	Not necessarily, does not affect my ability to engage people.	92%		
		PD013.1	I have the ability to respond/control the risk on my own	There is no way I can come in to manage the risk. You can't chip in.	81%		
		PD015.10	Has a high influence on my capacity to adopt a specific intervention to respond to the risk	Has little relationship with my ability or capacity to adopt a given intervention.	75%		
Predictability	It is easy to predict the occurrence of the risk; the business manager has the capacity to predict the occurrence of the risk; the	PC004.4	Is more complex and the likelihood of reoccurrences is high	One off and with a less likelihood of reoccurrence.	72%	2	3
		PC005.4	Has a high likelihood of it occurring and	Has a low likelihood of occurrence.	69%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
	business has experienced similar risks and is able to predict the patterns of it's occurrence; occurrence is more real or certain; volatility or likelihood of occurrence is considered high.		therefore impacting my business				
		PC011.9	The occurrence of the risk is more predictable, and therefore I can think ahead how to respond	It is difficult to predict the occurrence of the risk and therefore to think ahead how to manage it.	83%		
		PD005.2	The level of volatility or likelihood of occurrence is high	Take some time to change or occur.	81%		
		PD014.3	Occurrence is real and happens often	Occurrence is rear and does not happen often. You may not even experience this on your farm	83%		
Impacts production inputs	Ability to access quality inputs is affected; the quality of inputs is compromised as a result of the risks occurring; the production inputs can become more scarce; sources of production of processing inputs are affected.	PC009.1	Affects the quality of the inputs I can use in the production of my final products	It's an end result and has no or less effect on the determination of the quality of my inputs.	89%	1	2
		PC012.1	Has a high bearing on how and where to source my inputs	A little or no effect on how I source my inputs.	75%		
		PD008.9	Influence the kind of land uses to consider	Does not necessarily influence the land uses decision.	81%		

Category	Definition	Construct code	Emergent Pole	Implicit Pole	%similarity score	PD	PC
External stakeholder influence	Collective efforts required to address or respond to the risk; the responsibility to respond to the risks in not on the company alone but also other external parties; the mandate to manage the risks is with external parties to the business; a successful response	PC009.2	Requires negotiations or lobby with external stakeholders in order to respond to the risk	Does not necessarily require engagement of external stakeholders in order to respond to the risk.	86%	0	1
Multiplier effect	The occurrence of one risks or it's management can have an effect on the occurrence of another climate change risk.	PD008.1	The management of one risk has an effect or direct relationship on the management of another	Even when the risk is management, it has no impact on the management of another climate change risk.	81%	1	0
Past experience	Past experience of the manager is considered relevant in determining risks response action	PD007.5	Not had an experience of the risk and therefore it has no effect on my response decision	I have experienced the risks and it has had some effect on my response decisions.	94%	1	0
Miscellaneous	Defines the level of importance of the risk in influencing the manager's actions to respond to a given risk	PC010.1	Influences my decision to adopt a given climate friendly strategy or response	Does not necessarily impact my decisions to adopt a given climate friendly strategy.	75%	0	1

Appendix 10: Fist attempt categorization with all the categories

	Researcher			Collaborator	
No.	**Categories**	**Freq. Of Constructs**	**No.**	**Categories**	**Freq. of Constructs**
1	Manageable through Pricing	11	1	Final pricing of products	12
2	Production costing considerations	20	2	Cost of production	12
3	Within own control	36	3	Impact is within my control / influence	16
4	External role in risk control	9	4	External influence of the stakeholders	4
			5	Aggregation of efforts with others to manage the risks	15
			6	Input of internal expertise	2
			7	Government influence	2
5	Market accessibility	7	8	Product delivery	3
6	Impact on production capacity	28	9	Level of production / productivity	13
7	Multiplier effect	2	10	Multiplier effect	2
8	Business continuity	20	11	Threat to Business survival	6
			12	Influence of sustainability / continuity of the business	5
9	Influence on the type of response strategy	16	13	Influence the choice of response	**5**
10	Coarsed to act	8	14	Forced action	1
11	Long or Short-term effects	4	15	Immediate or short-term affect	9
12	Marketing decisions	23	16	Buying and selling decisions	5
13	Volatility or Predictability of the risk	12	17	Predictability of the risks in business	11
14	Production quality	11	18	Type, quality and quantity of products	3
15	Profitability Consideration	20	19	Profitability	18
16	Past experience of the risks	1	20	No experience about the risk	1

17	Sourcing Decisions	6	21	Where and how to source inputs	3
18	Availability of response options	18	22	Alternatives to manage the risks	9
			23	Selecting response strategies / adaptation strategies	4
19	Level of Investment	23	24	Cost of choice of climate change risk management	3
	Total	**275**			**164**
20	Agency of Actions	6	25	Climate friendly strategy	1
			26	Capacity to implement	2
			27	Skilled labour	1
			28	Market needs	18
			29	Quality of products	8
			30	Impact is outside my control / influence/ volatile	8
			31	Create jobs	1
			32	Planting season	2
			33	Influence on cash flow	3
			34	Effect on the health of the birds	1
			35	Effect on the species selection	1
			36	Time factor	2
			37	Incentives	1
			38	Power to bargain	1
			39	New innovations / Resource allocation	4
			40	Activities undertaken to manage the risks	1
			41	Customer satisfaction	4
			42	Materialization of risks/ events	2
			43	Quality inputs	5
			44	Cost of business	7
			45	Personal preparedness to	6

				mitigate climate change risks	
			46	Influence of funds in risk mitigation / management	5
			47	Technology in climate change	3
			48	Interventions	9
			49	Output volumes / level of output	4
			50	Crop varieties to plant	3
			51	Processing costs	1
			52	Availability of raw materials	1
			53	Business environment	3
			54	Level of revenue	5
			55	Adjustment requirement	1
			56	Land uses	1
			57	Method of processing	1
			58	Planning mitigation actions	1
	Total Constructs	**281**			**281**

Appendix 11: Key informant concerns Vs. Business manager concerns for climate change risk response

Key Informant No.	Suitable Business manager response Category	Responses
K1	External stakeholder influence	K.1.i - Policies are more punitive with no proper description of what the end user benefits out of the said policies.
	External stakeholder influence	K.1.ii - There is a lack of appropriate incentives to encourage voluntary policy implementation.
	Impacts profitability	K.1.iii - The private sector is more motivated by profitability
	External stakeholder influence	K.1.iv- Policies should be reviewed to include 'benefits for compliance' as this will attract more the private sector.
	Impacts profitability	K.1.v - Attach monetary value to climate change policy implementation.
	External stakeholder influence	K.1.vi -Need to promote business groupings to correctively develop mitigation strategies.
	External stakeholder influence	K.1.vii - The policies are not well localized to the lower level implementers, they are more academic and with legal jargons which affects implementation.
K2	External stakeholder influence	K.2.i - Corruption is affecting implementation of the national policies
	Impacts profitability	K.2.ii - Private sector are more interested in profits and not concerned about the effect of their actions on the climate.
	External stakeholder influence	K.2.iii - Government has not appropriately engaged the private sector yet they are propellers of climate change policy implementation
	Influences investment decisions	K.2.iv - Government has not invested in climate change policy implementation.
	External stakeholder influence	K.2.v- Implementation is affected by lack of ownership and proper dissemination. Only technocrats in the City Centre offices are consulted
	External stakeholder influence	K.2. vi - Lack of appropriate stakeholder mapping

Key Informant No.	Suitable Business manager response Category	Responses
	External stakeholder influence	K.2. vii - Custodian of the policies among the different government agencies is an issue due to conflicting financial interests.
	External stakeholder influence	K.2. viii - Too many policies not communicating to each other and making it difficult to enforce them.
	External stakeholder influence	K.2.ix - A lot of taxes that constrain the private sector from implementing the required mitigation measures.
	External stakeholder influence	K.2.x - A lot of informal private sector, making it difficult to enforce policies.
	Impacts profitability	K.2.xi - Sensitivity to profitability by the private sector. Can't invest where they will not earn returns.
	External stakeholder influence	K.2.xii - The technical people who formulate the policies are not necessarily the decision makers. The owners of businesses are and therefore have the final decision on what can be implemented.
K. 3	External stakeholder influence	K.3.i. - Little participation of the private sector in climate change policy formulation.
	Influences investment decisions	K..3.ii - Policy formulation is mainly foreign funded and there is lack of appropriate government financing.
	External stakeholder influence	K.3.iii - There is still a lack of appropriate sensitization for the private sector to have a mindset change, there is still a lack of appreciation of the need to manage climate change risks by the private sector.
	Influences investment decisions	K.3.iv - Implementation is still seen as a burden and do not see a reason to invest in it.
	External stakeholder influence	K.3.v - Need for more incentives
	External stakeholder influence	K.3.vi - Private sector still needs to be sensitized on the negative impacts of climate change.

Key Informant No.	Suitable Business manager response Category	Responses
	External stakeholder influence	K.3.vii - Have to clearly show the benefits of implementing the climate change strategies to the private sector.
K. 4	Capacity to Manage Risks	K.4.i - Lack of capacity to develop climate change policies internally.
	External stakeholder influence	K.4.ii - Lack of appropriate mechanisms to mainstream climate change in plans and budgets
	Capacity to Manage Risks	K.4.iii - Lack of appropriate technical and financial capacity to implement
	External stakeholder influence	K.4.iv - Climate financing is left to local government budgets which are already in deficit.
	Capacity to Manage Risks	K.4.v - Funding not accessible by the private sector.
	Capacity to Manage Risks	K.4.vi - Lack of appropriate training on climate change.
	External stakeholder influence	K.4.vii - Lack of sensitization on the risks and opportunities
	Effects on the cost of production	K.4.viii - Private sector looks at it as an additional cost.
	External stakeholder influence	K.4. ix - Private sector have the resources but are not reached
K. 5	External stakeholder influence	K.5.i - Creating incentives to attract private sector investments
	External stakeholder influence	K.5.ii - Access to new technology
	External stakeholder influence	K.5. iii - Appropriate sensitization
	External stakeholder influence	K.5.iv - Use private sector forums