Results-based monitoring and evaluation for the Africa Climate Smart Agriculture Alliance

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DECLARATION

I declare that this thesis/dissertation titled 'Results-based monitoring and evaluation for the Africa Climate Smart Agriculture Alliance' is my own, unaided work. I have acknowledged and referenced all sources that I have used and quoted. I hereby submit it in partial fulfilment of the requirements of the degree of Master of Management (Public sector monitoring and evaluation) in the University of the Witwatersrand, Johannesburg. I have not submitted this report before for any other degree or examination to any other institution.

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ABSTRACT

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Little is known about Climate Smart Agriculture Results Based Monitoring and Evaluation (CSA RBM&E) frameworks that are essential for measuring the outcomes and impacts of interventions like Climate Smart Agriculture. FAO (2013) and Sanahuja (2011) outline that measuring climate change related initiatives like CSA is a highly complex and contended issue. There is no single approach in assessment, monitoring and evaluation of climate change interventions like Climate Smart Agriculture. The purpose of the research was therefore to analyse different types of climate change related monitoring and evaluation frameworks and recommend a Climate Smart Agriculture results-based monitoring and evaluation framework for the NEPAD International Non-Governmental Organisations (iNGO) Africa Climate Smart Agriculture Alliance. A qualitative research approach within a case study design was utilised for the study. Fifteen key informants who are experts in development work, climate change, climate smart agriculture, agriculture and monitoring and evaluation were interviewed. The data generated from the respondents show that CSA impacts, outcomes and outputs are anchoring on five distinct key result areas that may be measured by use of proxy indicators. The key results areas are the concepts underlying the development of CSA results-based monitoring and evaluation framework and are proxies for adaptation or resilience and mitigation hence the need to measure them through proxy indicators. The concepts are agriculture productivity, environmental health, economic stability, policy integration and social stability.

Key Word: Climate Change, Climate Smart Agriculture, Monitoring, Evaluation Frameworks.

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1 INTRODUCTION TO THE RESEARCH

1.1 Introduction

This study seeks to analyse different types of Climate Smart Agriculture (CSA) Monitoring & Evaluation (M & E) frameworks and determine which measurement parameters will assist to develop the most relevant Climate Smart Agriculture Monitoring and Evaluation Framework for the NEPAD International Non-Governmental Organisations (iNGO) Africa Climate Smart Agriculture Alliance which will be referred to as the Alliance in this report.

Globally, climate change has become one of the major threats to human existence, particularly in Africa. Africa will be the hardest hit continent by the effects of climate change due to its low adaptive capacity which is exacerbated by high poverty levels and low levels of development (AMCEN, 2010; Boko et al., 2007). Agriculture, which is the backbone of Africa's economy, will be greatly affected by climate change. Climate models predict that by 2020, agricultural yields will have dropped by 50% resulting in widespread food insecurity (AMCEN, 2007; Boko et al., 2007; IPCC, 1998).

For some years, global attention has been building on the links between agriculture and climate change, with debates building momentum within the United Nations Framework Convention on Climate Change (UNFCCC) and outside. At the United Nations Framework Convention on Climate Change Conference of the Parties (CoP17) in Durban, South Africa, parties agreed to make agriculture an agenda item in the Subsidiary Body for Scientific and Technical Advice, moving it from the Working Group on Long-term Cooperative Action(LCA) discussions (FAO, 2010). The significance of this move from Working Group on Long-term Cooperative Action to Subsidiary Body for Scientific and Technical Advice was that agriculture could be explored in a more politically neutral environment, by focusing on the scientific and technical aspects of the sector in relation to climate change (CGIAR, 2013).

Worldwide, several organisations, influenced by the United Nations Framework Convention on Climate Change have come up with interventions like Climate Smart Agriculture (CSA) in a bid to combat climate change. Climate Smart Agriculture alliances are being formed in some parts of the world including in Africa, to pull together efforts of a range of organisations working on agriculture and climate change into a common goal of ensuring food security, contributing to mitigation and adaptation to climate change (UN, 2014). These include the Global Alliance for

Climate Smart Agriculture, the NEPAD-led Africa Climate Smart Agriculture Alliance and the North American Climate Smart Agriculture Alliance (UN, 2014). However, literature shows that little is known around Climate Smart Agriculture Results Based Monitoring and Evaluation (CSA RBM&E) frameworks that are essential for measuring the outcomes and impacts of interventions like Climate Smart Agriculture. Climate Smart Agriculture results-based monitoring and evaluation is also key to the establishment of a results-based funding mechanism which the Alliance wants to use as a basis for funding Climate Smart Agriculture projects (FAO, 2013; Kusek and Rist, 2014).

1.2 Background

The section provides detail on agriculture's contribution to the African economy. It also gives an overview of agriculture's performance in the continent with a particular focus on smallholder farmers. It further gives an overview of the evolution of agriculture from the Green Revolutions of the 20th century to Climate Smart Agriculture in the 21st century. The section provides the definitions of climate change, the effects of the phenomenon globally and particularly in the African agricultural sector. It further defines Results Based Monitoring and Evaluation, Climate Smart Agriculture and the challenges of monitoring and evaluating this intervention. Finally, an overview of the Alliance is provided.

1.2.1 Agriculture's Contribution to the African Economy

Agriculture remains the pillar of the African economy. In Sub-Saharan Africa, agriculture accounts for about a third of the Gross Domestic Product (GDP) and employs 65% of Africa's labour force (World Bank, 2008). Smallholder farmers, that is, those with 2 hectares of land and less, represent 80% of the total farms in Sub-Saharan Africa. They supply about 80% of the food in Africa and subsidise up to 90% of the total GDP in some countries (AGRA, 2014; Wiggins, 2009; Wiggins and Sharada, 2013).

Labour productivity in agriculture has stayed low in Sub-Saharan Africa. Evidence from data collected from 2008 to 2014 gives an indication that 34 countries in Sub-Saharan Africa are at an average of US$ 318 value added per worker, which is about a third of the world average of US$ 1,000 during the same period (AGRA, 2014). The situation of low productivity in agriculture contributes immensely to rural poverty as it converts to less than US$ 1 per day (Rosen and Shapouri, 2012). Sub-Saharan Africa is high ranking in terms of poverty and undernourishment; the ratio of people living below the poverty line in Sub-Saharan Africa is at 53% coupled with the proportion of 30% undernourished people by 2010 (AGRA, 2014).

AGRA (2014) highlights that smallholder agriculture systems are characterised by small-scale holdings of 2 hectares and less. Smallholder farmers make use of simple and basic technologies for their agricultural practices resulting in low returns with high labour variations per season. Women play a pivotal role in the production systems. However, smallholder farmers differ in characteristics from place to place. Farm sizes, resource allocation for consumption and cash crops, livestock and other external activities, use of hired labour and inputs, the ration of crops sold and household spending habits differ from farmer to farmer (AGRA, 2014).

A number of smallholder farmers in Sub-Saharan Africa integrate crop farming with livestock (PPLIPI, 2005). AGRA (2014) states that livestock has been one agricultural commodity that plays a pivotal role in poverty reduction in Sub-Saharan Africa. It has proved to increase food supplies, serve as savings and as a source of income, capital, generates work and can be a buffer for the supply of inputs and other on-farm services for crop production. In integrated farming, livestock has proved to reduce the risks associated with climate variation that may affect seasonal crop production as they contribute to the diversification of production thus adding to the availability of alternative sources of livelihoods for smallholder farmers (AGRA, 2014).

1.2.2 Defining Climate Change

There are two main institutions in the field of climate change that have endeavoured to define climate change and these are the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC). Both institutions define climate change as climatic changes that occur as a result of natural changes or human activity. The Intergovernmental Panel on Climate Change (2007:30) defines climate change as any change in climate over time, whether due to natural variability or as a result of human activity. The United Nations Framework Convention on Climate Change (Article 1:3) defines it as:

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

The natural causes of climate change include external factors that are outside the climate system like variations in volcanic activity, solar output, and the earth's orbit around the sun that influence greenhouse composition in the atmosphere (Government of Canada, 2013). Causes arising from human activity include the burning of fossil fuels and the conversion of land for

forestry and agriculture; these also contribute to greenhouse gas emissions that precipitate climate change (Government of Canada, 2013).

The analytical focus of this study will be based on climate change resulting from human activity. The study will focus on agriculture, specifically Climate Smart Agriculture with attention to results-based monitoring and evaluation frameworks for Climate Smart Agriculture. The term 'results-based monitoring and evaluation' is used to mean clearly identifying problems and opportunities and clearly defining programme and project beneficiaries (Spreckley, 2009). The term connotes the setting of clear and agreed upon objectives and setting up of systems to monitor the set targets and achievement of milestones (Spreckley, 2009). Of importance is to note that in this context, 'results' mean that monitoring is focused on the achievement of higher level outcomes and not activities and outputs (Spreckley, 2009). Kusek and Rist (2004: 15) compliment Spreckley (2009) by outlining that results-based systems intend to answer the "so what" question. Results-based systems intend to identify the goals of an organisation and to check if they are being achieved and provide evidence of achievement.

1.2.3 The Effects of Climate Change Globally and in Africa

Climate Change has been ranked as one of the top human crises of the 21st century (Tadesse, 2010) and will have negative impacts on ecosystems that are crucial to the functions of nature and food production and consequently affect the survival of humanity all over the world (IPCC, 1998). Globally, 800 million people are malnourished. This number might increase in the next two to three decades because of reduction in food production due to climate change and an increase in population growth (IPCC, 1998). The current food crisis is already putting pressure on the ecosystems as people unsustainably exploit land for agricultural production in a bid to meet the food demands of an increasing population (IPCC, 1998). Evidence shows that Africa will be the hardest hit continent by the effects of Climate Change (Boko et al., 2007).

The African population, its governments and the African Union are grappling with the challenges of Climate Change (Tadesse, 2010). A number of climate models predict negative impacts on agricultural production and food security in greater parts of Sub-Saharan Africa and the cost of adaptation could amount to at least 5 to 10% of Gross Domestic Product (GDP) by 2050, (Tadesse, 2010; AMCEN, 2007).

Some parts of Africa if not the whole continent is already feeling the effects of climate variation (Tadesse, 2010). The increasing food prices in the past years have been felt by the poor and

vulnerable communities especially those in rural Africa. The world prices of staple foods like rice, wheat and maize doubled between 2005 and 2008 forcing a 100 million people into poverty, a third of this number constitutes people from Africa (Tadesse, 2010). To make matters worse, prolonged droughts, flooding and land degradation due to deforestation have reduced agricultural yields and caused losses of livelihoods to 11 million people in the pastoralist Horn of Africa, leading to the mass migration of pastoralist in search for greener pastures (Boko et al., 2007; Tadesse, 2010).

1.2.4 The Advent of Climate Smart Agriculture

It is with the recent rise in the number of food insecure people that the leaders of the world have realised the potentially adverse effects of Climate Change and are calling for new approaches towards agriculture that include initiatives like the United Nations Reducing Emissions from Deforestation and Forest Degradation Programme (REDD+) and Climate Smart Agriculture (CSA) among others (Lambrou and Synnevåg, 2012). Climate Smart Agriculture integrates the three dimensions of sustainable development that include economic, social and environmental advancement. It further proposes a triple-win against the effects of climate change comprising: (i) sustainable increase in agricultural productivity and incomes; (ii) adaptation and building resilience to climate change; (iii) reduction and/or removal of greenhouse gases emissions, where possible (FAO, 2013; Lambrou and Synnevåg, 2012).

However, amongst the three benefits of CSA, Africa might be compelled to put more effort on increasing productivity and adaptation. Adaptation is the ability of a system to anticipate and flexibly respond to or manipulate the adverse effects of climate change to its own advantage (O'Brien, 2012). CSA entails policies, programmes and projects that respond to and curb the effects of climate change (FAO, 2013). It also entails proven on-farm practical techniques, such as conservation agriculture, intercropping, crop rotation, mulching, agro-forestry, improved water management, integrated crop-livestock management, improved grazing and better weather forecasting, production of resilient food crops and weather based index insurance (Boto *et al.*, 2012).

1.2.5 The Evolution of Agriculture to Climate Smart Agriculture

The modern evolution of agriculture to Climate Smart Agriculture can be traced to the Green Revolution of the 20th century, which started in the industrial countries (Hazel and Ramasamy 1991; IFPRI, 2002). The Green Revolution was driven by advancements in agronomic practices that included plant breeding, the development of inorganic fertilisers and modern pesticides (IFPRI, 2002; Nath, 1999). This saw industrial countries being able to achieve sustained food security by the second half of the 20th century, however, at the expense of developing countries (IFPRI, 2002). IFPRI (2002) argues that colonial powers invested less in agricultural advancements in developing countries. By the 1960s when India and Asian countries started to gain independence, their populations boomed against a shrinking food supply (Nath, 1999). The inadequate food supply was a result of back to back droughts in these regions. By the late 1960s, the Rockefeller Foundation tried to redeem the situation by establishing an international agriculture research system focusing on the improvement of rice and wheat (IFPRI, 2002). The initiative saw yields dramatically improve and poverty reduced in Asia, India and Latin America.

Hazel and Ramasamy (1991) and IFPRI (2002) argue that even though there were positive impacts in other developing countries, Africa lagged in the Green Revolution. This was mainly due to the inappropriateness and high costs of the agricultural technologies to the African context, exacerbated by poor infrastructure, limited investments in irrigation and discouraging market policies.

Institutes like the Africa Green Revolution Alliance (AGRA) are still making efforts to rectify the misdemeanour on African agriculture caused by the Green Revolution and the colonial powers (AGRA, 2014). The Food and Agriculture Organisation (FAO) introduced Climate Smart Agriculture along the same lines of a Green Revolution at The Hague Conference on Agriculture, Food Security and Climate Change in 2009 but this time taking into account the global agriculture framework and context specific sustainability issues (AGRA, 2014). FAO officially defined Climate Smart Agriculture in 2010 as a context specific three-pillar approach to agriculture.

In 2011, the United Nations Environment Programme (UNEP) introduced the Green Economy approach (UNEP, 2011). UNEP (2011: p2) defines a Green Economy as "one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities". The Green Economy introduces a broader and integrated approach

towards development in a changing climate. It proposes that development across all sectors including agriculture should take into account the context of a changing climate (UNEP, 2011). The Green Revolution alludes to the concept of Climate Smart Agriculture by introducing the concept of "greening agriculture", which is a concept that shares the same principles of Climate Smart Agriculture (Harren, 2011). Harren (2011) defines the concept of "greening agriculture" as agriculture that increases farm productivity and income in a sustainable manner, reduces impacts of external shocks and encourages positive externalities, and rehabilitates ecosystems by using natural resources more efficiently and reducing pollution. All three principles of the "greening agriculture" concept align with the Climate Smart Agriculture triple win approach of increasing farm productivity and incomes, ensuring climate change adaptation and mitigation (FAO, 2013).

1.2.6 Defining Results Based Monitoring and Evaluation

To understand Results Based Monitoring and Evaluation, one has to first understand the key terms encapsulated in the approach. These are broken down and defined as below.

1.2.6.1 Monitoring

Strengthening Monitoring and Evaluation System (SMES) (2009) define monitoring as a function of management that that utilises an on-going systematic collection of data on specific indicators to inform management with key pointers on the utilisation of resources and on the progress of an on-going intervention in achieving the intended objectives. Kusek and Rist (2004) state that monitoring makes the program objectives clear, it links and aligns activities with their resources and translates project objectives into indicators. Monitoring is principally concerned with tracking advancement and intermediate results and ensuring that necessary modifications are made during the project implementation timeframe (FAO, 2013). Contrary to many definitions, the UNDP (2009) states that monitoring is not only concerned with reviewing progress made in implementing activities but rather is focused on reviewing progress made towards achieving goals.

In Results Based Management (RBM), monitoring is focused on results. The UNDP (2009: 55) defines results "…as a describable or measurable development change resulting from a cause-and-effect relationship". RBM makes use of a results chain to plan a clearly defined logical process and manage programme or project implementation (Spreckley, 2009). The UNDP (2009) states that monitoring of project efficiency and effectiveness occurs within a results chain that is developed from a results mapping exercise. A results mapping exercise allows stakeholders to define the results an intervention will achieve in a logical manner. A results chain then links the

intervention variables together, that is inputs to activities; activities to outputs; outputs to outcomes; and outcomes to impacts. A results chain is iterative in nature; the planning starts from the impacts and outcomes then moves backwards on the chain to the inputs, while implementation of the programme or project starts from the inputs to the outcomes and impacts (Spreckley, 2009). Kusek and Rist (2004) identify outcomes and goals as 'results' in a RBM results chain, where goals are synonymous to impacts as defined by UNDP (2009).

1.2.6.2 Evaluation

SMES (2009) states that evaluation is also a systematic but periodic and objective assessment of projects, programmes and policies. These may be on-going or completed interventions. Evaluations are conducted at all phases of intervention development that is at the design stage, implementation, intervention end and post implementation. Evaluation is a rigorous process that seeks to determine whether objectives and goals of an intervention are being achieved (UNDP, 2009). In other words, the primary focus of evaluation is to review whether outcomes and impacts (results) are being met (FAO, 2013). This therefore, implies that expected intervention results should set clearly at the stage of project, programme or policy design (FAO, 2013).

The aim of evaluation is to determine the significance and achievement of objectives, efficiency, effectiveness, impacts and sustainability of policies, programmes or projects (SMES, 2009). FAO (2013) state that the evaluation of outcomes becomes more important at mid-project cycle and at the end of the project and at this stage evidence becomes important as a verifying factor for impact. End of project evaluations normally lay the foundation for long-term evaluations that seek to determine the impact of the intervention. Results from evaluations provide valuable information for the adjustment of policies, programmes and projects. For climate change interventions like CSA, evaluation assesses whether beneficiaries are becoming better adapted to the effects of climate change and the amount of resilience they have to climate change due to the interventions (Dinshaw and others, 2014).

SMES (2009) states that evaluations can be classified into two categories; by stages during the project cycle and by subject. The types of evaluations by stages during the project cycle are ex-ante, mid-term, terminal and ex-post evaluations while those by subject include project-level evaluation, program-level evaluation, sector program evaluation, thematic evaluation, policy-level evaluation.

1.2.6.3 Monitoring and Evaluation

FAO (2013) and SMES (2009) indicate that both of monitoring and evaluation are carried out to measure the achievements of interventions against set objectives and goals. The two functions are complementary to each other but are different in nature. Evaluation is more periodic while monitoring is a continuous. The UNDP (2009) outlines that; the process of monitoring provides real-time information on the performance of an intervention while evaluations give a detailed analysis on an intervention. The monitoring processes generate data that lays the basis for evaluations. The UNDP (2009) identifies another key distinction between the two as that evaluation are an objective assessment of interventions and are done independently to check if an intervention is making progress in achieving the set results. Evaluations are more thorough in their approach, design and methodology, and utilise a rigorous analysis of data as compared to monitoring.

The purpose of conducting Monitoring and Evaluation are to improve the performance of intervention formulation, design and implementation and to enhance transparency and accountability of organisations implementing the intervention to tax payers and relevant stakeholders SMES (2009). The UNDP (2009) argues that interventions with robust monitoring and evaluation mechanisms normally stay on track. It is easy to identify defects at an early stage and rectify them accordingly before they amount to tremendous costs that may delay intervention progress at a later stage. FAO (2013) highlights that for CSA, monitoring and evaluation frameworks are designed at the formulation stage of CSA Intervention options and development of detailed programme plans, and after climate change scenario assessments are done. FAO (2013) goes on to state that monitoring and evaluation processes of CSA interventions are unique in that they depend on baseline projections with regards to climatic conditions as their starting point. This allows for the formulation of the desired goals of the interventions to be monitored and evaluated.

1.2.6.4 Results Based Monitoring and Evaluation

Spreckley (2009) uses the term Results Based, Management, Monitoring and Evaluation instead of just Results Based Monitoring and Evaluation for his toolkit. Results Based Management is an approach to improve the performance of development interventions; it is in itself a management strategy for the achievement of outputs, outcomes and impacts (Strengthening Monitoring and Evaluation (SMES), 2009). Spreckley (2009) states that the term Results Based, Management, Monitoring and Evaluation is used to mean; clearly identifying problems and opportunities and clearly defining programme and project beneficiaries. The term connotes the setting of clear and

agreed upon objectives and setting up of systems to monitor the set targets and achievement of milestones (Spreckley, 2009). Spreckley (2009) state that of importance is to note that in this context, 'results' mean that monitoring is focused on higher level outcomes and not activities and outputs. Kusek and Rist (2004: 15) compliment Spreckley (2009) by outlining that Results Based systems intend to answer the "so what question" question. Results based systems intend to identify the goals of an organisation and to check if they are being achieved and provide evidence of achievement.

1.2.7 The Challenges of Measuring the Results of Climate Smart Agriculture Interventions

Evidence shows that there are a number of challenges associated with developing results-based Monitoring and Evaluation (RBM&E) frameworks for climate change interventions (Kusek and Rist 2014; FAO, 2013). FAO (2013) and Sanahuja (2011) outline that measuring climate change related programmes is a highly complex and contended issue. There is no single approach in assessment, monitoring and evaluation of climate change interventions like Climate Smart Agriculture. This is due to the challenges associated with defining the concepts to be measured and the interaction of multiple variables that differ according to contexts (FAO, 2013; Sanahuja, 2011).

Monitoring and evaluation frameworks for Climate Smart Agriculture should measure agricultural productivity, adaptive capacity or resilience of natural or human systems and the level of reduction of greenhouse gases as a result of the intervention (FAO, 2013). There are challenges, however, in finding consensus on the definitions of these attributes thus making it difficult to state what should be measured and how to measure it (FAO, 2013 and Sanahuja, 2011). For instance, in the table (1) below, adaptation is defined differently by four institutions that are important players in the sphere of climate change.

Table 1: Definitions of adaptation

Institution	Definition
Intergovernmental Panel on Climate Change (2001)	**An adjustment** by natural or human systems in response to climate change or its effects.
United Nations Framework Convention on Climate Change (2010)	**Practical steps** taken to protect communities or countries from the effects of climate change.
United Nations Development Programme (2005)	**A process, by which strategies** to cope with or moderate the effects of climate change are enhanced, developed and implemented.
United Kingdom Climate Impacts Programme (2003)	**A process or outcome of a process** that results in risk reduction of the climate change effects or exploitation of benefits that might come with it.

Dinshaw et al. (2014: 10) further identifies three major challenges in monitoring and evaluating climate change interventions like Climate Smart Agriculture and these include: "i) how to assess the attribution of an intervention to adaptation; ii) how to establish baselines and targets for adaptation initiatives; and iii) how to reconcile the longer time horizons".

Furthermore, climate change interventions are more difficult to track as they are characterised by uncertainty, complexities of climate change rhythms, and long-term impacts (Dinshaw et al., 2014). Conventional M & E approaches are only able to track the efficiency of climate change interventions but have a challenge in determining higher-level outcomes and impacts that measure effectiveness of interventions (Sanahuja, 2011).

Sanahuja (2011) also outlines that there is limited amount of literature and reports around monitoring and evaluation frameworks that bring forth proven approaches and techniques on measuring the effectiveness (higher-level outcomes and impacts) of climate change interventions like Climate Smart Agriculture. The subject area is still at its infant stages and literature is still building up. There is a lack of studies around monitoring and evaluating agriculture, gender, environmental protection and health interventions in a changing climate (Sanahuja, 2011).

There are currently large amounts of funds available for the implementation of climate change interventions however; the evidence base on the effectiveness of climate change initiatives like Climate Smart Agriculture is nearly non-existent (Sanahuja, 2011). There is, therefore, a need for the development of rigorous Climate Smart Agriculture results-based monitoring and evaluation frameworks that will contribute to the collection of evidence and body of knowledge to justify spending on climate change interventions (Sanahuja, 2011; UFCCC, 2010). In this regard, such frameworks will play an investigative and documentary role and capture key lessons of what does and does not work on climate change interventions like Climate Smart Agriculture (Spearman and McGray, 2011). It is in this context that this study examines different types of CSA related M & E frameworks to determine which measurement parameters will assist to develop the most relevant CSA RBM&E framework for the Alliance.

1.2.8 Overview of the NEPAD-iNGOs Africa CSA Alliance

In a bid to implement Climate Smart Agriculture interventions, African leaders are developing policies and setting up institutional arrangements that include initiatives like the Comprehensive Africa Agriculture Development Programme (CAADP) under the African Union (AU) (Lambrou and Synnevåg, 2012). It is under the CAADP that the NEPAD-iNGOs Africa Climate Smart Agriculture Alliance was formed and launched in Malabo on the 25th of June 2014. The Africa Climate Smart Agriculture Alliance comprises of five International Organisations (CARE, Catholic Relief Services, Concern Worldwide, Oxfam and World Vision) and four technical partners (United Nations' Food and Agricultural Organization, Food, Agriculture and Natural Resources Policy Analysis Network, the research consortium CGIAR, and the Forum for Agricultural Research in Africa). A memorandum of understanding binds all the nine organisations.

The Alliance is a self-selected group of NGOs, research organisations, NEPAD and other relevant stakeholders. They are drawn together by their common commitment and desire to stimulate and support increased uptake of CSA as a means to more stable, resilient and productive food and agriculture systems, and improved rural economies. The Alliance aims to 'pull' together the interests, programmes and capacities of the alliance members into a collective 'energy' to support strengthening local policy and programme design capacity, skills development, access to information and financing to scale-up CSA practices (UN, 2014). The NEPAD-iNGOs Africa Climate Smart Agriculture Alliance is a purpose-specific alliance with the aim of catalysing and supporting the scaling-up of Climate Smart Agriculture practices to 6

million smallholder farms in Africa through a system for quality assurance and verification by 2021.

The coming together in this Alliance is expected to leverage substantial political and financing support to grassroots activities which should directly impact on increased capacity and systems for expanded and sustained adoption of CSA practices. The consortium builds on compatible existing programs and promote new investments partly through establishment of a multi-donor Challenge fund that is results-based under the purview of the national CSA task forces.

The Alliance defined its value proposition concisely as the "greater than the sum of the pieces". This was done with consistency and alignment to the principles, values and targets in the Sustaining CAADP Momentum Results Framework (2014-24). Therefore, within clear and tangible targets, the Alliance will, for instance, seek to establish a results-based funding mechanism, with a corresponding monitoring and verification system that can attract international funding for food security and climate adaptation.

National coordination, monitoring and verification will take place through multi-stakeholder CSA/CA taskforces to be established in each country. FAO is mandated by COMESA, SADC and EAC to facilitate these taskforces.

The Alliance will strictly pursue complementarity, synergies and subsidiarity with other CSA initiatives and programmes including the EverGreen Agriculture Partnership, and CSA programmes under the Regional Economic Communities, the African Conservation Tillage Network (ACT) and Farmer Organisations, among others. It is expected some of these collaborations will be key to enabling the Alliance to centre its support at the community/farmer level. The NEPAD Agriculture Climate Change Mitigation-Adaptation Programme will provide coordination services.

A RBM&E framework is key to the establishment of a results-based funding mechanism for the Alliance. It is against this need to establish a results-based funding mechanism that the Alliance has to develop a clearly defined CSA RBM&E that will then define the measurement parameters for a results-based funding mechanism. A RBM&E framework is a critical public management tool that will assist the NEPAD-iNGOs Africa Climate Smart Agriculture Alliance in tracking progress and showing value of projects, programmes or policies by clearly outlining and

revealing impacts. It is different from traditional M & E systems that focus on activities and outputs in that it focuses on outcomes and impacts (Kusek and Rist, 2004).

1.3 Results Based monitoring and evaluation Frameworks for Climate Smart Agriculture Interventions

This section outlines the problem the study is going to address, the purpose, which provides the pathway of the study and the research question that will keep the study in perspective and scope.

1.3.1 The research problem statement

The Alliance does not have a CSA RBM&E framework for tracking programme outcomes and impacts. FAO (2013) and Sanahuja (2011) outline that measuring climate change related programmes like CSA is a highly complex and contended issue, due to the challenges associated with defining the concepts to be measured and the interaction of multiple variables that differ according to contexts (FAO, 2013; Sanahuja, 2011). Climate Smart Agriculture is a new concept and practitioners are still grappling with defining it and coming up with comprehensive and relevant CSA results-based monitoring and evaluation frameworks (FAO, 2013; Tadesse, 2010).

Conventional monitoring and evaluation approaches are only able to track the efficiency of climate change interventions and have a gap in determining higher-level outcomes and impacts that measure effectiveness (Sanahuja, 2011). It was therefore of importance that this study examined different types of CSA (climate change or adaptation) related M & E frameworks, and recommended measurement parameters that would assist in the development of the most relevant CSA RBM&E framework for the Alliance.

Non-governmental Organisations are promising a lot in terms of CSA results to donors, but outcomes and impacts are not clearly defined and documented. There are currently large amounts of funds for countries to implement climate change interventions, however the evidence base on the effectiveness of climate change interventions like CSA is nearly non-existent (Sanahuja, 2011). With the increasing demand for outcomes and impacts by donors and related stakeholders, there is need for institutions like the Alliance to develop well defined CSA RBM&E frameworks, particularly in developing continents like Africa where there are a number of obstacles in developing such frameworks (Kusek and Rist, 2004). Obstacles in developing RBM&E frameworks in developing countries include lack of political will at national and

institutional levels, poor institutional arrangements, low technical capacity and funding (Kusek and Rist, 2004).

The study added value to the development of the Alliance initiative that was still at its formative stages. The alliance aimed to increase the number of rural households practicing CSA to over 6 million smallholder farmers by 2021, through a system of quality assurance and verification. The CSA RBM&E framework was meant to assist the Alliance to define its outcomes and impacts and vouch for a results-based funding mechanism across its stakeholder base. Furthermore, the study contributed to the broader body of knowledge on climate change and CSA that is still at its infant stages as a discipline (Sanahuja, 2011).

1.3.2 The research purpose statement

The purpose of this research was to analyse different types of climate change related frameworks and recommend a CSA RBM&E framework for the Alliance.

CSA RBM&E frameworks are highly contested due to varying definitions of parameters to be measured and the fact that CSA is a fairly new subject in the development arena.

1.3.3 The research questions

The primary question of the study was - What will be the most appropriate Climate Smart Agriculture results-based monitoring and evaluation framework for assessing outcomes and impacts for the Africa Climate Smart Agriculture Alliance?

The sub-research questions included:

1. What are the basic theories underlying the development of RBM&E frameworks?
2. What variables are the key building blocks for CSA RBM&E frameworks?
3. What Climate Smart Agriculture indicators can be used to develop CSA RBM&E framework for the Africa Climate Smart Agriculture Alliance?

1.4 Preface to the research report

To this end, the report has six chapters. Following this introductory chapter,

- Chapter 2 provides a literature review covering the problem, the past studies, the explanatory framework and the conceptual framework.

- Chapter 3 discusses the research strategy, design, procedures, reliability and validity measures as well as limitations.
- Chapter 4 and Chapter 5 presents and discusses the findings, respectively, to interrogating our research questions.
- Chapter 6 summarises and concludes the research.

2 LITERATURE REVIEW

The literature review chapter discusses the key concepts and approaches in the development of CSA RBM&E frameworks for climate change interventions like CSA. It starts by giving an overview of CSA initiatives in Africa and then drills down onto the CSA RBM&E frameworks that have been used to measure similar initiatives. It is in this chapter that the conceptual framework of the study is outlined and discussed. An analysis of similar past studies is also presented for grounding the methodology and approach used in this study. However, it has to be noted that there is limited amount of literature around monitoring and evaluation frameworks that outline approaches and techniques for measuring the higher-level outcomes and impacts of climate change interventions like CSA (Sanahuja, 2011). The literature review therefore relied on research publications from renowned organisations in the fields of agriculture and climate change like the Food and Agriculture Organization of the United Nations (FAO), Norwegian Agency for Development Cooperation (NORAD), International Food Policy Research Institute (IFPRI), Alliance for a Green Revolution in Africa (AGRA), United Nations Environment Programme (UNEP) and other related institutions.

2.1 Measuring Climate Smart Agriculture in Africa: Results Based M & E Frameworks

This section outlines the development of CSA initiatives in Africa. It defines CSA and its major components. The section concludes by detailing the Africa Climate Smart Agriculture Alliance initiative, on which this study was based.

2.1.1 An Overview of Climate Smart Agriculture Initiatives in Africa

Lambrou and Synnevåg (2012) state that CSA integrates the three dimensions of sustainable development that include economic, social and environmental advancement. FAO (2013) states that CSA further proposes a triple win against the effects of climate change and that is: (i) sustainable increase in agricultural productivity and incomes; (ii) adaptation and building resilience to climate change; (iii) reduction and/or removal of greenhouse gases emissions (mitigation), where possible. However, amongst the three benefits of CSA, African farmers might be compelled to put more effort on increasing productivity and adaptation.

Adaptation in the CSA context refers to the ability of a system to adjust or exploit actual or expected climatic changes to its own advantage (O'Brien, 2012). Of importance under adaptation is the capacity to adapt which Oppenheimer (2012) defines as the totality of all available assets that a system may use to attain set goals. For adaptation to climate change to be attained, a system therefore needs to have adequate adaptive capacity. Adaptive capacity refers to the capability of a system or people to manipulate resilience (FAO, 2013), where resilience refers to the ability of a system to absorb an external hazardous shock and be able to recover from it in an efficient and timely way (FAO, 2013; Oppenheimer, 2012). Mitigation refers to the reduction of the rate of climate change by way of managing it through its root causes (Oppenheimer, 2012) for instance addressing agriculture contribution to climate change through CSA. A system in this instance may refer to communities, households or individuals (FAO, 2013).

Brooks et al. (2011) argue that there are two approaches to developing adaptation interventions and these are the utilitarian and egalitarian approaches. The utilitarian approach is broad in terms of beneficiary targeting while the egalitarian approach is focused and more specific. These two approaches also determine the types of monitoring and evaluation frameworks that will be used to measure success of interventions designed and implemented in line with the two schools of thought (Brooks et al. 2011).

There are a number of CSA interventions that have been initiated at continental level in Africa. The African Union (AU) and New Partnership for Africa's Development (NEPAD) take a leading role in agriculture development at continental level in Africa (AGRA, 2014; United Nations, 2014 and NEPAD, 2003;). The Climate Smart Agriculture initiatives in Africa are guided by the NEPAD led Comprehensive Africa Agriculture Development (CAADP) Programme that was launched in the African Union summit of Mozambique in 2003 (NEPAD, 2003). Kolavalli et al. (2010) outline that the CAADP programme is in essence a guiding policy framework for Agriculture development in Africa which is built on four pillars: (i) Land and Water Management, (ii) Rural Infrastructure and Trade-related Capacities for Improved Market access, (iii) Increasing Food Supply and Reducing Hunger and (iv) Agricultural Research, Technology Dissemination and Adoption. According to FAO (2013), the CAADP pillars conform to Climate Smart Agriculture and therefore, are well placed foundations for Climate Smart Agriculture implementation in Africa.

There is a notable buy-in from governments across Africa towards Climate Smart Agriculture. The African Ministerial Conference on the Environment (AMCEN) of 2013 recognised the need to prioritise climate change adaptation in the agriculture sector with mitigation being a co-benefit of the endeavour (AGRA, 2014). At a global level, the AMCEN approach conforms to the United Nations Framework Convention on Climate Change (UNFCCC) led Conference of the Parties (COP) and the Cancun Adaptation Framework while at continental level; it abides to the Nairobi Work Programme (AGRA, 2014). The African Union (AU) has also responded to the call for Climate Smart Agriculture by initiating the Africa Union- New Partnership for Africa's Development (NEPAD) Agriculture Climate Change Programme (UN, 2014). The initiative seeks to coordinate the African agenda in agriculture and climate change adaptation by way of aligning policies, investments and continental programmes towards national priority adaptation plans (UN, 2014). The Africa Climate-Smart Agriculture Alliance programme that seeks to reach 6 million farmers practicing Climate Smart Agriculture by 2021 compliments the AU-NEPAD Agriculture Climate Change Programme's target of reaching 25 million farmers practicing Climate Smart Agriculture by 2025 (UN, 2014). The AU-NEPAD Agriculture Climate Change Programme and the Africa Climate-Smart Agriculture Alliance programmes are still at their infant stages as they were both launched in year 2014 (UN, 2014).

The Africa Climate Smart Agriculture Alliance is a purpose-specific alliance with the aim of catalysing and supporting the scaling-up of Climate Smart Agriculture practices on the millions of smallholder farms in Africa. It aims to "pull" together the interests, programmes and capacities of the alliance members into a mutual collective "energy" to support strengthening local policy and programme design capacity, skills development, access to information and financing to scale-up CSA practices.

NEPAD's Comprehensive Africa Agriculture Development (CAADP) and Environmental Action Plan (EAP) frameworks are integral to the Alliance's overall purpose and vision. In this context, the alliance embraces an approach that focuses on and contributes to strengthening systems, policy and institutional capacity, to support increased adoption and sustained practicing of Climate Smart Agriculture. The alliance aims to increase the number of households practicing Climate Smart Agriculture to over 6 million by 2021, through a system for quality assurance and verification.

There are a number of organisations that fund and implement CSA initiatives at national and continental level in Africa and they include World Vision, Oxfam, CARE International, Concern Worldwide, Catholic Relief Services, and World Agroforestry Centre of the Consultative Group for International Agricultural Research (CGIAR) (UN, 2014). World Agroforestry Centre of the Consultative Group for International Agricultural Research also sponsors the Partnership to Create an Ever-Green Agriculture programme, which also supports the AU-NEPAD Agriculture Climate Change Programme by bringing together governments and organisations that seek to scale up agriculture practices that integrate trees into cropping systems (UN, 2014).

2.1.2 Embedding Climate Smart Agriculture Results-based Monitoring and Evaluation Frameworks in the Development Discourse

In this section, an overview of CSA and results-based monitoring and evaluation frameworks within the development sector is provided. The section traces the development of results-based management for concepts like Managing for Development Results. A discussion of measurement parameters that have been used to measure CSA related interventions in Africa and abroad is also provided.

Climate Smart Agriculture is embedded within the development arena. Development is a process that brings about change (Willis, 2005). In the conception of normative or social justice, development denotes progressive change as a concept that seeks to ensure equality in society, by way of a fairer income distribution and equality of individual opportunity to access services such as education and health (Morvardi, 2008; World Bank, 2000 and Momsen, 2004). Development is the continuous improvement in the social, economic well-being of people so that they live longer, healthier and fuller lives within any given political entity (Morvardi, 2008; Momsen, 2004). It however, has to be noted that development "…is not just a once-off process of change to something better, but implies a process which builds on itself, where change is continuous and where improvement builds on previous improvements", (Allen and Thomas, 2000: 23-24).

Development is a highly-contested concept (Chambers, 2004). It has meant different things to different people, in different places and at different times. This therefore implies that the meaning of development is highly context specific. Sumner and Tribe (2008) identified three definitions for development which are based on approaches and circumstances at different places and eras. The first definition is based on historical events and is largely long term oriented and possibly relatively value free. The first definition portrays 'development' as a process of

change. This is also supported by Byworth (2003) who underpins it from the angle of transformational development, stating that it is a process through which individuals, families and communities transcend toward life of completeness characterised by peace, dignity, justice and hope.

The second definition can be best exemplified through the development goals (Sumner and Tribe, 2008). It portrays development as a policy driven concept with short- to medium-term timeframes. In this context, development is indicator led and is based on value judgements. The third definition takes a post-modernist approach and portrays development as an ideologically loaded Western-driven concept (Sumner and Tribe, 2008). The approach seeks to come up with alternative conceptions towards development. However, Sumner and Tribe (2008) argue that regardless of the multiplicity of definitions and debates around the concept of development, there has been one underlying consensus, that is, it involves continuous change in a variety of aspects in human society.

Development is normally driven by economic growth, however, taking into account that economic growth on its own does not always bring about human development (improvement in people's quality of life) (Willis, 2011; World Bank, 2000). This therefore, brings in the concept of sustainable development (World Bank, 2000). Sustainable development is development that balances trade-offs between economic growth, social equity and the sustainable use of natural resources (de Britto, 2011; World Bank, 2000). Climate Smart Agriculture, is an intervention that bases its foundations on sustainable development. Climate Smart Agriculture, as defined by FAO (2013: ix) is "…an approach to developing the technical, policy and investment conditions to achieve sustainable agricultural development for food security under climate change". It brings a holistic approach in addressing issues faced by agriculture, natural resources and food systems which assist in circumventing conflicting policies and legislation or financing (FAO, 2013). Development further brings on board the concept of intergenerational justice, which is understood as meeting current needs without compromising those of the future generations; this is what CSA seeks to achieve (FAO, 2013).

From the FAO (2013) definition, it can be argued that CSA as an intervention cuts across all three definitions of development proposed by Sumner and Tribe (2008). It is implemented on a short- to medium term basis, at the same time seeks to achieve social change on a long-term

basis under the auspices of intergenerational justice. It may also be argued that CSA is a Western imposition that seeks to be contextualised as it is a term that was coined by FAO (2013).

The purpose of the development field of study is to understand how real improvement of people's lives can be achieved together with the attainment of choices and opportunities available for them (UNDP, 2009). This will encompass understanding how this can be achieved from a number of diverse development dimensions including economics, social studies, political science, legal and institutional structures, technological approaches in various forms (including the physical or natural sciences, engineering and communications), environmental studies, religion, the arts and culture (Sumner and Tribe, 2008).

Development should include components or approaches of tackling poverty by way of establishing relevant institutions, stable economies and social relations (Allen and Thomas, 2000; Kumssa and Mbeche, 2004). Poverty alleviation should be accompanied by grassroots participation in the development processes and the empowerment of groups that were disadvantaged because of dire historical circumstances (Bek et al., 2004). This kind of improvement of people's lives can be achieved by way of ensuring that environmental, economic and social conditions are improved (World Bank, 2000). Under the environmental pillar, ensuring a healthy environment for humans, rational use of renewable natural resources and conservation of non-renewable natural resources are the key objectives (World Bank, 2000). While under the economic pillar; growth, efficiency and stability are the corner stones; and equity, social cohesion, social mobility, participation and cultural identity are the building blocks for social development (World Bank, 2000). Climate Smart Agriculture as an intervention is also in line with the objectives of development as it seeks to achieve socio-economic, environmental and livelihood outcomes and impacts (FAO, 2013).

Development needs to be managed and the same applies for Climate Smart Agriculture. The Strengthening Monitoring and Evaluation System (SMES) (2009) states that the international development community has been making efforts to improve development management since the late 1990's. Initiatives that include the Millennium Development Goals (MDGs) of year 2000, the Monterrey Consensus on Financing for Development introduced in 2002, the Rome Declaration on Harmonization in 2003, the Marrakech Memorandum on Managing for Development Results in 2004, and the Paris Declaration on Aid Effectiveness in 2005 have all

been efforts to manage development (SMES, 2009). However, of interest in this section in all these developments is the concept of Managing for Development Results.

Managing for Development Results came into being as an initiative to respond to the escalating call for public accountability by citizens all over the world on how aid is used, the outcomes and impacts achieved and how relevant the achieved results are to human development in different contexts (UNDP, 2009). Managing for Development Results is a management strategy with a bias towards performance of development and the sustainable improvement of national development results (SMES, 2009). It offers a comprehensive and consistent development effectiveness framework that provides performance information to improve decision making. The strategy provides applied tools for strategic planning, risk management, progress monitoring and outcome evaluation (SMES, 2009).

Managing for Development Results is Results Based Management (RBM) in action but is more concerned with the exterior environment and national outcomes and impacts as compared to an agency's internal performance (UNDP, 2009). Managing for Development Results is synonymous to Results Based Management as UNDP (2009) defines it as a broader management strategy also focused on intervention efficiency and tangible results. The SMES (2009) identifies seven phases that make up Results Based Management and these are (i) formulation of the objective; (ii) development of indicators to show progress; (iii) setting of targets; (iv) monitoring of results; (v) performance measurement; (vi) evaluation and; (vii) utilisation of monitoring and evaluation information to improve interventions. Proper Results Based Management is a continuous process that provides constant feedback and learning through monitoring and evaluation in order to regularly modify plans as per arising need (UNDP, 2009).

Spreckley (2009) uses the term Results Based, Management, Monitoring and Evaluation instead of just Results Based Monitoring and Evaluation for his toolkit. The term Results Based, Management, Monitoring and Evaluation is used to mean; clearly identifying problems and opportunities and clearly defining programme and project beneficiaries (Spreckley, 2009). The term connotes the setting of clear and agreed upon objectives and setting up of systems to monitor the set targets and achievement of milestones (Spreckley, 2009). Of importance is to note that in this context, 'results' mean that monitoring is focused on higher level outcomes and not activities and outputs (Spreckley, 2009). Kusek and Rist (2004:15) compliments Spreckley (2009) by outlining that Results Based systems intend to answer the "so what" question. Results

based systems intend to identify the goals of an organisation and to check if they are being achieved and provide evidence of achievement.

Results Based Monitoring and Evaluation Frameworks utilise the Logical Framework Approach as the basis for project design, identification and establishment of quantifiable monitoring indicators to track achievement of objectives and to evaluate outcomes against assumptions, risks and stakeholders (Spreckley, 2009). A Logical Framework clearly defines project objectives, policy or program and shows a clear link among inputs, activities or processes, outputs, outcomes and impacts (SMES, 2009; Kusek and Rist, 2004). Although it has a lot of similarities with a Logical Framework, a Results Framework is normally used at the program or strategy level than at project level as it gives a holistic picture of the link between objectives and higher goals (SMES, 2009). The Results Framework is normally presented in a diagrammatic format (SMES, 2009).

When analysing the adaptation M & E frameworks, Brooks et al. (2011) noted that existing and emerging frameworks tend to focus on two aspects; (i) the capacity of governments, institutions, and civil society to appreciate climate change and be able to integrate climate informed decision making into development processes and (ii) the degree to which climate adaptation is aligned or aligns with development outcomes. The method of assessing the second aspect of the frameworks can be by way of using common development indicators on areas that are deemed to be at high risk of climate change impacts (Brooks et al., 2011) like agriculture.

Scherr et al. (2012) become more specific in the context of successful CSA landscapes by highlighting that the Monitoring and Evaluation frameworks should track, multi-stakeholder planning processes, government support and resource tenure, context specific investment that support climate smart objectives and the multiple dimensions of change to ascertain if social, ecosystem, economic and climate outcomes are being achieved at different levels. It can therefore, be noted that both approaches (Brooks et al., 2011; Scherr et al., 2012) to Monitoring and Evaluation frameworks are putting emphasis on tracking decision making processes, the integration of climate and development outcomes in policy, programming, and practice in the field.

Nelson and Swindale (2013) identify four Climate Smart Agriculture indicators that measure agriculture productivity at farm level including income and adoption of improved agriculture technologies. The indicators include: (i) gross margin per hectare, animal, or cage of selected product, (ii) number of hectares under improved technologies and management practices as a

result of United States Grant (USG) interventions, (iii) number of farmers and other who have applied improved technologies or management practices as a result of USG grant and (iv) value of incremental sales (collected at farm level) attributed to Feed the Future implementation.

The four indicators proposed by Nelson and Swindale (2013), are a combination of outcome indicators that provide an integrated approach to tracking intermediate results of improving agriculture productivity, increasing markets and trade and reducing poverty. The indicators are not different from the development and climate change integrated approach proposed by Brooks et al. (2011) and Scherr et al. (2012). FAO (2013) however, goes on to propose a more comprehensive framework of indicators for tracking Climate Smart Agriculture interventions. These are layered in five key result areas as noted on the table below:

Table 2: FAO Climate Smart Agriculture Indicators

Key Result area	Indicators
Poverty and household impacts (where possible this data should be disaggregated by gender or by male- and female headed households)	• Percentage of population that is food insecure; • Percentage of population below the poverty line; • Household income, income variability and diversification; • Gini coefficient; • Marketing and commercialization chains that are adapted to changing conditions; • Proportion of food and income that comes from climate-sensitive sources; • Amount of time spent collecting firewood; and • Amount of time spent collecting water.
Poverty and household impacts (where possible this data should be disaggregated by gender or by male- and female headed households) Outcomes in terms of CSA-related productive change	• Agricultural productivity (e.g. tonnage of crop produced per hectare); • Changes in land use (area); • Reduced GHG emissions; • Changes in productive resilience to climate variability; • Changes in biophysical characteristics (e.g. content of soil organic matter); and • Diversification from climate-sensitive livelihood sources.
Outcomes in terms of adoption of CSA systems	• Number of irrigation systems that raised drought prevention standards and area of farmland area covered; • Number of soil and water conservation works; • Area of farmland that adopted CSA technologies (e.g. reduced tillage, permanent crop cover, agroforestry); • Forest area in which climate-smart technologies are adopted; • Number of fisherfolk who adopted climate-smart fishery technologies, disaggregated by sex; and • Increased access of women to land and/or productive resources.
Outputs and outcomes related to capacity-building and service-related interventions	• Number of people who benefited from capacity development, disaggregated by sex; • Number of male- and female-headed households that have gained direct household benefits from more climate-resilient • agriculture infrastructure; • Farm-gate and market price; • Women beneficiaries constitute half of participants in capacity-development activities; and • Number of officials trained on the inclusion of gender issues in CSA.
Institutional outputs and outcomes	• Strategy, policy and regulation formulated for CSA; • Inclusion of climate change in agricultural policy frameworks; • Actions identified and planned by local authorities to address significant vulnerabilities and opportunities not yet present in • existing strategies and actions; • Public commitments made to identify and manage climate-related risk; • Proportion of budget allocated to support CSA; • Proportion of budget allocated to agricultural research and development; • Evidence of climate change mainstreaming in national and local agricultural development plans; and • Increase in number of women participating in local, national and regional dialogues on CSA.

Notably, the Climate Smart Agriculture indicators proposed by FAO (2013) also build on the concept of measuring climate change outcomes in tandem with development outcomes. At the top of the hierarchy of indicators proposed by FAO (2013) are development impact indicators; poverty reduction, as also proposed by Nelson and Swindale (2013).

Even though this is the case, FAO (2013) and Sanahuja (2011) caution that measuring climate change related initiatives is a complicated issue. There is no single approach in assessment, monitoring and evaluation of climate change interventions like Climate Smart Agriculture. This is due to the challenges associated with defining the concepts to be measured and the interaction of multiple variables that differ according to contexts (FAO, 2013 and Sanahuja, 2011). Dinshaw et al. (2014:10) further identifies three major challenges in monitoring and evaluation of climate change interventions like CSA and these include: "i) how to assess the attribution of an intervention to adaptation; ii) how to establish baselines and targets for adaptation initiatives; and iii) how to reconcile the longer time horizons". Furthermore, climate change interventions are more difficult to track as they are characterised by uncertainty, complexities of climate change rhythms, and long-term impacts (Dinshaw et al., 2014). Conventional M & E approaches are only able to track the efficiency of climate change interventions but have a challenge in determining higher-level outcomes and impacts that measure effectiveness (Sanahuja, 2011). Therefore, there is a need for well-defined CSA indicators to determine what success will look like for the Alliance.

Development interventions normally attribute final outcome by counterfactual assessment, that is, by determining what would have happened without the intervention (Dinshaw et al., 2014; Sanahuja, 2011). However, it might be more appropriate to consider the contribution of adaptation interventions like CSA in larger development interventions by making use of proxy adaptation outcome indicators such as observing availability of drought resilient crops, improved water security, and more climate resilient livelihoods (Dinshaw et al., 2014; UNFCCC, 2010). Dinshaw et al. (2014) highlight that a number of approaches can be applied to create a counterfactual on which adaptation intervention outcomes can be measured against. If a counterfactual cannot be used, qualitative methods can be used as an alternative approach of getting a deeper understanding and confidence to attribute particular outcomes to an adaptation intervention.

Identifying baselines for adaptation counterfactuals in constantly changing underlying contexts proves to be a challenge as well (Sanahuja, 2011, UFCC, 2010). In such complex and volatile situations, reconstructed and shifting or rolling baselines need to be utilised (Dinshaw et al., 2014). However, the challenge comes with the capacity required to generate and apply the sophisticated computational modelling and to analyse and interpret the data for the constant reconstruction of baselines (Dinshaw et al., 2014). The application of shifting baselines further comes with the challenges of biases where independent intervention variables like inputs and

dependant variables like outputs and outcomes turnout to be correlated with other factors beyond the control or predictions of the original impact assessment model (Dinshaw et al., 2014). In such instances, sequential targeting may be appropriate in assisting interventions adapt to fluctuating contexts and to warrant that agreed upon targets are realistic and are of appropriate magnitude for ensuring that intended impacts are achieved (Sanahuja, 2011).

Another dilemma is that results of adaptation interventions like Climate Smart Agriculture will in most instances become visible over long periods of time, that is, over 20-50 years when the impacts of climate change start to take effect and yet governments and development programme funders want to see the effectiveness of such initiatives within short timeframes (Dinshaw et al., 2014; Spearman and McGray, 2011). It is therefore, prudent that the designs of such adaptation interventions take this into account and focus on intermediate results that can be achieved within short time frames but have a bearing for long term impacts (Spearman and McGray, 2011; Sanahuja, 2011).

The issue of accountability and transparency is also critical particularly with the increase of resource allocation for adaptation interventions like CSA by the international community and governments (Dinshaw et al., 2014). This therefore, calls for the use of stakeholder participatory processes in planning, implementation, monitoring and evaluation of interventions like CSA (Spearman and McGray, 2011). Integrated learning may also promote accountability of implementers to funders and beneficiaries and allow for an iterative implementation process that enhances reflection and constant intervention realignment and improvement. Learning can be better ensured by making monitoring and evaluation an integral part in the design of an intervention (Dinshaw et al., 2014 and Spearman and McGray, 2011).

Climate Smart Agriculture intervention design, monitoring and evaluation approaches must be flexible and adaptable to the changing context (Dinshaw et al., 2014). This can be achieved by distinguishing between projects and programmes design that are simple and those that are complicated or complex. In simple adaptation interventions that follow a linear logic where the correlation of variables (inputs, activities, outputs and outcomes) within the results chain is clear, grounded monitoring and evaluation approaches from the development field are appropriate for tracking and assessments (Dinshaw et al., 2014 and Sanahuja, 2011)

More sophisticated adaptation interventions like CSA that comprise of multiple components or involvement of diverse shareholders over long timescales may need an integrated approach that makes use of multiple assessment techniques to determine whether the combined different

elements of the initiative are a cause of a particular effect (Dinshaw et al., 2014; Sanahuja, 2011). Most adaptation interventions like Climate Smart Agriculture are complicated and characterised by a number of uncertainties that may alter the causal relationship proposed by the results chain, which may as well be visible after a climate event. It may also be difficult to predict when exactly an intervention will show signs of solving a climate problem (Dinshaw et al., 2014). In such instances, the ordinary methods for monitoring and evaluating Climate Smart Agriculture are bound to yield no credible results. It is therefore, advisable to use different approaches of integrated CSA frameworks informed by multiple theories of change that capture each fundamental detail that will assist in apprising assessments (Dinshaw et al., 2014; Sanahuja, 2011).

There is limited amount of literature and reports around M&E frameworks that bring forth proven approaches and techniques on measuring the effectiveness (higher-level outcomes and impacts) of climate change interventions like CSA (Sanahuja, 2011). The subject area is still at its infant stages and literature is still building up. There is a lack of studies around monitoring and evaluating agriculture, gender, environmental protection and health interventions in a changing climate (Sanahuja, 2011). There are currently large amounts of funds for countries to implement climate change initiatives however; the evidence base on the effectiveness of climate change interventions like CSA is nearly non-existent (Sanahuja, 2011). There is, therefore, a need for the development of rigorous CSA RBM&E frameworks that will contribute to the collection of evidence and body of knowledge to justify spending on climate change interventions (Sanahuja, 2011 and UFCCC, 2010). In this regard, such frameworks will play an investigative and documentary role and capture key lessons of what does and does not work on climate change interventions like CSA (Spearman and McGray, 2011).

2.2 Concepts Underlying the Development of the Results Based monitoring and evaluation Frameworks for Climate Smart Agriculture Interventions in Africa

This section, discusses the concepts that are the building blocks in the development of a CSA RBM&E Framework. It discusses the origins of the concepts, their proponents and opponents where applicable; it also discusses their pros and cons, and relevance to the development of CSA RBM&E frameworks. Some of the concepts identified include the logical framework, the results chain and adaptation approach.

The basis of the development of a RBM&E framework is a logical framework (Spreckley, 2009). Garbutt and Bakewell (2005) state that the origins of the logical framework approach can be traced thirty years back to the United States (US) military planning processes. It was then adapted by the US space agency NASA before being bought by the USAID for the implementation of development interventions. The European development organisations picked it up by the 1980s and by the 1990s, it had become a prerequisite for the application of development grants from many donors (Garbutt and Bakewell, 2005).

The Logical Framework Approach perceives a development intervention as a causally linked sequence of events (NORAD, 1999). It clearly outlines the theory and assumptions that form the basis of an intervention. A logical framework helps structure the objectives of an intervention and the causal links between its variables (inputs, processes, outputs, outcomes and impacts) (SMES, 2009 and Spreckley, 2009). It is at the centre of an intervention and builds a distinct hierarchy of objectives, from inputs at the lower level to outcomes at the top (Spreckley, 2009). The W.K Kellog Foundation (1998) states that the Logical Framework Approach is a systematic and visual portrayal of how an intervention should or is implemented.

A logical framework is a systematic sequencing of development hypothesis since there is no certainty that the chaining of variables (inputs, activities, outputs, outcomes and impacts) will produce the intended results (NORAD, 1999). The uncertainty goes even higher as variables go beyond the control of the management team at higher outcome and impact levels. A logical framework assumes that "…if inputs are available, then the activities will take place; if the activities take place, then the outputs will be produced; if the outputs are produced, then the purpose will be achieved; in the long run this will contribute to the fulfilment of the goal" (NORAD, 1999: 9). It assists in the identification and development of indicators that will measure performance and achievements of results at each level (SMES, 2009). The clearer the hierarchy of objectives, the easier they are to monitor and evaluate and adjust the intervention in accordance to external changes (Spreckley, 2009).

The logical framework defines the context within which an intervention is being implemented by way of framing it within assumptions and related risks that may hamper the achievement of results (SMES, 2009). It has to be approached as a dynamic tool that is used to monitor and evaluate interventions like CSA. It helps in drawing lessons learnt from the implementation of an

intervention (Spreckley, 2009). It helps in tracking changes in the external environment and readjusting interventions accordingly.

The purpose of a logic framework is to provide project partners and other relevant stakeholders with an intervention blue print, defining the sequential arrangement of related events and linking the justification of a program with the intended goals (W.K Kellog Foundation, 1998 and Spreckley, 2009). A Logical framework helps in mapping the logic of an intervention, which in turn helps managers, visualise how resources can be allocated for improvement and attainment of desired results (W.K Kellog Foundation, 1998 and SMES, 2009). The logical framework improves planning by linking the project components to the external factors (NORAD, 1999). It assists in standardising data collection procedures and processing. It further ensures that continuity of the intervention approach is retained as staff leave and are replaced during the course of implementation (NORAD, 1999).

As all other theoretical tools, the logical framework approach is not perfect. The approach may trigger rigidity in project management in instances where initial project objectives and external factors are over-emphasised (NORAD, 1999). There is therefore, a need to ensure that there are regular intervention reviews where major components are assessed and readjusted accordingly (Garbutt and Bakewell 2005; NORAD, 1999). Furthermore, the approach is but a summary of key elements on an intervention and thus does not capture other crucial elements of an intervention like distribution of income, accessibility of resources, costs and feasibility of approaches and technology, employment prospects and effects on nature (Garbutt and Bakewell 2005; NORAD, 1999). The Logical Framework Approach therefore needs to complement and be complemented by other tools during intervention planning, implementation, monitoring and evaluation (Garbutt and Bakewell 2005; NORAD, 1999). Below is a tabular presentation of a logical framework:

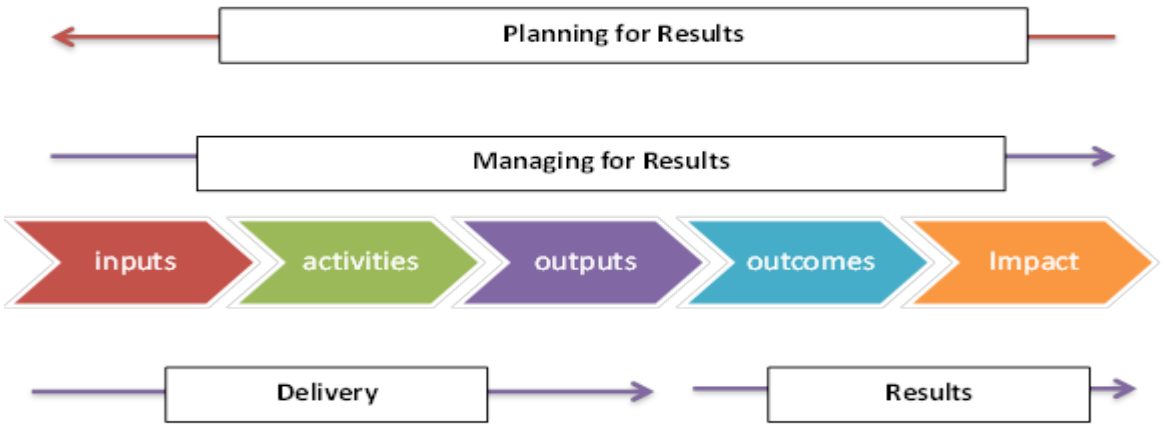
Table 3: Logical Framework (Informed by Spreckley (2009)

Results Chain	Indicators	Baselines	Targets	Assumptions	Risks
Impact					
Outcomes					
Outputs					
Activities					
Inputs					

The Logical Framework has its foundations laid on a results chain also termed the logic model by the W.K. Kellogg Foundation (1998). The results chain traces its roots to the field of evaluation more than thirty years ago and has been extensively used by institutions like the Foundations of Success in the conservation community since the 1990s (Stemet al., 2013). A results chain is an iterative route, of linking inputs to activities to outputs to outcomes and to impacts. The planning starts with the end in mind, which is the impact and outcomes of the intervention. It then moves backwards up to the inputs; however, implementation will start from inputs to the outcomes (Spreckley, 2009).

Stem et al. (2013) describe a results chain as a vital tool for assisting management to clearly define the theory of change forming the basis of the processes on an intervention. It helps management make explicit assumptions underlying particular actions and assist in setting objectives and indicators for measuring impact. The crucial undertaking in designing a good results chain is to ensure that each level of objectives directly links with and achieves successive levels in the hierarchy (Spreckley, 2009). If the link is not strong enough practitioners might need to change the objectives that are a weak link. Practitioners also need to take note of too ambitious higher objectives that will make the linkage between outputs and outcomes unrealistic (Spreckley, 2009). To ensure effectiveness, an intense thinking process and analysis need to be done before drawing up a results chain (Spreckley, 2009). It also has to be noted that a results chain, like a logical Framework, does not describe the entire intervention and does not necessarily represent the truth but remains a hypothesis of a development intervention (Stem et al., 2013). Below is a diagrammatic presentation of a results chain:

Figure 1: Results Chain (Adapted from Spreckley, (2009))



The results chain is drawn from the theory of Results Based Management (RBM) (Meier, 2003). Results Based Management is a management strategy intended to achieve significant changes in the way an intervention operates by enhancing performance results. It brings forth a comprehensive management framework, apparatus for strategic planning, monitoring and evaluation and risk management (Meier, 2003). The SMES (2009) identifies seven phases that make up Results Based Management and these are (i) formulation of the objective; (ii) development of indicators to show progress; (iii) setting of targets; (iv) monitoring of results; (v) performance measurement; (vi) evaluation and; (vii) utilisation of monitoring and evaluation information to improve interventions. Proper Results Based Management is a continuous process that provides constant feedback and learning through monitoring and evaluation in order to regularly modify plans as per arising need (UNDP, 2009).

Meier (2003) states that, the primary purpose of Results Based Management is to increase efficiency and effectiveness, and enhance accountability. This can be done through organisational learning and constant performance reporting. The key determinants of its success include stakeholder involvement throughout the intervention cycle, developing realistic expected results, monitoring progress, integrating learning in intervention implementation and assessing risks (Meier, 2003).

Results Based Management is a by-product of management concepts that have been evolving since the past sixty years (Meiers, 2003). During the 1960s, emphasis was on financial planning and cost accounting, and the focus was therefore, on management of inputs that included operating and capital cost and human resources amongst many others. The approach used then for ensuring management of inputs was the Planning, Programming and Budgeting Systems (PPBS) (Meiers, 2003).

The Programme Management By Activity (PMBA) followed the PPBS approach in the 1970s and 1980s (Meiers, 2003). The approach borrowed from the field of construction engineering and systems management. Its focus was on the implementation of processes conferring to a planned schedule. Tools like the Work Breakdown Structure (WBS), Critical Path Method (CPM), the Gantt Chart and the Programme Evaluation and Review Techniques (PERT) were the most prevalent at this time (Meiers, 2003).

In the mid-1970s, Management By Objective (MBO) approach became the talk of the day. The Management By Objective approach ran concurrently with the Log Frame Approach and its purpose was to set objectives and identify indicators for measuring performance (Meiers, 2003). It gave managers the liberty to design, plan and implement intervention even though this was done under a controlled environment (Meiers, 2003).

By the 1980s, government efforts were leaning towards client and service satisfaction and this led to the birth of a number of methods and approaches focused on service delivery. These included ISO Accreditation, Quality Assuarance and Total Quality Management (TQM) (Meiers, 2003). During this period, there was a revival of interest to track efficiency and effectiveness by establishing indicators to measure performance. This revival led to the Results Based Management approach in the 1990s whose focus was now on outcomes (Meiers, 2003). It can therefore, be noted that Results Based Management is an evolution of a number of management theories whose objective was to improve performance. The trend shows that Results Based Management might as well evolve to another approach and Sanahuja (2011) suggests that emphasis might be on Impact Evaluation in the next coming years.

The Results Based Management/Management for Development Results, the results chain, and logical framework are the building blocks or concepts for a results-based monitoring and evaluation framework. However, a Climate Smart Agriculture results-based monitoring and evaluation framework is informed by the Climate Smart Agriculture intervention. FAO officially defined Climate Smart Agriculture in 2010 as a context specific three-pillar approach to agriculture that: (i) sustainably and efficiently increases productivity and incomes; (ii) reduces or removes greenhouse gases; and (iii) enhances achievement of national food security and development goals (FAO, 2013).

The Climate Smart Agriculture concept can be traced to the industrial and green revolutions of the 20th century that left Africa in dire need to develop its industrial sector (IFPRI, 2002 and Nath, 1999). Climate Smart Agriculture is also linked to developments in agriculture that include the current Green economy approach that introduces a broader and integrated approach towards development in a changing climate. It proposes that development across all sectors including agriculture should take into account the context of a changing climate (UNEP, 2011). This therefore, embeds Climate Smart Agriculture in Climate Change approaches, which a number of authors have termed as adaptation approaches (Dinshaw et al., 2014; Sanahuja, 2011; Spearman

and McGray, 2011 and UFCCC, 2010). In summary, the Conceptual Frameworks of Climate Smart Agriculture results-based monitoring and evaluation framework can thus be presented as below:

Figure 2: The Conceptual Framework for the CSA Results Based Monitoring and Evaluation Frameworks

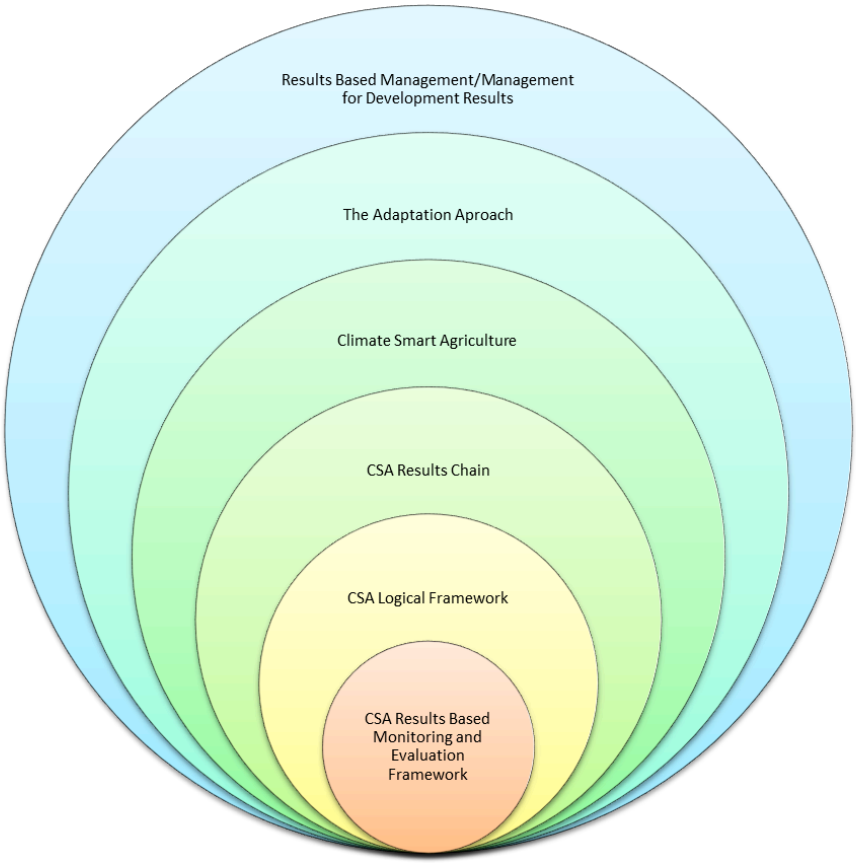


Table 4: Deepening the Conceptual Framework through the Logical framework Approach

Themes	Author	Question	Purpose	Data
Impacts	NORAD (1999), W.K. Kellogg Foundation (1998), Spreckley (2009), FAO (2013)	1. How would you define a CSA impact/impacts that takes into account productivity, mitigation and adaptation? 2. What major CSA impact/s do you think the Africa CSA Alliance (ACSAA) should aim at? 3. What major external factors will contribute to the achievement or none achievement of this impact/s? 4. How will ACSAA know that the intended impacts were achieved?	• To provide a contextual definition of impact/s within the Africa CSA Alliance RBM&E framework • To have a clear and common goal for the ACSAA • To document assumptions underlying the achievement of the impact/s • To define impact indicators for ACSAA	• Secondary data • Primary data
Outcomes	Dinshaw and others (2014), NORAD (1999), W.K. Kellogg Foundation (1998), Sanahuja (2011) Spreckley (2009), FAO (2013)	5. How would you define a CSA outcome that takes into account productivity, mitigation and adaptation? 6. Given the major CSA impact/s you just mentioned and taking into account the following facts: **a)** that climate change intervention outcomes like CSA take longer periods to manifest **b)** that governments and funders want to see immediate results and **c)** that the ACSAA will be implement activities for the next 5-6 years What would you recommend the ACSAA tracks as immediate and inter-mediate outcomes? 7. Why do you recommend these outcomes? 8. What major external factors will contribute to the achievement or none achievement of this outcome/s? 9. How will ACSAA know that the intended outcomes are being achieved?	• To provide a contextual definition of outcomes/s within the Africa CSA Alliance RBM&E framework • To have a clear and common scope of immediate and inter-mediate results the ACSAA seeks to achieve by 2021 • To document assumptions underlying the achievement of the outcome/s • To define the outcome indicators for ACSAA	• Secondary data • Primary data
Outputs	NORAD (1999), W.K. Kellogg Foundation (1998), Spreckley (2009), FAO (2013	10. How would you define a CSA output that takes into account productivity, mitigation and adaptation? 11. What major CSA outputs do you think will enable the ACSAA to achieve the impact/s, outcome/s you just mentioned? 12. What major external factors will contribute to the achievement or none achievement of these outputs? 13. How will ACSAA know that the intended outputs	• To provide a contextual definition of output/s within the Africa CSA Alliance RBM&E framework • To have a clear and common scope of immediate and inter-mediate results the ACSAA seeks to achieve by 20121 • To document assumptions underlying the achievement of the outcome/s • To define the output indicators for ACSAA	• Secondary data • Primary data

2.3 Methods, data, findings, and conclusions studies and determining of Results Based monitoring and evaluation Frameworks

In this section, past and current studies are reviewed to get an understanding of the approaches experts took in determining results-based monitoring and evaluation frameworks. The methods used, data collection and analysis processes and how data were presented are analysed. Conclusions on general trends in the approaches are then drawn.

When developing results based monitoring and evaluation frameworks, experts tend to use the qualitative methodology and employ case study designs in their research. When developing a results-based logical model for primary health care in Canada, Watson et al (2004), used a qualitative methodology and employed a case study design. Likewise, Garbutt and Bakewell (2005) used a qualitative research methodology to take stock of current reviews on how different international development NGOs utilise the Log Frame Approach (LFA).

Labuschagne (2013) also used a qualitative methodology in developing an integrated and transversal model for monitoring and evaluating rural development for the Limpopo Provincial Government in South Africa. Labuschagne (2013) also employed a case study design when executing the study. Vivideconomics (2011) also used a qualitative desk-based research to examine the monitoring and evaluation frameworks and the performance and governance of international funds across twelve finance institutions in the world. When analysing the trends, challenges and approaches associated with researching, monitoring and evaluating (R, M and E) Communication for Development (C4D), Lennie and Tacchi (2011) conducted a case study of the United Nations (UN).

Based on evidence from these studies, it can be noted that the qualitative methodology was the best approach for conducting this study. It can further be noted that the qualitative methodology for such studies was employed in the context of case study designs. As such, a case study design was considered relevant for this research as the researcher's focus was on a particular institution.

However, it has to be noted that comparison was also a key component in some of the similar studies. It was done either through literature review or by design of the study. When Stem et al. (2005) were reviewing trends and approaches to monitoring and evaluation (M and E) in conservation, they employed a comparative analysis across a number of different fields that included conservation, international planning, public health, education, family planning, business, social services and education. The rationale of the design was to draw key lessons learnt across the entire reviewed fields from which organisations could build their monitoring and evaluation systems (Stem et al., 2005). Likewise, Vivideconomics (2011) employed a comparative examination of twelve finance institutions in the world to draw lessons learnt and the findings were primarily based on the examination of secondary literature.

The studies in some instances went beyond their focus to capture emerging key issues that affected the variables under research. For instance, even though the study conducted by Vivideconomics (2011) was focused on examining the monitoring and evaluation frameworks of twelve finance institutions in the world, it went a few steps further to look at environmental and social safeguards, engagement of civil society organisations, financial management, perceptions of developing country 'ownership', and conflict management (Vivideconomics, 2011). Comparison of similar scenarios was therefore considered of great value in this study. Furthermore, the researcher realised the necessity of paying attention to vital emerging issues in literature review and in responses from key respondents.

In terms of primary data collection, various qualitative data collection processes cutting across iterative feedback mechanisms, focus group discussions, key informant interviews and workshops or conferences were utilised. For instance, Watson et al. (2004) used an iterative feedback mechanism in form of stakeholder consultations. A first draft of the results based logical model was developed based on policy analysis and literature review processes and then reviewed and revised over a period of nine months based on continuous feedback from key stakeholders. Garbutt and Bakewell (2005) had intended to conduct ten telephone interviews, however, they ended up utilising a simple structured questionnaire to widen their reach and 18 different organisations responded. Garbutt and Bakewell (2005) then followed up on some of the questions through

telephone interviews and further conducted other telephone interviews with key respondents.

Lennie and Tacchi (2011) conducted consultations with a fifteen-member Expert Panel from UNICEF including universities and consulting organisations from all over the world. Furthermore, eleven Communication for Development monitoring and evaluation specialists from seven United Nations agencies were also interviewed. To complement and validate data collected from the consultations and interview process, Lennie and Tacchi (2011) conducted two online surveys on issues, approaches, and challenges in Researching, Monitoring and Evaluation for Communication for Development. Fourteen Expert Panel members and ten UN Focal Points gave feedback on the survey. It can be noted that the studies utilised several data collection processes depending on the context. Furthermore, the studies were flexible enough to adjust the data collection processes to the changing situations but at the same time ensuring data quality and validity by making use of triangulation.

In terms of data analysis most studies utilised themes to make sense of the data with some using descriptive statistics depending on the subject matter under research. The CBD (2011) utilised thematic data analysis and presented findings in two themes which were further broken down into sub themes. Findings were further presented in form of descriptive statistics in tables (CBD, 2011). Stem et al. (2005) also employed thematic analysis and results were presentation in the same manner. Of interest is the approach taken by Watson et al. (2004) who analysed data and presented findings in thematic categories based on the key components of a results-based logical model. The researcher noted the approach taken by Watson et al. (2004) as the most relevant one for this study. Developing thematic categories based on a results-based logical model enables the researcher to present data at all levels of the results chain; that is at input, output, outcome and impact levels. A results-based logical model further enables the researcher to examine the environmental factors affecting the variables under study by determining the assumptions under which each one of them operates. It thus enables a comprehensive analysis of a results based monitoring and evaluation framework.

3 RESEARCH METHODOLOGY

This chapter discusses the methodological blue print of the study. It describes the research approach, the design and gives an account of the research procedures employed in the study. Finally, the reliability and validity issues are also discussed.

3.1 The research approach

This study utilised the Interpretive Social Sciences paradigm as it sought to describe and understand monitoring and evaluation variables under the climate change phenomenon in the Alliance context (Rhinesmith and Wolske, 2014). The paradigm is also best suited for case studies hence its applicability to this research (Vine, 2009).

Rajasekar et al. (2013) states that a research strategy is a systematic approach to solving a problem. It is a science that defines how a study should be carried out. There are three types of research strategies and these are qualitative, quantitative and mixed research methodologies. Bours et al. (2014) conducted a qualitative desk study to review approaches in evaluating programmes through a climate adaptation lens in the coastal areas in Asia and the Pacific. Garbutt and Bakewell (2005) also used a qualitative research strategy to take stock of current reviews on how different international development NGOs utilise the Log Frame Approach (LFA). When assessing the development of ecosystem service indicators across the globe the Convention on Biological Diversity (2011) used a qualitative research strategy to synthesise findings from several reviews and consultations with experts on a project focusing on ecosystem service indicator development and utilisation. A qualitative strategy was thus best suited for this kind of study. Qualitative strategies are primarily focused on non-numerical data such as behaviour description and they are flexible and allow for freedom of inquiry and normal progression of action, which this study intended to capture (Henning et al., 2004).

3.2 Research design

Wagner et al. (2012) define a research design as a blueprint of the study. It tells the researcher how s/he is going to conduct the study. There are five types of research designs and these are experimental, case study, comparative studies, cross sectional and longitudinal. This study utilised a single case study design. A case study is "…an

approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources" (Baxter and Jack, 2008: 544). It is a "…systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest" (Bromley, 1990: 302). Baxter and Jack (2008) argue that when used appropriately, case studies can enable researchers to develop theory, assess programs, and design interventions.

When developing a results-based logical model for primary health care in Canada, Watson, et al, (2004), used a qualitative methodology and employed a case study design. When analysing the trends, challenges and approaches associated with researching, monitoring and evaluating (R, M and E) Communication for Development, Lennie and Tacchi (2011) conducted a case study of the United Nations. Labuschagne (2013) also used a qualitative methodology in developing an integrated and transversal model for monitoring and evaluating rural development for the Limpopo Provincial Government in South Africa.

This was a case study whose parameters were bound by the Alliance means of operation which are Africa wide. The Alliance comprised of five International Organisations: CARE, Catholic Relief Services (CRS), Concern Worldwide, Oxfam and World Vision and four technical partners: United Nations' Food and Agricultural Organization (FAO), Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), the research consortium CGIAR, and the Forum for Agricultural Research in Africa (FARA). All the nine organisations are bounded by a Memorandum of Understanding. This study was therefore, within the boundaries of the MoU that all Alliance members signed.

3.3 Research procedure and methods

3.3.1 Data collection instrument

The Family Health International (2004) states that there are three main data collection approaches in qualitative research methods and these are participant observation, in-depth interviews and focus group discussions. They all use specific data collection instruments. Observation makes use of a schedule, while in-depth interviews may use structured, semi-structured and unstructured data collection instruments. Focus group

discussion also use interview guides (Sage, 2007). This study utilised a semi-structured guide to conduct in-depth interviews as the researcher sought a deeper understanding of the variables that were being investigated. The semi-structured guide was tested with three colleagues working with the researcher. The work colleagues were readily available and assisted the researcher to refine the interview guide.

Garbutt and Bakewell (2005), Lennie and Tacchi (2011) and Vivideconomics (2011) all used a semi-structured interview guide when conducting similar studies. A semi-structured interview guide allowed for flexibility in interviews that consequently enabled the researcher to get a worldview insight from the responded on the problem. It gave the researcher room to manoeuvre as he interviewed the respondents and made follow up questions on findings thus providing an in-depth understanding and rich data on the problem (Sage, 2007).

The Alliance is made of nine organisations implementing different CSA approaches from on farm practices to policy interventions. Their perspectives were likely to differ on how the CSA RBM&E framework for the Alliance should look like. A semi-structured interview guide therefore provided flexibility in capturing important data that might not have been catered for by the researcher in the design of the data collection tool. Such data was necessary in providing comprehensive perspectives of how Alliance members perceive the mandate of the Alliance and what it seeks to achieve.

3.3.2 Target population and sampling

Sampling is the process of identifying and picking target respondents from a population (Family Health International, 2004). There are three common techniques of sampling in qualitative research and these are purposive sampling, quota sampling and snowballing (Family Health International, 2004; Harden, 2009, and Wagner et al., 2012). This study used purposive sampling. Purposive sampling organises participants in line with predefined criteria relevant to the research question (Family Health International, 2004, Harden, 2009, and Wagner et al., 2012).

The sampling criteria for the study was predefined by the research question and the nature of the study. This study drew from the development sector with sub components being climate change, agriculture, CSA RBM&E. This therefore, implied that the target

population for this study be comprised of Alliance members and external experts from the fields of development studies, climate change, agriculture, CSA RBM&E.

The external experts enabled the study to provide a global perspective on the development of CSA RBM&E frameworks. The Alliance members helped to bring out perspectives that are specific to the Alliance context. The combination of data from both groups helped in bringing out comprehensive results informed by both external and internal expert opinion.

3.3.3 Ethical considerations when collecting data

A Masters Student was conducting this research in Public and Development Management sector Monitoring and Evaluation supervised by the WITS School of Governance. The student also sat in the steering committee of the Alliance. He was therefore, playing the role of the observer participant in this study. The Family Health International (2004) states that research ethics are primarily concerned with the interaction between researchers and the respondents or the target population. Whenever a study is conducted the research question is a secondary issue but the welfare of research participants should always be a priority. According to Bryman (2012), ethics play a key role where there is possibility of harming the participants, lack of informed consent, possible invasion of privacy and where deception is used during the research process. The ethical considerations in the study aimed at ensuring that the research processes were conducted professionally and that no ethical infringements were exerted to the participants either physically or emotionally.

This study ensured that all research participants or respondents were respected. Their dignity and confidentiality of their opinion came first in all data collection processes. Furthermore, the researcher ensured that there is informed consent by respondents by detailing and explaining what the research was all about and the implications therein. The researcher asked the respondents for permission to be interviewed, to speak, ask questions and record the interviews. The researcher also ensured that interview schedules and time were respected. He was flexible enough to reschedule when respondents were unable to take the interviews at the time proposed earlier.

3.3.4 Data collection and storage

In-depth key informant interviews were conducted with fifteen experts of whom forty percent were members of the Alliance. The interviews were either face to face, telephonic or on Skype. In some instances, eight respondents proposed to provide their responses on the questionnaire then follow up with interviews. The responses were concise and strait to the point and allowed for easy data analysis. This further enabled the researcher to save on time and review responses prior to follow up interviews and target key issues that required in depth discussions. The greatest challenge that was encountered by the researcher was the response rate from respondents. The request for interviews was sent to thirty experts and only fourteen responded after persistent follow ups.

During the interview, the researcher did not only take the responses at face value, but also analysed the non-verbal signals that accompanied the responses to get the full meaning of the feedback. Data was then downloaded from the recorder and into a laptop and password secured and stored. Data was also backed up on a desktop.

When conducting similar studies, Watson and others (2004) developed a model M and E framework that was reviewed by experts. They then followed up with key informant interviews to conduct in-depth inquiries on glaring issues. Garbutt and Bakewell (2005) and Stem and others (2005) also conducted key informant interviews when conducting similar studies. However, Garbutt and Bakewell (2005) went on to conduct key informant interviews over the phone as they could not access some of the respondents.

3.3.5 Data processing and analysis

The researcher intended to come up with a model CSA RBM&E framework. After all data were collected, they were transcribed and analysed. Data analysis is crucial in eliminating chaos and making sense of data for purposes of data interpretation. The process requires imagination, self-control and a methodical approach (Powell and Renner, 2003). Qualitative data analysis involves organising text and therefore, Russell (2013) describes the process as an art that requires creativity and discipline.

For this study, data analysis drew from the logical framework and a deductive content analysis approach was used. A deductive content analysis is usually used in instances

where the searcher wants to retest prevailing data in a new environment. This might include testing concepts, categories and models (Kyngaॅs and Elo, 2007). This approach to data processing and analysis was the most relevant of this study as it sought to derive a model Climate Smart Agriculture results-based monitoring and evaluation framework.

As proposed by Kyngas and Elo (2007), the researcher selected the units of analysis, made sense of the data and developed an analysis matrix drawn from the logical framework on which themes and data were classified and categories derived. In this instance themes were preconceived from the basis of a logical framework. They followed the results chain that is inputs, outputs, outcomes and impacts. They were then subdivided into specific categories emanating from the data and these formed the basis of data interpretation (Powell and Renner, 2003). The researcher utilised pre-set themes and emergent categories to ensure that data analysis was comprehensive. Horizontal and vertical relationships between categories, themes and research questions were established to facilitate the interpretation of data (Powell and Renner, 2003).

3.3.6 Description of the respondents

This researcher interviewed a target of fifteen respondents based on the broader field of study. Forty percent of the respondents were from the Alliance. The respondents included practitioners from the field of development, climate change, agriculture/Climate Smart Agriculture and monitoring and evaluation. With this composition of respondents, the study provided comprehensive conclusions on the development of CSA RBM&E framework.

3.4 Research reliability and validity measures

Reliability refers to the extent to which a study method can be replicated (Tolores, 2007) while validity refers to the extent to which accurate data is collected in a study (Wagner et al., 2012). Golafshani (2003) argue that in qualitative research reliability and validity are intellectualised as trustworthiness, rigor and quality. Using field experts ensured that the study gained credibility, trustworthiness and dependability as feedback from the respondents were expert oriented.

It is hoped that this study will be replicable for other CSA initiatives with a similar theory of change to that of the Alliance especially in an African setting. This study also has an ecological bearing as it enables practitioners implementing Alliance initiatives to learn from the process through the CSA RBM&E framework. This provides practitioners with a deeper insight and evidence based understanding of what works and what does not. This understanding enables practitioners to avoid implementing CSA components with a potential for mal-adaptation that might jeopardise the livelihoods of the people in the future within a changing climate.

3.5 Research limitations

Limitations are issues that arise from the study that the researcher has no control over. Limitations may affect the rigour of the research and thus affect issues of reliability and validity of the study (Simone and Goes, 2013). Some scholars have sub-divided limitations into two categories, that is, methodological limitations and limitations of the researcher (University of Southern California, 2015).

a. Methodological Limitations

   This was a case study and Simone and Goes (2013) argue that such studies focus on one unit of analysis which might not be representative of other related objects of assessment, hence making it a challenge to generalise findings. CSA RBM&E frameworks and CSA are fairly new concepts that have not been studied much. The University of Southern California (2015) states that unavailability of baseline studies on a particular topic may pose as a limitation. However, this also provided an opportunity for the researcher to conduct an in-depth analysis of the topic under study which was what this study sought to achieve.

   The data collection method limited the validity of this study. Information might have been distorted through interviewee recall error, biasness and the urge to impress the interviewer (Altheide and Johnson, 1994). Furthermore, flexibility likely caused inconsistences throughout the interviews. The amount of information was very large and hence a challenge to transcribe thus diminishing data.

b. Limitations of the Researcher

The researcher was both an employed parent and student. This therefore, meant that his focus and efforts were divided into providing for his family, delivering on his work outputs and this research assignment. The researcher engaged with his employers to ensure that adequate time was also allocated to the study.

3.6 Delimitations of the research

Delimitations are those components or characteristics of a study that define and determine the scope of the research and are in the researcher's control (Simon, 2011). This study focused on the development of the CSA RBM&E framework considering issues of applicability and utilisation in the African context. The study based the CSA RBM&E framework on the logical framework (Spreckley, 2009) which is discussed in depth in chapter 2. This therefore implies that most of the variables and attributes of the study were derived from the logical framework on which the CSA RBM&E framework was then built.

4 PRESENTATION OF DATA

In this chapter, the research data is presented thematically. The research sought to answer the following research question:

What will be the most appropriate CSA RBM&E framework for assessing outcomes and impacts for the Africa Climate Smart Agriculture Alliance?

The sub questions that guided the answering of the main research question are as below:

1. What are the basic theories underlying the development of RBM&E frameworks?
2. What variables are the key building blocks for CSA RBM&E frameworks?
3. What CSA indicators can be used to develop CSA RBM&E framework for the Africa Climate Smart Agriculture Alliance?

The data were generated from fifteen key informants who are specialists in development work, agriculture, climate change, CSA RBM&E. Of the fifteen key respondents, six were from the Alliance and they comprised of CARE, Catholic Relief Services, Concern Worldwide, NEPAD, World Vision and FANRPAN. Below is a table with the profiles of the respondents:

Table 5: Respondents Profiles

Respondent	Level of Qualification and Field	Country
1	Professor in Agriculture: Animal science	Zimbabwe
2	Professor in Agriculture: Crop Production	Mozambique
3	Doctor: Green Economy	Uganda
4	Doctor: Climate Change Modelling	South Africa
5	Master: Rural Development	Zambia
6	Master: Public Management	Uganda
7	Master: Climate Smart Agriculture – Conservation Agriculture	Zambia

8	Professor: Agriculture and climate change	Swaziland
9	Master: Agriculture Sciences	Zimbabwe
10	Master: Agriculture Post Harvest Management and Gender	South Africa
11	Doctor: Agriculture Sciences	Tanzania
12	Master: Development	Malawi
13	Professor: Agriculture and climate change	Botswana
14	Doctor: Agriculture Monitoring and Evaluation	South Africa
15	Professor: Agriculture Postharvest Management	Uganda

The researcher conducted interviews himself including the transcription of verbal data into written form. The generation of themes was theory driven as it follows the structure of a logical framework presented below.

Table 6: Logical Framework (Informed by Spreckley (2009))

Results Chain	Indicators	Baselines	Targets	Assumptions	Risks
Impact					
Outcomes					
Outputs					
Activities					
Inputs					

The analysis focuses on impacts, outcomes, outputs and inputs as key variables, with their corresponding indicators and assumptions and or risks. Baselines and targets were not analysed as these required different processes that were outside the scope and time limit of the study. Baselines and indicators are more at operational level and will require specific studies and approaches to be generated.

4.1 Proposed Climate Smart Agriculture Impacts

Respondents identified several impacts that the Alliance could look into. The impacts were focused on the agriculture, natural resources and development components. The researcher therefore identified these as key themes under impacts.

Eleven of the key informants defined a CSA impact as a situation that reflects reduced vulnerability to climate change. Respondent 7 (November 2016) stated that, "A CSA impact will be one that reflects reduction on vulnerability and enhanced food security to rural communities plus sustainable environmental protection". It is a scenario where "food security is enhanced and the environment is sustainably protected among rural communities" (Respondent 7, November 2016). Four of the respondents felt that CSA impacts are positive changes in food availability, income generation and reduced greenhouse gas emissions as a result of improved adoption of CSA practices by farmers and accompanying enabling policies by governments.

All the eleven respondents presented a CSA impact from a sustainable development perspective, particularly rural development. They stated that at impact level CSA should bear sustainable development results that are improved economic gains, environmental health and enhanced social values. One of the respondents felt that "farmers should be able to strike the balance in achieving the three objectives under sustainable development", (Respondent 12, October 2016). The impacts should have "improved productivity, adaptation, and mitigation as key building blocks that facilitate achieving food security and the development goal under Climate Smart Agriculture", (Respondent 6, October 2016).

The issues of context were also prominent in the definitions given by nine of the key informants. They felt that CSA impacts should have technical relevance, originality, innovation, and sustainability. The impacts will be a scenario where "Climate Smart Agriculture technologies are found to be usable by farming communities", (Respondent 3, November 2016). Hence, the Alliance should aim for community level impacts, those in which farmers can rely on and sustain even in the absence of outside assistance.

One of the experts, (Respondent 8, December 2016) also highlighted that impacts should be measurable. They should be prominently visible at societal level. The respondent stated that:

> Impact, which is measurable, should happen at societal level. Impactful changes brought about by CSA initiatives should reflect on improved resilience by the farming households. This therefore means that practitioners should track reduction in vulnerability levels of communities and bear in mind that improvements in productivity, mitigation and adaptation are a means to achieving CSA impact.

Impacts should show evidence of improved resilience at farming household level therefore evaluation M & E practitioners should track reduction in vulnerability levels of communities.

4.1.1 Agricultural impacts

The most recurring impact was "improved productivity". Ten respondents felt this impact was more urgent and was a means of enhancing food security. Respondent 1 (October 2016) defined productivity at household level as "…the ability of smallholder farmers to produce enough food that would sustain them year round especially in times of external shocks". Three of the respondents felt that productivity should encompass "food, income and nutritional security of smallholder famers in Africa" (Respondent 1, 7 and 12, October and November 2016).

Productivity was also linked to production systems by three of the respondents. One of the three respondents (Respondent 5, Oct 2016) highlighted that "the diversity of the production systems is actually a proxy indicators for adaptation". Respondent 3, (November 2016) stated that "If farmers are engaged in mono-production systems then they are vulnerable to external shocks, but if their production systems are diversified their resilience levels go up". Diversified production systems in this instance included crop, livestock and alternative sources of income like village savings and lending as highlighted by one of the respondents.

4.1.1.1 Agricultural impact indicators

Five of the respondents stated that some of the observable indicators for productivity at household level included the ability of farmers practicing CSA to produce food even in times of natural shocks such as droughts. The level of production per hectare at household level was also identified as a way of determining productivity. Four respondents highlighted the number or percentage increase in the number of farmers recording better yields due to CSA as one way for measuring productivity at household level. Respondent 11 (October 2016) highlighted the "…percentage of farmers adopting suitable crop or animal types and varieties or breeds in view of extreme weather events." as a proxy indicator for productivity. Respondent 5 (October 2016) highlighted that the "…reduced or absence of the need for food hand-outs" is one indicator that reflects on improved productivity at household level. Three respondents highlighted dietary diversity as one indicator to measure the nutritional component under productivity. Respondents 5 (October 2016) also stated that "If farmers are able to produce enough

diversified foods or are able to produce more than enough so that they are able to buy supplementary foods for their diet then that reflects on improved productivity".

4.1.2 Environmental impacts

Improved environmental health was considered to be a crucial impact under the environmental component by seven respondents. Six of the seven respondents also felt that increased levels of awareness on climate change and Climate Smart Agriculture among practitioners and farmers could be an impact in its own right. "Increased levels of awareness provide an assumption that the concerned target group will act on climate change effects by applying Climate Smart Agriculture practices" (Respondent 12, October 2016). The increased efforts by farmers to reduce the carbon foot print through carbon sinking using massive or expansive growing of grasses and trees was also considered an environmental CSA impact by two of the respondents. One of the experts, Respondent 11 (October 2016), felt that "…improved nutritional packages that limit greenhouse gas emission (GHGE) from enteric fermentation by ruminants and manure production from intensive-factory or industrial or very intensive farming." is an impact that could be considered. Four respondents also strongly felt that improved soil fertility is an impact under the environmental impacts. Their opinion was that soil and water are the basis for all agricultural activities and thus impacts should be felt or be visible at landscape level. Respondent 7 (November 2016) highlighted that "a healthy environment is key to agricultural productivity therefore the base impacts should be at landscape level".

4.1.2.1 Environment Impact Indicators

Improved soil fertility that can be measured by improved organic matter in soils was considered as an indicator of environmental health by four respondents. "Improved moisture composition in soils." was also identified as an indicator that is closely linked to that of improved organic matter in soils by Respondent 5 (October 2016). Diversification of species in tree, animal and microorganisms in the environment was also highlighted as a key indicator of improved environmental health by the four respondents.

4.1.3 Economic Impacts

Improved economic status by smallholder farmers was highlighted as a key impact by fourteen key informants. Respondents felt that CSA should ensure economic gains

through profits generated as a result of improved productivity but at the same time upholding community social values.

4.1.3.1 Economic Impact indicators

Economic indicators highlighted by the respondents include improvement in the national food production index. Respondent 3, (November 2016) highlighted that, "Improved public spending on CSA as a percentage of Gross Domestic Product from the agriculture sector." is an important indicator for economic impact. The majority of the respondents felt that some of the indicators that should be observed over time include CSA technology adoption rate, viable farmer groups engaged in climate smart agribusiness enterprises, access to roads, access to credit, improved farmer profit, percentage of farmers living above the poverty line, access to farmlands, access to markets, reduction in farmers' production cost, increased employment in the agricultural sector, increased extension-farmer ratio and farmer savings.

4.1.4 Social Impacts

Ten respondents highlighted that improved social stability is one impact that CSA should aim to achieve. Social stability was centred more on people's cultures, practices and change of attitudes as these have a bearing on the adoption of CSA. What became apparent though when interviewing some respondents was that "…there should be a balance between agriculture, environmental, economic and social impacts." (Respondent 3, 5, 7 and 12, October and November 2016). Respondent 12 (October 2016) stated that "…there should not be one impact that is prioritised over others". The achievement of one or more impacts should not negatively affect the others but rather should enhance sustainability. Linked to culture was also the issue of "social value", (Respondent 12, October 2016). Respondent 12 (October 2016), highlighted that a coherent achievement of the intended impacts could only be achieved if communities realised social value in them. It was therefore made clear by the respondents that communities needed to be made aware of the value of CSA and how it has a bearing on the environment, agriculture, economy and their social well-being.

4.1.4.1 Social Impact Indicators

One respondent highlighted that "…if households are becoming healthier and happier and have time to do other things like leisure then social stability is being achieved" (Respondent 10, November 2016). The availability of time to do other leisurely activities

at household level was highlighted as very important particularly for women's work load. Respondents 12 (October 2016) indicated that "Climate Smart Agriculture should reduce the work load for agricultural activities that are normally done by women". Climate Smart Agriculture should ensure that households save more time to do other activities. "Enough time enables women in particular to plan and serve their families much better" (Respondent 12, October 2016). Responded 10 (November 2016) indicated that some scholars argue that "agriculture is the culprit for issues like malnutrition, household disintegration and other calamities as its heavy-laden activities deprive women of the time they need to fend for their families, cook healthy foods and have time with their husbands". Respondent 12 (October 2016) highlighted that "Husbands in some instances end up marrying second wives because the first wife does not have time to take good care of herself and look presentable (beautiful) to her husband. In essence that is women abuse of which CSA should rectify".

4.1.5 Policy Impacts

A conducive policy environment was highlighted by all respondents as a very important impact. This was highlighted as the cornerstone for CSA impacts. Respondents highlighted harmonised CSA policies at national level as the ultimate policy impact. Respondent 13 (2016) highlighted that:

> Different line ministries like the Ministry of finance, Economic planning, Ministry of environment, agriculture and other sectors that have a stake in Climate Smart Agriculture and whose target is the smallholder farmer should be in a position to develop harmonised policies and have a clear cross-sectoral implementation approach.

The respondents felt that policies at this level should support subsidies on environmental friendly farm inputs like organic fertilisers they should consider the farmer as the first unit for protecting the environment through CSA and social values that promote the protection of ecosystems.

4.1.5.1 Policy Impact Indicators

There were a couple of indicators that were proposed by the respondents. These include "number of joint Climate Smart Agriculture related policies developed; new policies put in place by government in support of Climate Smart Agriculture; number of Climate Smart Agriculture related programmes developed; number of Climate Smart Agriculture related programmes implemented; number of Climate Smart Agriculture related projects developed; number of Climate Smart Agriculture related projects implemented; number

of extension officers knowledgeable in Climate Smart Agriculture and levels of investment injection by governments and donors e.g. irrigation schemes, introduction of crops/ cultivars more adapted to the prevailing climatic conditions".

4.1.6 Assumptions and or Risks underlying the achievement of impacts

There are several preconditions that were identified as drivers for the attainment of the proposed impacts. Eight respondents indicated that there will be need for capacitated extension services and adaptive research in the countries to develop and disseminate context specific CSA practices if the proposed impacts will be achieved. Extension services or actors need to have "…the same message or approaches to avoid conflict at farmer's level which might end up causing confusion" (Respondent 2, December 2016).

Respondent 8 (December 2016) felt that the farmers' level of adopting the developed Climate Smart Agriculture technologies will also be determined by "…their capacity to take up the innovations". Farmers should have adequate knowledge or understanding about CSA for them to be able to appreciate and adopt the concept. Beside their capacity, Respondent 12 (October 2016) felt that "…farmers need to have a positive attitude towards Climate Smart Agriculture". Respondent 8 (December 2016) highlighted that "…farmers will adopt Climate Smart Agriculture techniques if they see or experience the benefits therein". Respondent 7 (November 2016) pointed out that most "…farmers are currently sceptical of adopting Climate Smart Agriculture concepts and technologies as they believe that one produces more in conventional farming as compared to Climate Smart Agriculture".

The capacity of ecosystems and the natural environment to withstand the negative impact of climate change was also highlighted as a key factor for success at impact level by two of the respondents. Respondent 5 (2016) stated that, "…moisture is the only limiting factor to yield increase and not the unavailability of other inputs such as fertilizer". Their emphasis was that there is need to increase the moisture content in the soil by improving its organic content and consequently its fertility. Respondent 3 (2016) also highlighted that there will be need for farmers to understand that "…increased food production does not mean increase in land cleared for agricultural activities". Increase in land for agriculture activities will lead to the clearing of forests thereby reducing opportunities for carbon sinking through photosynthesis.

Six respondents noted that the availability of Climate Smart Agriculture technology, tools and information is a necessity to achieve the impacts. Respondent 4 (November 2016) indicated that "Climate Smart Agriculture technologies should be affordable for smallholder farmers as this has a bearing on their cost of living". The presence of supporting institutions including working or functional financing mechanisms to support farmers financially was also a major building block.

Respondent 11 (2016) said that a "…sound structure for input and output markets for products from Climate Smart Agriculture practices." is as one of the pre-requisites for the attainment of impacts. The policy environment was presented as a compulsory factor for the success at impact level by all the fifteen respondents. Respondent 8 (December 2016) indicated that "…there should be policies in place that support Climate Smart Agriculture and its implementation". Enabling agriculture marketing and fiscal policies incentivising the farmers to adopt Climate Smart Agriculture practices was perceived as being crucial by the respondents. Respondent 3 (2016) emphasised that "A favourable policy environment will go a long way in ensuring the achievement and nurturing of impacts". The availability of funding was also seen as a key driver for success by eight of the respondents.

4.2 Proposed Climate Smart Agriculture Outcomes

Respondent 1 (2016) defined outcomes as

> …increased adoption of Climate Smart Agriculture practices at field level and enabling policies by governments that make farmers produce enough food under a changing climate while at the same time reducing their emission contributions from their farming and better still from their livelihood activities.

Eight of the respondents highlighted that outcomes include those results that show increased productivity, and resilience of agriculture and food systems to climate change. They should show reduced environmental damage caused by poor farming practices and emission of greenhouse gases. Respondent 14 (December 2016) highlighted that "Outcomes are evidence of farmers being able to produce more food to improve food and nutrition security and boost the incomes of families who rely on agriculture for their livelihoods". Respondent 14 (December 2016) also indicated that "Climate Smart Agriculture outcomes should indicate reduction in vulnerability to drought, pests, disease and other shocks; and be evidence of improved capacity to adapt and grow in the face of longer-term stresses like shortened seasons and erratic weather patterns".

Respondents 11 (October 2016) outlined that:

> Outcomes develop over time that is, (i) short-term outcomes which are likely to be changes in skills, attitudes, and knowledge; (ii) medium-term outcomes that often include changes in behaviour and decision making; and (iii) long-term outcomes that may involve changes in the social status or life conditions.

Respondents also felt that for Climate Smart Agriculture, outcomes should reflect the following three areas: increasing agricultural productivity and incomes; adaptation and building of resilience to climate change; and reducing and/or removing greenhouse gas emissions, where possible.

Respondent 1 (October 2016) indicated that:

> …for productivity, "outcomes should be measurable in terms of yields per hectare or per animal; for mitigation; they should be measurable in terms of the damaging effects to food production potential foregone because of implementing Climate Smart Agriculture while for adaptation, they should be measurable in terms of new practices and their adoption levels showing how they have negated poverty and natural resource degradation.

One respondent felt that outcomes should be categorised into technical, financial, institutional, and economic results.

4.2.1 Proposed Climate Smart Agriculture Outcomes

The outcomes were divided into three main themes that is, immediate outcomes, intermediate outcomes and long-term outcomes. Inputs from the respondents were then analysed as categories under the main themes. The CSA theory was positioned into the logical framework in order to build the theory of change.

4.2.1.1 Immediate outcomes

Five respondents highlighted that the acceptance of CSA by farmers is a success on its own under social impacts as it highlights the will by farmers to change their culture. The actual practice of Climate Smart Agriculture at farm level is also a reflection of social impacts as it shows a positive attitude towards the agronomic practice by farmers. Respondent 12 (2016) highlighted that "In some cases farmers may accept Climate Smart Agriculture as an agronomic practice but might not be willing to adopt it. Therefore, there is need to go further and measure farmers' willingness to adopt under immediate outcomes".

Respondent 13 (December 2016) highlighted "assured harvest levels after implementing Climate Smart Agriculture in the face of climate change" as one immediate outcome that could be considered. Respondent 13 (December 2016) further, identified "increased incomes, increased food security, improved nutrition, new varieties or breeds and availability of new technical and scientific knowledge on Climate Smart Agriculture" as immediate outcomes that could be tracked by the Alliance.

4.2.1.2 Immediate outcome indicators

Under the immediate outcome indicators, Respondent 6 (October 2016) highlighted that the Alliance should track "…farmers reached with Climate Smart Agriculture technologies and the enabling policies influenced to favour the promotion of Climate Smart Agriculture". Furthermore, they should track the number of farmers adopting Climate Smart Agriculture technologies being promoted. Respondent 8 (December 2016) also highlighted that "…in the interim the Alliance should track the agricultural activities and productivity trends of farmers that have adopted Climate Smart Agriculture practices".

The Alliance may also track if producers are demonstrating improved knowledge on the costs, benefits and trade-offs of adopting CSA technologies. Farmer engagement with extension services and government engagement with CSA partners may also be tracked. Respondent 14 (December 2016) indicated that, measuring farmer engagement with extension services and government "…is essential as it forms part of the evidence base for assessing if Climate Smart Agriculture is being adopted by both governments and farmers, before realising the impact on the climate – which is rather long-term".

4.2.1.3 Intermediate outcomes

Eleven respondents identified increased adoption of CSA as an agronomic practice by smallholder farmers as an intermediate outcome. This intermediate outcome is also appearing as an indicator under immediate outcomes. There is need to analyse the pattern of these variables against the conventional thinking of the log frame. Respondent 14 (December 2016) emphasised that "farmers should be in a position to adopt Climate Smart Agriculture as an agronomic practice after five to six years". She outlined that this is because when you train farmers they need to internalise the knowledge, which they would then put into practice. She further indicated that once this is regularly practiced it then becomes a habit and eventually a culture; "cultures are not built within a year or two they take time to manifest". Therefore, there will be need to

clearly think about long term outcomes whilst thinking about the intermediate outcomes.

Respondent 14 (December 2016) highlighted that,

> As much as immediate outcomes are important to donors or funders, there is need to consider long term outcomes that will have lasting effects. Some immediate and intermediate outcomes are not sustainable as farmers would engage on them to impress the implementers but they will immediately drop them after the project ends. For that reason there is need to pay attention to behaviour change as one of the intermediate to long term outcomes.

In fact, six respondents felt that Climate Smart Agriculture projects need between ten and twenty years for farmers to have adequate time to internalise them. Respondent 6 (October 2016) indicated that there are a lot of things farmers need to know, "…it actually took long for farmers to accept conventional farming itself".

Respondent 10 (November 2016) further highlighted that "Climate Smart Agriculture is not for the faint hearted it takes a lot of energy and commitment to adopt". However, this statement was more in contradiction to that of one responded who highlighted that Climate Smart Agriculture should ease the burden that comes with on-farm agricultural activities particularly for women. This contradiction might be implying that there are some CSA practices that are labour intensive and some that are less labour intensive. The amount of labour required on the on-farm CSA practice has an implication on their adoption rate. The more labour intensive they are, the low their adoption rate is and the less labour intensive they are, the higher the adoption rate. This statement might also be implying that there are some CSA technologies that are only "climate smart" but do not consider other key factors outside the climate like labour intensiveness which of course has a bearing on women and children who perform most of the agricultural activities in the African context. Some of these factors that are outside the climate may affect the adoption rate as an intermediate outcome either positively or negatively.

Improved environmental management in areas where farmers are practicing CSA was also presented as an intermediate outcome by four respondents. This is closely linked to healthy environments and improved farm soil fertility in areas where CSA is being practiced. These environmental intermediate outcomes were presented as environmental impact indicators by some respondents. This might imply that some outcomes are indicators of impacts. There is a chance that the logic of the logical framework is not just horizontal and vertical but follows rather follows a reflexive pattern. Four

respondents also highlighted the reduction of environmentally unfriendly practices as an intermediate outcome.

Increase in the number of farmers knowledgeable in CSA and increased income levels at household level as a result if CSA were also noted as intermediate outcomes by the five respondents. Increased incomes seemed to be recurring at impact level under agriculture impacts as well as under immediate outcomes. This trend suggests that incomes are an important outcome and should be tracked up to impact level. This implies that incomes should be incremental over time within households practicing CSA. Ultimately, at impact level, one respondent highlighted that farmers should reach a level of income security. This was quite interesting as income security implies availability, access, utilization, and stability of incomes among smallholder farmers.

Nine respondents further highlighted the availability of food year-round as an intermediated outcome. This is closely related to sustained higher yields that increase annually as mentioned by some respondents. Respondent 15 (November 2016) further highlighted that "…sustained yields are a reflection of agricultural growth or productivity among smallholder farmer communities". He further indicated that "…yield increase should be the primary target and mitigation and adaptation should be consequential benefits of Climate Smart Agriculture".

However, these outcomes are closely related to food security appearing at impact level and at immediate outcome level. This therefore gives an indication that there should be a clear chain tracking the process of improved food availability from outcome level to food security at impact level. Under intermediate outcomes, respondents are not necessarily highlighting food security but rather a component of it which is food availability through increased yields. This implies that food availability might be an entry point at intermediate outcome level for tracking and nurturing productivity towards food security, of course without compromising on sustainable development outcomes as indicated by the respondents under impacts.

"Better resilience levels by farmers, crops and animals to unexpected extreme weather events also termed as the level of preparedness underpinned by vigilance of the people and hardiness and vigour to stress by plants and animals" was presented as an intermediated outcome by Respondent 5 (October 2016). This is closely linked to one of the intermediate outcomes which Respondent 6 (October 2016) termed – "better

livelihoods as a result of Climate Smart Agriculture". Better resilience levels of farmers and the agroecology and better livelihoods might lead to "increase in the number of healthier and happier households" highlighted by Respondent 12 (October 2016).

4.2.1.4 Intermediate outcome indicators

Immediate outcome indicators suggested by almost all the respondents include the number of farmers reached with CSA practices. Seven respondents highlighted that the Alliance should also measure the number of farmers adopting and sustaining CSA over at least three seasons. Respondent 14 (December 2016) felt that "…farmers engaging in Climate Smart Agriculture for only one or two seasons should not be considered as adopters. Adopters should be those that consistently sustain the practices for over three or more season". Respondent 7 (November 2016) felt that besides the adoption rates of direct beneficiaries of the initiatives "…the Alliance should further measure the number of farmers adopting CSA practices as result of learning from other farmers". Those farmers that are also training others should also be measured.

Ten respondents felt that the Alliance should also measure the number of households reporting increase in their income as a result of adopting CSA practices. Four respondents also noted that the number of farmers that have managed to diversify their agro-enterprises as a result of CSA should be measured. They outlined that the diversity of agro-enterprises is a proxy indicator for resilience. A farmer with diversified agro-enterprises has a higher chance of resisting shocks as compared to the one practising mono-culture. Diversified agro-enterprises guarantee the spread of risk and ensure diversified income streams. Respondent 14 (December 2016) also felt that the "Number or percentage of farmers reporting sustained yields over seasons." is also an important measurement that could show if CSA is yielding the intended results. Four respondents felt that the Alliance should also measure the area rehabilitated through environmental works as a proxy indicator for improved environmental health under immediate outcomes.

4.2.1.5 Long term Outcomes

There are four major long term outcomes that were mentioned by the key respondents. These are more inclined towards impacts and they include increased capacity of smallholder farmers to produce food under external shocks and increased capacity of smallholder farmers to cope and adapt in adverse circumstances. The latter is closely related to the first long term outcome, as the ability to produce food under external

shocks reflects the increased capacity of smallholder farmers to cope and adapt to adverse climate effects. Under long term outcomes, Respondent 3 (November 2016) highlighted that there should be evidence of "Improved environmental health in areas where farmers are practicing Climate Smart Agriculture". Another outcome closely linked to improved environmental health is improved soil composition in farms where CSA is being practiced. Four respondents highlighted that "improved soil composition or fertility at farm level can be a long-term outcome which shows that Climate Smart Agriculture is really rehabilitating the dilapidated landscapes around farming areas".

4.2.1.6 Long term outcomes indicators

The long-term outcomes indicators proposed by the respondent mostly focus on the improvement of environmental health. These include the measurement of the area with improved groundcover in areas where CSA is practiced, improvement of the diversity of natural species in areas where CSA is being practiced, increase in soil organisms that help improve fertility in areas where CSA is being practiced and increase in soil moisture content in areas where CSA is being practiced. This implies that in the long term, the Alliance should track if there is improvement in environmental health. This is due to that the environment is the base for increased agricultural yields as highlighted by four respondents who stated that the base for agronomic productivity are vibrant landscapes. This purports that more effort is required towards managing landscape through CSA and tracking their improvement in the long run.

4.2.2 Assumptions and or Risks underlying the achievement of outcomes

Twelve respondents noted that poor coordination by government and the private sector might affect the achievement of outcomes. Therefore, there is need for all critical actors to be willing to effectively coordinate the implementation of CSA for the outcomes to be achieved. One respondent highlighted that "Actors involved in Climate Smart Agriculture should be in a position to conduct regular follow-ups and provide feedback to each other on ongoing implementation processes and key lessons learnt". This will give actors the ability to effectively reinvest and redesign agro business models that promote the uptake of CSA. Actors responsible for availing resources should be willing to do so for longer periods as CSA results take time to manifest. Respondent 11 (October 2016) felt that "The non-achievement of the proposed outcomes may be as a

result of limited commitment in terms of will power, zeal and effort by all partners with a stake in Climate Smart agriculture".

Three respondents further pointed out that the achievement of outcomes will be possible if knowledge levels about climate change and CSA permeate well into communities. The knowledge must also be at the fingertips of policy makers and strategists. Respondent 4 (November 2016) also highlighted that "Climate Smart Agriculture training content to be delivered to farmers will need to be well articulated and agreed upon by all actors involved to avoid conflicting messages that might hinder the achievement of the results". There will be need for well capacitated technician to train farmers and also implement Climate Smart Agriculture if these outcomes will be achieved.

Respondent 7 (November 2016) further highlighted that the proposed "Climate Smart Agriculture technologies should be feasible to implement taking into account the prevailing socio-economic environment". In other words, there should be "…a rigorous evidence base generated through area specific vulnerabilities and risk assessments" (Respondent 4, November 2016). These assessments will enable practitioners to identify the most appropriate CSA practices to be promoted in specific areas. This will further promote the dissemination of area specific and demand driven CSA practices rather than those being driven by the supplier. This has an implication on the adoption of the practices.

Almost all experts that were interviewed indicated that there will be need for policies supporting the implementation of CSA at global, regional and national levels if the proposed outcomes will be achieved. One respondent indicated that this will require political will from the side of the politicians. Respondent 14 (December 2016) also felt that "impactful programmes and projects with government support will need to be replicated across different countries and regions for the Alliance to meet its objectives".

The respondents further highlighted that the widespread adoption of CSA practices will need to be supported by capacity development at all levels. Farmers' limited knowledge about promising initiatives, combined with inconsistent and conflicting advice provided by extension agents, will lead to poor adoption of CSA practices. Respondent 1 (October 2016) also indicated that "…at a policy level, capacity will need to be built among legal departments and government ministries…" if the outcomes are to be

achieved. Most financing of CSA initiatives is based on donor funding. Respondent 2 (December 2016) indicated that "Given the importance of Climate Smart Agriculture in national and local economies, African governments need to provide budgetary support for Climate Smart Agriculture by allocating their own resources to promising initiatives".

4.3 Proposed Climate Smart Agriculture Outputs

4.3.1 Definition of Outputs

The respondents defined CSA outputs as those products and services that ensure that farmers are fully capacitated to practice CSA in the long run, through improved agricultural productivity and incomes, strengthened resilience of farmers; and reduced greenhouse gas emissions from agriculture.

4.3.2 Outputs as proposed by the respondents

Seven respondents highlighted that the Alliance needs to measure farmers equipped with CSA technologies and knowledge. They also proposed that farmers equipped with environmental management techniques is an important result towards improvement of the environment in a changing climate. Respondent 3 (November 2016) felt that "Increase in public and private investment in agriculture, improved climate-resilience of rural agriculture and the creation of incentives for farmers to adopt Climate Smart Agriculture practices." were important outputs of CSA interventions. However, these results also appear under outcomes and there is a need to determine which category they fall under. Five respondents indicated that CSA technologies that increase production, productivity and income and where possible reduce emissions or increase the contribution of agriculture to carbon sequestration are important products that need to be produced by CSA Interventions.

4.3.3 Output Indicators

There are several output indicators that were proposed by the respondents and these are measuring a number of aspects under Climate Smart Agriculture that include research, capacity building, partnerships and awareness raising. Below are the indicators proposed by the respondents:

Number of Climate Smart Agriculture manuals produced

Number of Climate Smart Agriculture scientific publications produced

Number of partnerships formed within a certain period which is meant to improve working relationships on Climate Smart Agriculture

Number of Climate Smart Agriculture sensitisation meetings convened

Number of farmers identified for equipping with Climate Smart Agriculture knowledge

Number of farmers trained in Climate Smart Agriculture

Number of committees set up for purposes of environmental management

Number of committees trained in environmental management

Number of community members capacitated in environmental management

Number of environmental management plans developed by communities.

4.3.4 Assumptions and or Risks underlying the achievement of outputs

Respondent 3 (November 2016) outlined that the proposed "…outputs will be achieved provided that the global economy promotes the sustenance of donor funds that have an implication on investment efforts towards Climate Smart Agriculture". Peace and security within countries where CSA will be implemented were also regarded as prerequisites for the achievement of the intended outputs. All respondents also highlighted that there is need for policies and strategies that promote CSA for the proposed outputs to be achieved. The policies and strategies seem to be recurring across all levels of the results under assumptions. This might imply that there is need for interventions at policy level that will advocate for the inclusion of CSA in policies of line ministries that have a stake in CSA. This will be crucial if there are no policies with elements of Climate Change or CSA that could be used as entry points.

4.4 Proposed Inputs

Ten respondents highlighted that there is need for educated and well informed human resources that will ensure the execution of CSA intervention at various levels. The respondents also considered appropriate policies and strategies backed by appropriate technologies as inputs required for the achievement of the intended results at all levels. Respondent 9 (December 2016) indicated that "appropriate policies and strategies backed by appropriate technologies should also make agriculture more attractive especially to the youth". Respondent 11 (October 2016) indicated that "Markets that

promote contract farming with well set up production targets through command agriculture and produce sharing arrangements are important inputs". Four respondents also pointed out that water is a crucial input that forms the base for all agricultural practices. Also important was the availability of innovative financing options for all stakeholders involved in the implementation of CSA especially smallholder farmers.

4.5 Proposed Theory of Change

Seven respondents highlighted that the appropriate approach to developing a theory of change in this case will be to determine gaps in food and nutrition security that have been created by climate change and approximate with valid case study evidence or experimentation how CSA can help to close those gaps. Also, there will be a need to look at relevance of interventions, efficiency, effectiveness and cross cutting issues that are within CSA.

Partnerships were presented as an important element of the theory of change. The respondents also highlighted that smallholder farmers should be the core focus within the theory of change. Respondent 3 (November 2016) highlighted that to achieve the intended impacts; "the Alliance has to involve the communities in setting up Climate Smart Agriculture projects providing them with space to be innovative in the processes. Sufficient training should also be provided on rural resource management, land management and ecosystem management". Respondent 10 (November 2016) felt that the Alliance should involve women at large, "…considering that in sub Saharan Africa about 80% of women are involved in agriculture". The respondents highlighted that the Alliance must build effective partnerships with the private sector and universities.

Respondent 5 (October 2016) pointed to the following theory of change which has an objective of promoting CSA practices to attain increased food security and enhance resilience under climate uncertainty:

> If farmers have access to effective Climate Smart Agriculture technologies that will ensure increase in productivity and income in the short term then farmers will adopt the technologies. The technologies will in the long run improve their food security and resilience to climate change. If communities effectively manage their natural resource base and if they have access to effective Climate Smart Agriculture technologies, their natural resource base will become more resilient to climate change and consequently make the farmers and communities become resilient to climate change as well.

The potential entry points that were presented by the respondents include the following:

Conservation Agriculture

Crop livestock integration

Agriculture Forest interface

Wetland utilisation for spatial and temporal landscape utilisation for agriculture production in changing climate and seasons

Agroforestry

Role of climate risk and uncertainty

Role of legal and institutional environment

Input support efficiency

5 DISCUSSION OF RESULTS

This chapter discusses the results of the study against the research questions, evidence from the literature review and the goal of the Alliance. The researcher also makes use of his intuition and knowledge in monitoring and evaluation to make sense of the results. The main research question of the study was: What will be the most appropriate CSA RBM&E and evaluation framework for assessing outcomes and impacts for the Africa Climate Smart Agriculture Alliance? The sub questions that guided the generation of data to address the main research question are as below:

1. What are the basic theories underlying the development of RBM&E frameworks?

2. What variables are the key building blocks for CSA RBM&E frameworks?

3. What CSA indicators can be used to develop CSA RBM&E framework for the Africa Climate Smart Agriculture Alliance?

5.1 Theories underlying the development of results-based monitoring and evaluation frameworks

This component of theories underlying the development of results-based monitoring and evaluation frameworks was addressed through the review of literature. The theory of change underlying the development of a CSA RBM&E framework was addressed through interviews with the key respondents.

The researcher did not find theories underlying the development of results-based monitoring and evaluation frameworks, but what he found was concepts. Concepts underlying the development of RBM&E frameworks include Results Based Management/Management for Development Results, the results chain, and logical framework.

However, a CSA RBM&E framework is informed by the CSA concept which was officially defined by FAO in 2010 as a context specific three-pillar approach to agriculture that aims to increase productivity and incomes in a sustainable way, contribute to the reduction of greenhouse gases and enhance the achievement of food security at national level and the attainment of development goals. The concept of CSA is closely linked to that of the Green

economy which introduces a broader and integrated approach towards development in a changing climate. It proposes that development should now be viewed in climate change lenses across all sectors including agriculture (UNEP, 2011). This therefore, places CSA in climate change approaches, which a number of authors have termed as adaptation approaches (Dinshaw at al., 2014; Sanahuja, 2011; Spearman and McGray, 2011 and UFCCC, 2010).

The theory of change presented by the respondents is in line with the CSA approach and may be utilised to inform the development of the CSA RBM&E framework for the Alliance. The respondents presented the theory of change as below:

> If farmers have access to effective Climate Smart Agriculture technologies that will ensure increase in productivity and income in the short term then farmers will adopt the technologies. The technologies will in the long run improve their food security and resilience to climate change. If communities effectively manage their natural resource base and if they have access to effective Climate Smart Agriculture technologies, their natural resource base will become more resilient to climate change and consequently make the farmers and communities become resilient to climate change as well.

This theory of change is in line with the key building blocks and most of the indicators that were presented by the respondents as shall be revealed in the following sections. It encapsulates the goal of the Alliance which is to reach six million farmers with CSA technologies by 2021. The theory of change is also reflective of the anticipated integrated impacts within the agriculture and environmental sector denoted by improved food security and the resilience of the natural resource base and communities to climate change.

5.2 Key building blocks and indicators for developing Climate Smart Agriculture results-based monitoring and evaluation framework

Literature review and evidence from the data collected from the experts that were interviewed in this study show that the key variables that are the building blocks for CSA RBM&E frameworks are outputs, outcomes and impacts. Since CSA results take time to manifest, there is a need to break down outcomes to different categories that include immediate, intermediate and long-term outcomes. This will allow for the measurement of short-term outcomes that can

be showcased to governments and funders as these entities need to show value for money in the interim. However, the short-term outcomes need to have a bearing for long term outcomes and impacts that are ultimate results of adaptation and resilience to climate change.

5.2.1 Analysis of the definitions of impacts, outcomes and outputs

The definitions of CSA impacts, outcomes and outputs given by the respondents are anchoring on five distinct key result areas. These are agriculture productivity, environmental health, economic stability, policy integration and social stability. The respondents argued that at impact level CSA results should be: the presence of enabling policies, enhanced food security to rural communities, improved economic gains, environmental health and enhanced social values. The same trend of expected results can be noticed under outcomes and outputs. The proposed key results areas under these definitions are in line with the FAO (2013) definition which states that CSA is an agriculture approach aimed at sustainably increasing productivity and incomes, enhancing adaptation, reducing greenhouse gas emissions where applicable and ensuring the attainment of national food security and development goals.

The respondents also embedded the key results within the concept of sustainable development in their definitions. This still reflects on the CSA FAO (2013) definition particularly where it refers to sustainable increase of productivity and the attainment of development goals at national level. The concepts of Managing for Development Result and Results Based Management are also echoed in the definitions given by the respondents. Managing for Development Results and Results Based Management are management approaches that seek to track the performance of development and the sustainable improvement of national development results (SMES, 2009). These approaches are heavily implied within the CSA impacts, outcomes and outputs definitions given by the respondents.

The key results areas of presence of enabling policies, enhanced food security to rural communities, improved economic gains, improved environmental health

and enhanced social values within the sustainable development paradigm also resonate with approaches proposed by Brooks et al. (2011) and Acherr et al (2012). Brooks et al. (2011) states that existing and emerging climate change intervention frameworks are focusing on the capacity of governments, institutions, and civil society to appreciate climate change and be able to integrate climate informed decision making into development processes. They seem to be also focusing on the degree to which climate adaptation is aligned or aligns with development outcomes (Brooks et al., 2011).

Scherr et al. (2012) is more specific in the context of successful CSA landscapes by highlighting that the monitoring and evaluation frameworks should track multi-stakeholder planning processes, government support and resource tenure, context specific investment that support climate smart objectives and the multiple dimensions of change to ascertain if social, ecosystem, economic and climate outcomes are being achieved at different levels. It can therefore, be noted that both approaches (Brooks et al., 2011; Scherr et al., 2012) to M & E frameworks are putting emphasis on tracking decision making processes, the integration of climate and development outcomes in policy, programming, and practice in the field as implied by the definitions given by the respondents.

The five key result areas that are emanating from the definitions given by the respondents are actually in line with four indicators proposed by Nelson and Swindale (2013). Nelson and Swindale (2013) identified four key CSA indicators that measure agriculture productivity at farm level including income and adoption of improved agriculture technologies that are friendly to the environment. The indicators include: (i) gross margin per hectare, animal, or cage of selected product, (ii) number of hectares under improved technologies and environmental management practices as a result of the interventions, (iii) number of farmers and other who have applied improved technologies or environmental management practices as a result of the intervention and (iv) value of incremental sales (collected at farm level) attributed to the intervention implementation. The four indicators proposed by Nelson and Swindale (2013), are a combination of outcome indicators that provide an integrated approach to tracking intermediate results of improving agriculture productivity, increasing

markets and trade and reducing poverty. The indicators are not different from the development and climate change integrated approach proposed by Brooks et al. (2011) and Scherr et al. (2012). However, the only missing key result from those proposed by the respondents is the enabling policy environment.

The evidence generated from the respondents and literature review implies that the RBM&E framework for the Alliance should be anchored in tracking decision making processes and the integration of CSA with development outcomes. The respondent specifically put the CSA key results areas that need to be tracked in five categories which are the enabling policies environment, enhanced food security to rural communities, improved economic gains, improved environmental health and enhanced social values within the sustainable development paradigm. These will be the key building blocks for the RBM&E framework for the Alliance.

5.2.2 Outputs

Literature states that outputs are programme facilities or services delivered to the intended beneficiaries (W.K. Kellogg Foundation, 1998 and Spreckley, 2009). Their description is usually in accordance with the magnitude or scope of the products or services produced by the programme. This puts outputs within the control of a programme (Rajalahti et al., 2005). In CSA interventions, outputs may include changes in use of resources, increase in soil organic carbon levels, increases in above and below ground biomass, increase in soil depth and increase in soil water retention (FAO, 2013).

The respondents outlined CSA outputs as those products and services that ensure that farmers are fully capacitated to practice CSA in the long run, through improved agricultural productivity and incomes, strengthened resilience of farmers; and reduced greenhouse gas emissions from agriculture. The definition given by the respondents puts emphasis on capacity building of smallholder farmers to be able to practice CSA in the long run. The implication is that at output level, the Alliance should track training of smallholder farmers in all forms necessary so that they are able to appreciate and utilise CSA

approach within their farming activities. If farmers are not capacitated enough they will not have confidence to engage in CSA activities.

The respondents that were interviewed highlighted that the Alliance needs to measure the number of farmers equipped with CSA technologies and knowledge. This output resonates with the goal of the Alliance which is to catalyse and support the scaling-up of CSA practices to six million smallholder farms in Africa through a system for quality assurance and verification by 2021. This may be regarded as a key output that is directly linked to the goal of the Alliance. This is also linked to some of the outcomes outlined by Nelson and Swindale (2013) and FAO (2013) that relate to farmers and others who have applied improved agricultural technologies or management practices as a result of CSA.

The respondents also proposed that farmers equipped with environmental management techniques is an important output towards improvement of the environment in a changing climate. This output also links well with the outcomes proposed by Nelson and Swindale (2013) and FAO (2013) who indicate that there is need to measure the area under improved environmental management practices and the farmers adopting these practises. The environmental management component came up as a key issue from the respondents who highlighted that the basis for CSA should be the landscape. It is therefore, paramount that environmental management results are captured and tracked from the onset at output level up until the level of impacts.

Respondents further added that CSA technologies that increase production, productivity and income and where possible reduce emissions or increase the contribution of agriculture to carbon sequestration are important products that need to be produced by CSA interventions. This is also a viable output that directly links to the goal of the Alliance and the outcome indicators proposed by Nelson and Swindale (2013). There will be need for the Alliance to track the development or production of CSA technologies intended to be adopted by the farmers. This will enable the Alliance to also track those technologies that work and those that do not. This output will further provide an opportunity to

generate lessons on why some of the technologies work while some do not. These lessons learnt will provide opportunities for further improvement on the design of the technologies. The outputs proposed by respondents include the following:

- Number of CSA manuals produced
- Number of CSA sensitisation meetings convened
- Number of CSA technologies developed and tested for dissemination
- Number of farmers identified for equipping with CSA knowledge and technologies
- Number of farmers trained in CSA
- Number of farmers reached with Climate Smart Agriculture technologies
- Number of committees set up for purposes of environmental management
- Number of committees trained in environmental management
- Number of community members capacitated in environmental management
- Number of environmental management plans developed by communities.

Some of the respondents indicated that increase in public and private investment in agriculture, improved climate-resilience of rural agriculture and the creation of incentives for farmers to adopt CSA practices were important outputs of CSA interventions. However, these outputs are more of outcomes and they already appear at outcomes levels. Thus, the researcher decided to discard them at this level as outputs are products produced and services rendered as a result of CSA interventions while outcomes are changes that emanate from the outputs as implied by the proposals from the respondents (W.K. Kellogg Foundation, 1998).

5.2.3 Outcomes

Dinshaw et al. (2014:10) identified three major challenges in monitoring and evaluation of climate change interventions like CSA and these include and these are "(i) how to assess the attribution of an intervention to adaptation; ii) how to

establish baselines and targets for adaptation initiatives; and iii) how to reconcile the longer time horizons". The key challenges that are of interest and within the scope of this study are (i) and (iii); that is, the assessment of attribution of an initiative to adaptation and how to reconcile longer timeframes.

Respondents outlined that to address the challenges outlined by Dinshaw et al. (2014), since outcomes develop over time, there is need to break them down into different levels which are: (i) short-term outcomes which are likely to be changes in skills, attitudes, and knowledge; (ii) medium-term outcomes that often include changes in behaviour and decision making; and (iii) long-term outcomes that may involve changes in the social status or life conditions. The proposal by the respondents is in line with Spearman and McGray (2011) and Sanahuja (2011) who also argue that the designs of such adaptation interventions like CSA should focus on intermediate results that can be achieved within short time frames but have a bearing for long term impacts.

This break down will enable practitioners to be able to identify key outcomes at immediate level and be able to link them to those at intermediate level and finally at long-term outcome level. The breakdown will give clear linkages between the outcomes at different levels and how they can be attributed to the adaptation results of CSA. This breakdown of the CSA outcomes should be measured through use of proxy adaptation outcome indicators such as observing availability of drought resilient crops, improved water security, and more climate resilient livelihoods (Dinshaw et al., 2014 and UNFCCC, 2010). This is so because results of adaptation interventions like CSA will in most instances become visible over long periods of time, that is, over 20-50 years when the impacts of climate change start to take effect and yet governments and development programme funders want to see the effectiveness of such initiatives within short timeframes (Dinshaw et al., 2014 and Spearman and McGray, 2011). The RBM&E framework will thus be anchored on proxy indicators for both adaptation and mitigation at outcomes level.

The key proxy indicators at outcome level which were identified by the respondents include the following:

(a) Immediate outcome indicators:

- Farmers reached with CSA technologies
- Number of policies influenced to favour the promotion of CSA.
- Number of farmers adopting CSA technologies being promoted.
- Agricultural activities and productivity trends of farmers that have adopted CSA practices.
- Improved knowledge on the costs, benefits and trade-offs of adopting CSA technologies.

The *number of farmers reached with CSA practices* was presented under immediate outcomes by the respondents. However, the researcher felt these are more at output level and should not be indicators of outcomes.

(b) Intermediate outcomes indicators

- Number of farmers adopting and sustaining CSA over at least three seasons.
- Number of farmers adopting CSA practices as result of learning from other farmers.
- Number / percentage of farmers reporting sustained yields over three seasons.
- Number of households reporting increase in their income as a result of adopting CSA practices.
- Number of farmers that have managed to diversify their agro-enterprises as a result of CSA should be measured.
- Increase in area rehabilitated through environmental works

(c) Long-term outcomes Indicators

- Measurement of the area with improved groundcover in areas where CSA is practiced,
- Improvement of the diversity of natural species in areas where CSA is being practiced,
- Increase in soil organisms that help improve fertility in areas where CSA is being practiced and
- Increase in soil moisture content in areas where CSA is being practiced.

The long-term outcomes indicators proposed by the respondent are focusing on the improvement of environmental health. This may imply that the results-based monitoring and evaluation framework of the Alliance should put emphasis on the improvement of environmental health in the long term. The emphasis on

environmental health might be due to that respondents felt that healthy environments are the foundation for increased agriculture productivity and development impacts.

5.2.4 Impacts

The W.K. Kellogg Foundation (1998) defines impacts as community, organisational or system level changes because of an intervention. They may include enhanced capacity in the policy space and improved conditions in the livelihoods of the beneficiaries. Spreckley (2009) highlights that a project cannot achieve an impact alone but rather other initiatives or interventions of similar nature will contribute the same level goal. NORAD (1999) defines the impact as the expected long-term objective to which a project contributes. It is in essence the project justification. Impact can be achieved between seven to ten years after an intervention commences (W.K. Kellogg Foundation, 1998). For Climate Smart Agriculture interventions, impacts may include contribution to climate change mitigation, agriculture better adapted to the climate and improved food security (FAO, 2013).

There are five key distinct impact areas that were identified by respondents. These impacts resonate with elements of climate change mitigation, adaptation to climate change and improved food security as indicated by FAO (2013). The impacts that were identified by the respondents include agricultural impacts, environmental impacts, economic impacts, social impacts and policy impacts. These areas of impact are in line with those proposed by the W.K. Kellogg Foundation (1998) which state that impacts are system level changes as a result of an intervention and they may occur within the policy space and at community level.

The key impact areas proposed by the respondents at impact level are embedded within sustainable development results. Sustainable development is development that balances trade-offs between economic growth, social equity and the sustainable use of natural resources (de Britto, 2011 and World Bank, 2000). The balancing of trade-offs between impacts was made clear by the respondents when they stated that "…there should be a balance between agriculture, environmental, economic and social impacts." (Respondent 3, 5, 7 and 12, 2016). CSA, as further elaborated by FAO (2013: ix) is "…an approach to developing

the technical, policy and investment conditions to achieve sustainable agricultural development for food security under climate change".

As also proposed by the respondents, CSA brings a holistic approach in addressing issues faced by agriculture, natural resources and food systems which assist in circumventing conflicting policies, legislation or financing (FAO, 2013). Sustainable development takes into account issues of intergenerational justice which is understood as meeting current needs without compromising those of the future generations and this is what Climate Smart Agriculture seeks to achieve and is reflected in the impacts proposed by the respondents (FAO, 2013). Some of the relevant impact indicators proposed by the respondents are as below:

- % of food-secure households
- Public spending on CSA as a percentage of GDP from the agriculture sector
- Technology Adoption Rate
- Water availability
- Productivity levels
- Farmers above the poverty line
- Improved land fertility
- The ability of farmers practicing CSA to produce food even though they are affected by natural or man-made shocks such as droughts.
- Number or % increase in the number of farmers recording better yields due to CSA irrigation scheduling
- Reduced or absence of need for food hand-outs.

The RBM&E framework for the Alliance should thus be anchored on these five key result areas at impact level. This therefore, implies that all levels of the results chain should show a clear link between results leading to the five key impact areas. In essence, the impacts define the rest of the levels of the results chain. A results chain is iterative in nature; the planning starts from the impacts and outcomes then moves backwards on the chain to the inputs, while implementation of the programme or project starts from the inputs to the outcomes and impacts (Spreckley, 2009).

5.3 The reflexive nature of the proposed log frame

A logical framework is a systematic sequencing of development hypothesis since there is no certainty that the chaining of variables (inputs, activities, outputs, outcomes and impacts) will produce the intended results (NORAD, 1999). The Logical Framework Approach perceives a development intervention as a causally linked sequence of events (NORAD, 1999). It is linear in nature and assumes that "…if inputs are available, then the activities will take place; if the activities take place, then the outputs will be produced; if the outputs are produced, then the purpose will be achieved; in the long run this will contribute to the fulfilment of the goal" (NORAD, 1999: 9). However, the researcher noted a peculiar reflexive pattern in the nature of the log frame proposed by the respondents. After analysing the data presented by the key informants, the researcher noticed that there was a trend, whereby at some point, some impact indicators where actually presented as outcomes by some respondents. The same trend could be noticed under outcomes where some outputs were presented as outcome indicators. The table below highlights this pattern in form of colour codes.

Table 7: The reflexive pattern of the logical framework

Impacts	**Indicators**
• Agriculture impacts - Improved food, income and nutritional security of smallholder famers in Africa, Improved productivity • Environmental impacts – Improved environmental health, Increased efforts by farmers to reduce carbon foot print through carbon sinking using massive/expansive growing of grasses and trees, Improved nutritional packages that limit greenhouse gas emission (GHGE) from enteric fermentation by ruminants and manure production from intensive-factory/industrial/very intensive farming • economic impacts - Improved economic status • policy impacts - Harmonised CSA policies at national level • social impacts - Improvement in livelihoods, Improved social stability, Increased level of awareness on climate change (CC) and CSA, Enhanced resilience through ADOPTION of CSA technologies	1. Food Production Index 2. Public spending on CSA as a percentage of GDP from the agriculture sector 3. Technology Adoption Rate, 4. Viable farmer Groups, 5. Water availability, 6. Access to roads, 7. Access to credits, 8. Farmer profit, 9. Increased Yield, 10. Increased Productivity, 11. Farmers above the poverty line, 12. Access to farmlands, 13. Access to markets, 14. Farmers' production cost, 15. Improved land fertility, R&D, 16. Employment, 17. Extension-farmer ratio and farmer savings. 18. The ability of farmers practicing CSA to

	produce food even though they are affected by natural or man-made shocks such as droughts. 19. Level of production per hectare at household level 20. Number or % increase in the number of farmers recording better yields due to CSA irrigation scheduling 21. % of farmers adopting suitable crop/ animal types and varieties/breeds in view of extreme weather events. 22. Reduced or absence of need for food hand-outs. 23. Number of joint CSA related polices developed. 24. New policies put in place by government in support of CSA 25. Number of CSA related programmes developed 26. Number of CSA related programmes implemented 27. Number of CSA related projects developed 28. Number of CSA related projects implemented.

	29. Number of extension officers knowledgeable in CSA 30. Levels of investments put in place by governments and donors e.g. irrigation schemes, introduction of crops/ cultivars more adapted to the prevailing climatic conditions 31. Level of knowledge in CSA at community level 32. Number/ % percentage of farmers engaged in mitigation interventions 33. Number/ % of private sector organisations producing animal feed that promote low carbon emission.
Outcomes *Immediate Outcomes* • Acceptance of CSA as an agronomic practice by smallholder farmers • Willingness to adopt CSA by smallholder farmers • Assured harvest levels after implementing CSA in the face of climate change • Increased incomes, increased food security, improved nutrition, new varieties and breeds; availability of new technical and scientific knowledge, etc. *Intermediate Outcomes*	1. Farmers reached with CSA practices and enabling policies influenced to favour CSA promotion 2. Number of farmers reached with CSA practices; 3. Number of farmers adopting CSA over three seasons;

• Increased adoption of CSA by Smallholder farmers adopting CSA as an agronomic practice • Improved environmental management in areas where farmers are practicing CSA • Increase in the number of farmers knowledgeable in CSA • Increased income levels at household level • Availability of food year round • Sustained higher yields that increase annually (agricultural growth) • Increase in agricultural productivity • Better livelihoods as a result of CSA • Lowered contributory effects to GHGEs • Better resilience levels by farmers/crops/animals to unexpected extreme weather • Increase in the number of healthier and happier households	4. Number of farmers adopting CSA as result of learning from other farmers. 5. Measurement of the area rehabilitated through environmental works. 6. Number of farmers consistently practicing CSA 7. Number of farmers training others in CSA 8. Number of households reporting increase in their income as a result of CSA 9. Number of farmers that have managed to diversify their agro-enterprises as a result of CSA 10. Number/% of farmers reporting sustained yields over seasons.
Long-term outcomes • Increased capacity of smallholder farmers to produce food under external shocks. • Increased capacity of smallholder farmers to cope and adapt in adverse circumstances. • Improved environmental health in areas where farmers are practicing CSA • Improved soil composition in farms where CSA is being practiced	11. Measurement of the area with improved groundcover in areas where CSA is practiced 12. Improvement of the diversity of natural species in areas where CSA is being practiced 13. Increase in soil organisms that help improve fertility in areas where CSA is being practiced

	14. Increase in soil moisture content in areas where CSA is being practiced
Outputs • Farmers equipped with CSA • Increased public and private investment in agriculture, • Improved climate-resilience of rural agriculture, creating incentives for farmers to adopt climate –smart practices • Farmers equipped in environmental management • CSA technologies that ensure production, productivity and income generation and where possible reducing emissions or contributing to carbon sequestration	• Number of CSA manuals produced • Number of CSA sensitisation meetings convened • Number of farmers identified for equipping with CSA knowledge • Number of farmers trained in CSA • Number of committees set up for purposes of environmental management • Number of committees trained in environmental management • Number of community members capacitated in environmental management • Number of environmental management plans developed by communities.

There are two scenarios that might be causing this kind of pattern; (i) there is a chance that some respondents were using the indicators interchangeable due to different perspectives of understanding of the levels of the logical framework, hence some ended up presenting some outcomes as impact indicators and some outputs as outcome indicators, (ii) the nature of the logical framework might not be linear but rather reflexive. That is, as the level of results move higher within the logical framework, outputs tend to be converted to outcome indicators and outcomes to impact indicators.

However, the reflexive pattern seems to be insignificant as there are isolated incidents of this pattern at output and outcome level. Of the thirty-three impact indicators proposed by the respondents only eight are reflective of the outcomes and of the thirteen outcome indicators only three are reflective of the outputs. This may suggest that scenario (i) may hold more value with regards to the reflexive pattern observed by the researcher but this does not totally disregard scenario (ii) that may require further analysis of different types of log frames to firm up this argument.

5.4 The gender dimension in CSA results based monitoring and evaluation framework

Gender is one of the issues that were identified by the respondents. Even though this did not come out strongly from the rest of the respondents, it was significant as it was an issue raised by female respondents who are professionals; women are the most affected when it comes to issues of development. Gender refers to socially constructed traits, characteristics, roles and relationships between men and women (WHO, 2017). Gender is context specific and thus varies from one community to the other (WHO, 2017). The way the gender dimension was presented by the respondents was more biased towards the benefits of men regardless of the fact that it was raised by female respondents.

The respondents argued that CSA should ease the burden of women on agriculture so that they may have more time to attend to other household chores and beautifying themselves for their husbands. This still does not give women complete freedom as they still need to attend to household chores and make themselves beautiful for their husbands rather than having freedom to use their extra time more productively. GIZ (2013) argues that new innovations such as CSA have potential to contribute to the strengthening of women's freedoms and control over resources. Appropriate

innovations such CSA have the capability of reducing time women spend on agriculture thus allowing them to focus more of their energy and time saved on more productive activities outside the usual none economic rural chores like gathering of firewood (GIZ, 2013). The Gender Status Index has one of its indicators on gender issues being time use or employment: measured by time spent in economic activities, and in employment (FAO, 2005). It is therefore essential that the CSA results-based monitoring and evaluation framework tracks the amount of time saved by CSA and check if women and men have equal freedoms to utilise the spare time on productive economic activities of their choice.

However, beside the issue of time, there are a number of components that need to be tracked under the gender dimension. These are generated from a number of guiding international, regional and national gender frameworks. A gender responsive results-based monitoring and evaluation framework measures gender related results over time (BRIDGE, 2007). The framework should utilise a combination of quantitative and qualitative gender indicators. Quantitative indicators are normally statistical data disaggregated by sex which provides the basis for the analysis of the results of an intervention to both males and females (BRIDGE, 2007). The qualitative measures may include the assessment of the levels of women empowerment in a particular setting, change of attitude by men and women towards gender issues, changes on gender relations, changes in political, economic and social statuses between men and women as result of a particular initiative (BRIDGE, 2007). Gender is reflected within the FAO (2013) qualitative and quantitative indicators under CSA adoption outcomes, and outputs and outcomes under capacity building. Some of the indicators are disaggregated by sex and some are biased towards women for example; Increased access of women to land and or productive resources, and Number of people who benefited from capacity development, disaggregated by sex (FAO, 2013).

The frameworks that guide the monitoring and evaluation of the gender dimension in development interventions include the Gender-related Development Index (GDI) which is derived from the Human Development Index (HDI). If focuses on gender inequalities from three facets illustrated within the Human Development Index and these are life expectancy, education, and income (BRIDGE, 2007). The other framework is the Gender Empowerment Measure (GEM) that seeks to ascertain women empowerment in political and economic spheres (Klasen, 2006). The framework assesses the gender

dynamics and gaps in governance, particularly political representation; it also takes into account the representation of men and women in influential economic positions including gender margins in incomes (Klasen, 2006).

The Social Watch's Gender Equity Index (GEI) is another framework guiding the measurement of gender dimension in development interventions. It integrates indicators from both the Gender-related Development Index and Gender Empowerment Measure, putting emphasis on education, participation in the economy and empowerment (Social Watch, 2005). The World Economic Forum's Gender Gap Index (GGI) is another framework with a bias towards similar dimensions as those of the Social Watch's Gender Equity Index. The only two areas that are added within this framework are political empowerment, health and well-being (Lopez-Claros and Zahidi, 2005).

However, international frameworks are not always context specific and do not necessarily reflect on local and regional realities (ECLAC, 2004). There is therefore a need to contextualise these international frameworks to reflect local realities. One such framework developed to do that within the African Context is the African Gender and Development Index. The Africa Gender and Development Index (AGDI) was crafted to give African policymakers relevant mechanisms for tracking milestones towards achieving gender equality (UNECA, 2004). It was also meant to assist monitor development in the rollout of resolutions endorsed by African countries, like the Dakar Platform for Action (UNECA, 2004). Informed by the Gender Status Index (GSI) the framework localises measurements of three components which are social power, economic power and political power (FAO, 2005).

The African Women's Progress Scoreboard (AWPS) is another context specific framework meant to ascertain the status of implementation of all key regional and international frameworks relating to women's rights (BRIDGE, 2007). It addresses these in four dimensions that include the women's rights component, the social component, the political component and the economic component (BRIDGE, 2007). Under the economic component, the framework has access to agricultural extension services, technology and land as one of its specific items for measuring gender equality (BRIDGE, 2007). This indicator is quite relevant to the CSA results-based monitoring and evaluation framework that will be proposed by the researcher.

There are three relevant components that are measured by all these gender frameworks and these are opportunities and treatment of men and women in the political, economic and social spaces. The proposed CSA results-based monitoring and evaluation framework will take into account the gender issue and make use of quantitative and qualitative indicators to track the achievement of gender outcomes and impacts within the three key areas common among the gender frameworks. The framework will adopt and adapt two indicators from the Gender Status Index and the African Women's Progress Scoreboard. The one from Gender Status Index measures time use or employment: measured by time spent in economic activities, and in employment (FAO, 2005) while the one from the African Women's Progress Scoreboard's framework measures access of men and women to agricultural extension services, technology and land under its economic component.

5.5 The Proposed CSA results-based monitoring and evaluation framework

The CSA RBM&E framework for the Alliance need based on the following theory of change drawn from the respondents:

If farmers have access to effective Climate Smart Agriculture technologies that will ensure increase in productivity and income in the short term then farmers will adopt the technologies. The technologies will in the long run improve their food security and resilience to climate change. If communities effectively manage their natural resource base and if they have access to effective Climate Smart Agriculture technologies, their natural resource base will become more resilient to climate change and consequently make the farmers and communities become resilient to climate change as well.

The framework will also need to be anchored on the five key result areas (agriculture productivity, environmental health, economic stability, policy integration and social stability) proposed by the respondents. These should be measured by use of proxy indicators also proposed by the respondents. The issue of gender should also be taken into account with a focus on engagement of women in CSA activities, tracking of their time saved by the approach and how they use their extra time. Below is diagrammatic presentation of the proposed theory of change as a result of evidence from the study:

Figure 3: Proposed Theory of Change

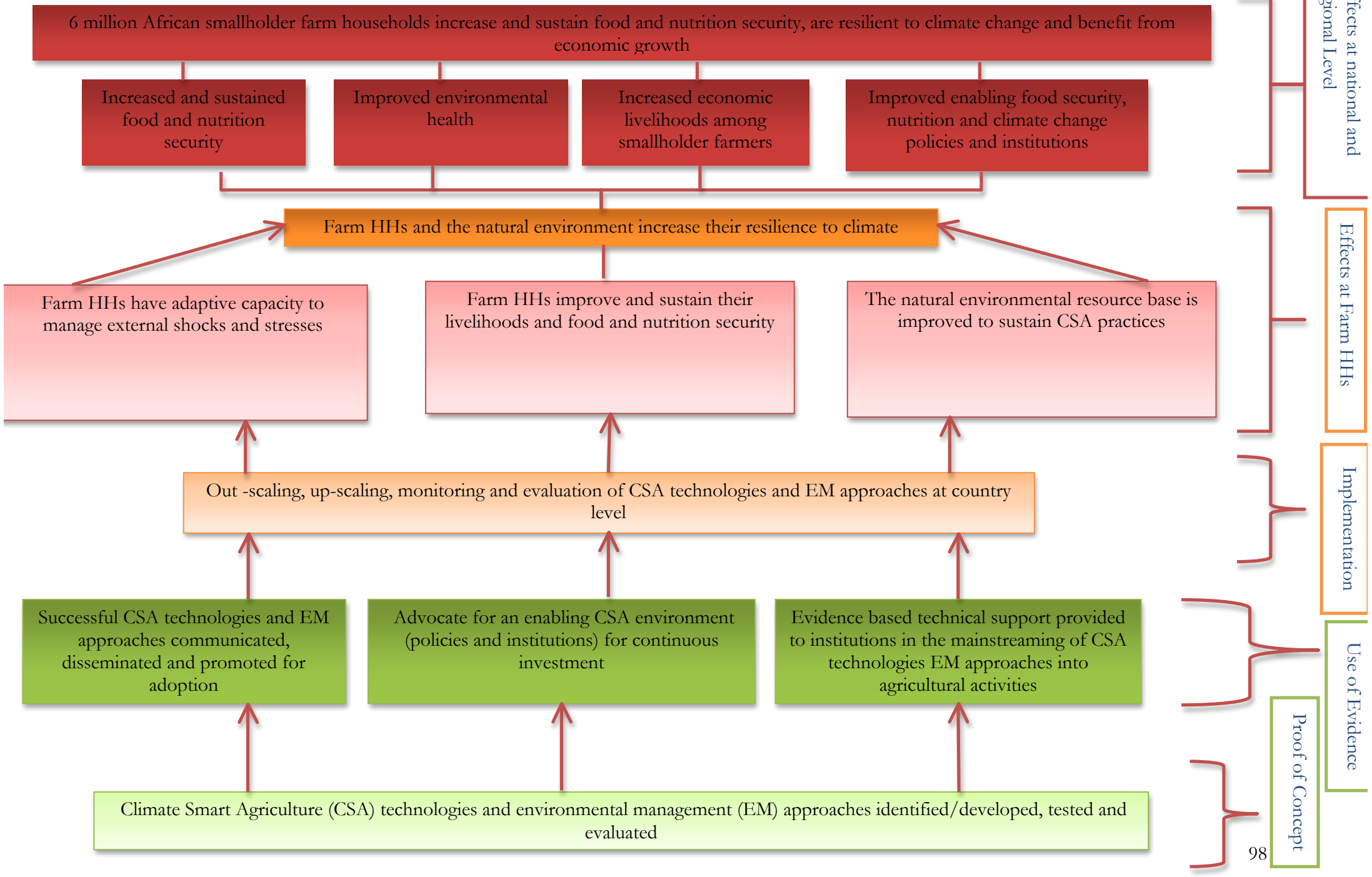


Table 8: Proposed CSA results-based monitoring and evaluation framework

Hierarchy of Results	Description	Objectively verifiable indicators	Means of verification	Assumptions
Impact	Six million African smallholder farm households increase and sustain food and nutrition security, are resilient to climate change and benefit from economic growth	• Enhanced food and nutrition security and socio-economic status of the smallholder farmers in Africa under a changing climate	• Food Production Index • Regional annual reports on in agriculture and climate change (AGRA, FAO, COMESA, etc)	• There is capacity and will by technical partners, government and private sector to implement CSA and natural resource management approaches across Africa. • The is sustained funding to implement CSA natural resource management approaches across Africa
Results at regional level				
	Description	**Objectively verifiable indicators**	**Means of verification**	**Assumptions**
Long-term outcomes	Increased and sustained food and nutrition security	• Level of production per hectare at household level • Number/% of farmers reporting sustained yields over three seasons disaggregated by sex. • Number/% of female headed households reporting increase in their income as a result of CSA • Number/% of male headed households reporting increase in their income as a result of CSA	• Food Production Index • Regional annual reports on in agriculture and climate change (AGRA, FAO, COMESA, etc) • End of project and programme evaluation reports	• Provided there is capacity of extension and adaptive research in countries to develop and disseminate context specific CSA practices • Provided there is a sound structure of input and output markets for products from CSA practices • Provided that policy makers are willing to integrate CSA into agricultural policies
	Improved environmental health	• Measurement of the area with improved natural resources in areas where CSA and natural resources management approaches are practiced		
	Improved enabling food and nutrition security, and climate change policies and institutions	• Number of joint CSA related polices with gender components developed. • New or revised policies put in place by		

		government in support of CSA • Number of CSA related programmes developed • Number of CSA related programmes implemented • Number of CSA related projects developed • Number of CSA related projects implemented. • Number of extension officers knowledgeable in CSA • Levels of investments put in place by governments and donors e.g. irrigation schemes, introduction of crops/ cultivars more adapted to the prevailing climatic conditions		
Results at national level				
	Description	**Objectively verifiable indicators**	**Means of verification**	**Assumptions**
Intermediate outcomes	Farming HHs have adaptive capacity to manage external shocks and stresses	• Number or % increase in the number of farmers recording better yields due to CSA (disaggregated by sex) • Number or % of farmers adopting suitable crop/ animal types and varieties/breeds in view of extreme weather events (disaggregated by sex) • Number of farming households that have managed to diversify their agro-enterprises as a result of CSA (female	• End of project evaluation reports • Midterm reviews • Project bi-annual and annual reports	• Provided there is effective coordination by government and the different players especially the private sector • CSA technologies are available, accessible and affordable Farmers are willing to adopt CSA • Farmers have been well capacitated to adopt CSA

		headed and male headed) • Reduced or absence of need for food hand-outs.		• Actors responsible for availing resources should are willing to do so for a sustained period of time- • Provided there is allocation of all manner of applicable resources, i.e. financial, inputs, management, time etc. • There are policies supporting the implementation of CSA • There is retooling, reinvestment and agro business models that promote CSA. • Provided the introduced technologies are implementable in relation to the prevailing social economic environment. • Good evidence base for the promotion of CSA practices through target area specific vulnerability and risk assessments as a means of identifying the most appropriate CSA practices to be promoted • There is capacity within the Alliance members to facilitate the demonstration of area specific/relevant demand driven CSA practices • Policy, global trade dynamics are constant
	Improved natural environmental resource base	• Increase in soil organisms that help improve fertility in areas where CSA is being practiced • Increase in soil moisture content in areas where CSA and environmental management approaches are being practiced • Improvement of the diversity of natural species in areas where CSA is being practiced		
Results at community level				

	Description	Objectively verifiable indicators	Means of verification	Assumptions
Immediate outcomes	Increased adoption of CSA by Smallholder farmers adopting CSA as an agronomic practice	• Number of farmers adopting CSA technologies (disaggregated by sex)	• End of project evaluation reports • Midterm reviews • Project bi-annual and annual reports • Indicator Tracking Tables	• Provided there is effective coordination by government and the different players especially the private sector • CSA technologies are available, accessible and affordable Farmers are willing to adopt CSA • Farmers have been well capacitated to adopt CSA • Actors responsible for availing resources should are willing to do so for a sustained period of time- • Provided there is allocation of all manner of applicable resources, i.e. financial, inputs, management, time etc. • There are policies supporting the implementation of CSA • There is retooling, reinvestment and agro business models that promote CSA. • Provided the introduced technologies are implementable in relation to the prevailing social economic environment. • Good evidence base for the promotion of CSA practices through target area specific vulnerability and risk assessments as a means of identifying the most appropriate CSA

				practices to be promoted • There is capacity within the Alliance members to facilitate the demonstration of area specific/relevant demand driven CSA practices • Policy, global trade dynamics are constant
Outputs	Farmers equipped in CSA	• Number of CSA manuals produced • Number of CSA sensitisation meetings convened • Number of farmers identified for equipping with CSA knowledge (disaggregated by sex) • Number of farmers trained in CSA (disaggregated by sex)	• End of project evaluation reports • Midterm reviews • Project bi-annual and annual reports • Indicator Tracking Tables	• The global economy remains constant in terms of availing donor funds and promoting investment efforts. • There is peace and security within countries. • There are climate smart policies and strategies, agricultural practices and technologies to the mainstreaming CSA practices into local and national programmes
	Farmers equipped in environmental management	• Number of committees set up for purposes of environmental management • Number of women holding leadership positions in the committees. • Number of committees trained in environmental management • Number of community members capacitated in environmental management (disaggregated by sex) • Number of environmental management plans developed by communities.		

	CSA technologies identified/developed	• Number of CSA technologies identified or developed		
	CSA technologies tested and evaluated	• Number of CSA technologies tested and evaluated for dissemination		

6 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 Summary

Globally, climate change has become one of the major threats to human existence, particularly in Africa. Africa will be the hardest hit continent by the effects of climate change due to its low adaptive capacity which is exacerbated by high poverty levels and low levels of development (AMCEN, 2010; Boko et al., 2007). Agriculture, which is the backbone of Africa's economy, will be greatly affected by climate change. Climate models predict that by 2020, agricultural yields will have dropped by 50% resulting in widespread food insecurity (AMCEN, 2007; Boko, et al, 2007; IPCC, 1998).

It is with the recent rise in the number of food insecure people that the leaders of the world have realised the potentially adverse effects of Climate Change and are calling for new approaches towards agriculture that include initiatives like the United Nations Reducing Emissions from Deforestation and Forest Degradation Programme (REDD+) and Climate Smart Agriculture (CSA) among others (Lambrou and Synnevåg, 2012). Climate Smart Agriculture integrates the three dimensions of sustainable development that include economic, social and environmental advancement. It further proposes a triple-win against the effects of climate change comprising: (i) sustainable increase in agricultural productivity and incomes; (ii) adaptation and building resilience to climate change; (iii) reduction and/or removal of greenhouse gases emissions, where possible (FAO, 2013; Lambrou and Synnevåg, 2012).

However, literature shows that little is known around CSA RBM&E frameworks that are essential for measuring the outcomes and impacts of interventions like CSA. Evidence shows that there are a number of challenges associated with developing RBM&E frameworks for climate change interventions (FAO, 2013; Kusek and Rist 2014). FAO (2013) and Sanahuja (2011) outline that measuring climate change related programmes is a highly complex and contended issue. There is no single approach in assessment, monitoring and evaluation of climate change interventions like Climate Smart Agriculture. This is due to the challenges associated with defining the concepts to be measured and the interaction of multiple variables that differ according to contexts (FAO, 2013; Sanahuja, 2011).

The purpose of this research was thus to analyse different types of climate change related monitoring and evaluation frameworks and recommend a CSA RBM&E framework for the NEPAD International Non-Governmental Organisations (iNGO) Africa Climate Smart Agriculture Alliance. The primary research question of the study was - What will be the most appropriate CSA RBM&E framework for assessing outcomes and impacts for the Africa Climate Smart Agriculture Alliance?
The sub-research questions included:

1. What are the basic theories underlying the development of RBM&E frameworks?
2. What variables are the key building blocks for CSA RBM&E frameworks?
3. What Climate Smart Agriculture indicators can be used to develop CSA RBM&E framework for the Africa Climate Smart Agriculture Alliance?

The researcher utilised a qualitative research approach within a case study design. He interviewed fifteen key respondents who are experts in development work, climate change, climate smart agriculture, agriculture and monitoring and evaluation. Six of the key respondents were Alliance members. Data from the respondents were presented and analysed thematically. Data from both Alliance members and external respondents seemed to be coherent and this indicated that all respondents were in agreement on pertinent issues to be addressed. The researcher did not find theories underlying the development of CSA RBM&E frameworks, but what he found was concepts. Literature reveals that monitoring and evaluation frameworks for CSA should measure agricultural productivity, adaptive capacity or resilience of natural or human systems and the level of reduction of greenhouse gases as a result of the intervention (FAO, 2013). These are the concepts that form the basis for the development of CSA RBM&E frameworks.

The respondents further elaborated on these concepts. The data generated from the respondents show that CSA impacts, outcomes and outputs are anchoring on five distinct key result areas that may be measured by use of proxy indicators. The key results areas are the concepts underlying the development of CSA RBM&E framework and are proxies for adaptation or resilience and mitigation hence the need to measure them through proxy indicators. The concepts are agriculture productivity, environmental health, economic stability, policy integration and social stability.

Evidence shows that at impact level CSA results should be the presence of enabling policies, enhanced food security to rural communities, improved economic gains, environmental health and enhanced social values. The same trend of expected results was noticed under outcomes and outputs. The proposed key results areas are in line with the FAO (2013) definition which states that CSA is an agricultural approach aimed at sustainably increasing productivity and incomes, enhancing adaptation, reducing greenhouse gas emissions where applicable and ensuring the attainment of national food security and development goals.

6.2 Conclusions

There was consistency with regards to the respondents' definitions of key building blocks that are to be measured under CSA. As a result, five distinct key results areas emanated from the research and these were considered as key concepts and building blocks for the CSA RBM&E framework. These are agriculture productivity, environmental health, economic stability, policy integration and social stability. The respondents had a common understanding of these key result areas and how they contribute to adaptation or resilience and mitigation. Evidence shows that there is general consensus on the definition of terms or result areas that need to be measures under CSA. The use of proxy indicators was identified as the best approach for measuring adaptation and or resilience. All indicators that were presented by the respondents are not resilience nor are they adaptation but are representative of scenarios that stand for adaptive capacity. These findings corroborate other frameworks proposed by FAO (2013) and Sanahuja (2011) however, this study has gone on to categorise the key result areas to be targeted.

There is need to also pay attention to the gender component of CSA. Data from the two female respondents (who brought the gender issue out), show that gender is an important component to be measured under CSA. However, their view of the gender component was biased towards men's satisfaction as they felt that CSA should ease the burden of agriculture activities on women so that they could have extra time for their husbands and other household chores. This contradicts the gender approach within the agricultural sector which intends to give men and women equal opportunities and choices of what economically productive activities they prefer to use their spare time on.

Further studies might need to be conducted to ascertain if this is general opinion among women with regards to gender.

6.3 Recommendations

Based on the literature review, data collection and analysis, the following items are recommended by the researcher:

- The Alliance should focus on measuring the following five key results areas within the framework; presence of enabling policies, enhanced food security to rural communities, improved economic gains, environmental health and enhanced social values.
- There is need to break down outcomes into immediate, intermediated and long-term outcomes to be able to track and showcase interim and mid-term results to governments and funders (Spearman and McGray, 2011; Sanahuja, 2011).
- There is need to measure results at local, national and regional levels and show the link between the results throughout the whole results framework.
- There is need to make use of proxy indicators as surrogates for adaptation and resilience of communities. Adaptive capacity and resilience can only be measured after a shock occurs (Dinshaw et al., 2014).
- The CSA results-based monitoring and evaluation framework should be gender sensitive and ensure that results relating to women and men empowerment are measured.

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APPENDICES

Appendix 1.1: Climate Smart Agriculture results-based monitoring and evaluation interview guide

Respondent Profile	
Respondent number:	
Institution:	
Area of Expertise	

Themes	**Question**	**Purpose**
Impacts	1. How would you define a CSA impact/impacts that takes into account agriculture productivity, mitigation and adaptation? 2. What major CSA impact/s do you think the Africa CSA Alliance (ACSAA) should aim at? 3. What major external factors will	• To provide a contextual definition of impact/s within the Africa CSA Alliance RBM&E framework • To have a clear and common goal for the ACSAA • To document assumptions underlying the achievement of the impact/s • To define impact indicators for ACSAA

	contribute to the achievement or none achievement of this impact/s? 4. What kind of indicators can ACSAA use to show the achievement of intended impacts? And what are the risks / assumptions?	
Outcomes (happen at beneficiary level)	5. How would you define a CSA outcomes that takes into account agriculture productivity, mitigation and adaptation? 6. Given the major CSA outcome/s you just mentioned and taking into account the following facts: a. that climate change intervention outcomes like CSA take longer periods to manifest and b. that governments and funders want	• To provide a contextual definition of outcomes/s within the Africa CSA Alliance Results Based Monitoring and & Evaluation framework • To have a clear and common scope of immediate and inter-mediate results the ACSAA seeks to achieve by 2021 • To document assumptions underlying the achievement of the outcome/s • To define the outcome indicators for ACSAA

	to see immediate results manifesting during the course of projects, c. that the ACSAA will be implement activities for the next 5-6 years What would you recommend the ACSAA tracks as immediate (3-4 years of project implementation) and inter-mediate (5-6 years of project implementation) outcomes? 7. Why do you recommend these outcomes? 8. What major external and internal factors will contribute to the achievement or none achievement of this outcome/s?	

	9. How will ACSAA know that the intended outcomes are being achieved?	
Outputs (happen within ACSAA)	10 How would you define a CSA output that takes into account agriculture productivity, mitigation and adaptation? 11. What major CSA outputs do you think will enable the ACSAA to achieve the impact/s, outcome/s you just mentioned? 12. What major external factors will contribute to the achievement or none achievement of these outputs? 13. How will ACSAA know that the intended outputs are being achieved?	• To provide a contextual definition of output/s within the Africa CSA Alliance RBM&E framework • To have a clear and common scope of immediate and inter-mediate results the ACSAA seeks to achieve by 20121 • To document assumptions underlying the achievement of the outcome/s • To define the output indicators for ACSAA
You need to add process/mechanisms for	1. What do you think is the appropriate Theory of Change to bring-about	• To understand the mechanisms required for change.

change.	required outputs, outcomes and impact? E.g., partnerships required, capacity building /strengthening needs (institutions and individuals; and policy, practice/research, and farmer levels, communication/ advocacy, building community of practice etc.	
Inputs	2. What are the required resources?	• To understand the level of resources required.