**UNIVERSITY OF NAIROBI**

**CENTER FOR ADVANCED STUDIES IN ENVIRONMENTAL LAW AND POLICY (CASELAP)**

**EFFICACY OF COMMUNITY BASED ADAPTATION (CBA): A CASE OF KALRO PROJECTS IN MAKINDU SUBCOUNTY, MAKUENI COUNTY, KENYA**

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# DECLARATION

## Student's Declaration

I Kithuku Robert Muthami hereby declare that this thesis is my original work and has not been submitted for examination to any institution of higher learning.

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Kithuku Robert Muthami                                          Date

## Supervisors' Approval

This thesis has been submitted for examination with our approval as the university supervisors.

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Dr. Elvin Nyukuri                                                    Date

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Prof. Richard Mulwa                                              Date

## DEDICATION

This thesis is dedicated to my family for their continued support. This thesis would never have been successfully completed without their support.

# ACKNOWLEDGEMENT

# ABSTRACT

Various climate change response approaches, such as Community Based Adaptation (CBA), have been proposed and piloted globally. There is a dearth of information on the effectiveness of such approaches to enhance communities' adaptive capacity to climate change. This study examined the effectiveness of Community Based Adaptation (CBA) Projects in Kenya by analyzing the Kenya Agricultural and Livestock Research Organization (KALRO) CBA Projects in Makindu Sub-county, Makueni County. Specifically, it analyzed how communities perceive impacts on their adaptive capacity; ii) assessed the factors that hinder the success of CBA projects in improving the livelihoods of communities, and (iii) examined gaps in policies that promote CBA Projects at county level. This was a cross-sectional study that utilized mixed methods of research in data collection. A total of 102 households were randomly selected from Kiboko, Ngaaka, Nguumo, Mulili, Kisingo and Kaasuvi villages. The study found that the community perceived CBA projects undertaken by KALRO both positively and negatively. Positive perceptions were due to the improved market for agricultural produce; improved standards of living, improved agricultural yield and adaptation to the impacts of climate change. Negative perceptions were due to poor understanding of cultural practices, lack of financial support and capacity building from national government and county government. Secondly, the research established that capacity gaps at institutional and individual levels hindered effective implementation of CBA projects at community, KALRO and county levels. Lastly, the research identified gaps in policy to facilitate the implementation of CBA at the county level. From the findings, it was concluded that there is great potential for the CBA approach to enhance community climate change resilience. However, the lack of climate change legal and policy frameworks to implement CBA projects; skills gaps and the lack of ownership of the projects by the residents continue to influence performance of CBA projects in Makindu Sub-county. The research thus recommends the county should, domesticate the national level climate change policy and then develop relevant policy frameworks based on local climate change impacts. Lastly, CBA projects should be run by the community and supported by the county government and the national government through institutions like KALRO. This will ensure that all actors contribute and reap the optimal benefits from such projects for enhanced climate resilience.

Key words: Community Based Adaptation, Makindu, KALRO

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| | |
|---|---|
| AEO | Agricultural Extension Officers |
| AF | Adaptation Fund |
| ASAL | Arid and Semi-Arid Lands |
| CBA | Community-Based Adaptation |
| CBO | Community-Based Organizations |
| CDF | Constituency Development Fund |
| CGM | County Government of Makueni |
| CIDP | County Integrated Development Plan |
| EBA | Ecosystem Based Adaptation |
| FGDs | Focused Group Discussion |
| GCF | Green Climate Fund |
| IPCC | Intergovernmental Panel on Climate Change |
| KALRO | Kenya Agricultural and Livestock Research Organization |
| KCSAIF | Kenya Climate Smart Agriculture Implementation Framework |
| KCSAS | Kenya Climate Smart Agriculture Strategy |
| KMD | Kenya Meteorological Department |
| MTP | Medium Term Plan |
| NAP | National Adaptation Plan |
| NCCAP | National Climate Change Action Plan |
| NCCF | National Climate Change Fund |
| NGO | Non-Governmental Organization |
| SES | Socio-Ecological System |
| UN | United Nations |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WARMA | Water Resources Management Authority |
| WCCPC | Ward Climate Change Planning Committees |

# CHAPTER ONE: INTRODUCTION

## 1.1. Background

When effective community-based adaptation and participatory development strategies are embraced and assessed against socio-economic, environmental, and policy changes, they are likely to promote resilience to climate change (Gebre et al, 2016). The Intergovernmental Panel on Climate Change (IPCC) defines Climate change as: Any change in weather over a period of time, whether as a result of unpredictability in nature or because of anthropocentric activity. The United Nations Framework Convention on Climate Change (UNFCCC), defines it as: variability in climate which is credited direct or indirect human activity and natural changes in climate. These activities then alter the structure of the universal atmosphere. These events are observed over comparable periods of time (UNFCCC, 2018).

Hence, climate change involves prolonged and systematic change in climatic patterns of regions of the world. Greenhouse gases such as carbon dioxide and carbon monoxide, largely are the main causes of climate change. The United Nations (2017) estimates that up to 4.2 billion people across the world are affected in various degrees by climate change. In fact, most of those hit hardest by the effects of climate change are the vulnerable poor in the developing countries. Thornton et al (2010) explains that this is due to the fact that the poor tend to live in areas that are vulnerable to the effects of climate change, such as the lowlands, undesirable lands, land prone to mudslides and areas susceptible to flooding and water contamination.

Over the last several decades, world leaders have focused their attention on addressing the effects of climate change through adaptation and mitigation measures. To this end, most of the action is targeted at cutting back on greenhouse emissions. However, national interests, especially the need

to access cheap power and to industrialize and therefore create opportunities for citizens have always come in the way of these efforts.

Thus, as far as cutting back of emissions is concerned; global leaders have never really been committed to the international agreements they enter into such as the Kyoto Protocol. In the year 2015, global leaders again committed themselves to the Paris Agreement, which like previous agreements, also focused on cutting back on greenhouse emissions. Even though this agreement was celebrated, especially because it went further and championed for climate change adaptation, the withdrawal of President Trump of the United States complicated the process (DiChristopher, 2017).

Owing to the reality that cutting back of greenhouse emissions is unlikely to be realized, and the fact that even if such emissions were indeed reduced, the effects of climate change will be felt for much longer, the focus has now shifted to climate change adaptation. Climate change adaptation refers to the efforts put in place to help communities affected by climate change to adapt to the situation they find themselves in (FAO, 2010). The back and forth negotiations about cutting back greenhouse emissions have not been able to help the people that are most affected by the impact of climate change.

Moreover, those effects are only getting more severe, leading to massive failure of crops, huge losses of livestock, impoverishment of communities due to livelihoods being affected, and in some instances, loss of lives. There are also fears that desperation may provide fertile grounds for conflicts across many parts of the world, hence leading to displacements of communities and making the refugees crisis even much worse (Field, 2012).

Climate adaptation programmes involve building the resilience of communities to enable them to better deal with the effects of climate change. These programs often include the introduction of drought resistant crops, irrigation farming, reduction of number of herd, afforestation programmes, conservation of water sources as well as building new improved water sources among others. These interventions, together with others are intended to alleviate the impact of climate change on vulnerable communities. When these programs are led by and implemented at the community level, they are referred to as *Community-Based Adaptation* programs.

The term Community-Based Adaptation (CBA) was first used in 2006 as observed by Huq and Reid (2007). In their explanation, CBA entails fostering community-based development activities, practices, research and policies. To achieve this, one needs to identify those communities that are vulnerable to the impacts of climate change such as droughts and floods. After identifying their vulnerability, science should be used to engage the community to help them address these impacts.

Community-Based Adaptation (CBA) in this aspect can therefore be defined as a process that is led by the community; usually based on their priorities, necessities, information and capabilities to enable them to cope with the effects of climate change. At the moment, development projects are being re-branded as CBA projects, without necessarily addressing the fundamental drivers of climate-related risks, nor contributing significantly to the reduction of susceptibility of communities (Huq & Reid, 2007).

CBA entails empowering vulnerable communities, their governments and service providers in order to comprehend and examine how climate change is impacting and will continue to influence their lives. Consequently, they are able to make informed and anticipatory choices. These decisions are often based on priority adaptation actions so they can continually modify their livelihood and risk management plans in response to novel and unclear circumstances. Making those affected as

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part of decision making team and avoiding predetermined solutions is the starting point for effective climate adaptation (Fiona et al, 2015).

CBA seeks to build on the inherent adaptive capacity that exists amongst vulnerable groups. The adaptive capacity of any community is key to building resilience as it enables, through its processes and capacities constant response to a changing and uncertain climate over time. Their capacity to adapt to climate change is strengthened when they can access, accumulate and control assets, and knowledge; and when they have confidence and access to innovation, institutions and rights and when they make flexible and progressive decisions (Fiona et al, 2015).

CBA acknowledges that even amongst the vulnerable communities, women and men of different ages are susceptible; they experience climate change and respond to the effects of climate change differently. The differences in their power, roles and access to and control over resources determines if the vulnerable groups will be able to adapt or not adapt to the effects of climate change. Therefore, an analysis of gender-based differences is important in the identification of suitable, reciprocally supportive and gender equitable adaptation approaches and guarantee future resilience for all groups (Fiona, et al 2015).

In the process of engaging the community to set up Community-Based Adaptation projects, implementers should have the trust of the community. This means that they should engage with the local organizations first before moving into the community. Secondly, communication about issues of climate change must be made in a language that can be understood by the community. Lastly, there is need to learn about the community's indigenous capacities, knowledge and practices regarding climate change so they can be incorporated in the upcoming CBA projects (Huq & Reid, 2007).

Care International has established that, under the most realistic scenarios in Kenya, if one invests £1 in CBA, it will generate between £1.45 ($2.44) and £3.03 ($5.09) of wealth for these communities (Fiona, et al 2015). Similarly, in Niger, studies by Vardakoulias & Nicholles (2015) established that for every £1 invested in CBA, returns of between £4 and £6 are likely to be realized despite the different climate scenarios (Vardakoulias & Nicholles, 2015). Moreover, if the analysis is limited to financial benefits only, returns on every £1 spent on these projects are between £2 and £2.80.

Kenya fully commits to addressing climate change impacts domestically. The Kenya National Adaptation Plan identifies the rural populations, who often form the bulk of the poor, as the most vulnerable to climate change (KNAP, 2015). Beneficiaries of CBA projects include Kano Plains area in Western Kenya; Mbooni and Makueni areas in Eastern Kenya; and Garissa, Marsabit and Isiolo in North-Eastern Kenya. So far, these projects have been able to promote resilient livelihoods; the capacities of local stakeholders have been built; the projects have also been able to mobilize communities to address the underlying causes of vulnerability (King, 2014; Wakhungu et al, 2010).

Makueni County is highly susceptible to the effects of climate change, a fact aggravated by highly erratic rainfall coupled with increasing temperatures which often increase evapotranspiration. Kenya Meteorological Department (KMD) has recorded rainfall variability for Makueni from year to year. According to KMD, rainfall patterns are characterized by noticeable inconsistency from year to year and place to place. Onset, end, and the length of growing seasons has become volatile in recent decades. The variations in period of the main and succeeding growing seasons have seriously undermined efforts of households, organizations, and the county government of Makueni (CGM 2018). The status of food security has thus gradually worsened in recent past.

In a bid to address this variability and its effects, the Kenya Agricultural and Livestock Research Organization (KALRO) rolled out three Community Based Adaptation projects in the villages of Kiboko, Ngaaka and Nguumo from 2013 to 2019.  These villages are located in Makindu Sub-county, Makueni County. According to Recha et al (2016) over the past 50 years, annual rainfall has reduced in Makindu Sub-county. The available rain cannot sustain crop and livestock production and human livelihoods. In 2013, there was an estimated 70 to 90 percent of crop failure in the Makueni County (Kamau & Mativo, 2013).  It is projected that between 2021 and 2065, the climate change situation is likely to get worse (KCCRPS, 2017).

The relevant activities of the KALRO CBA projects to this study include: Water harvesting from rooftop, surface runoff and sand dams to store for domestic uses, micro irrigation, and fish production; Dairy goat keeping as an alternative livelihood option because improved goat breed produces high milk yield with minimal pasture and adaptive to high temperatures; and Walking-in tunnels to control pests, wind and other hazards related to climate changes and variability.

Others include Adoption and diversification of drought tolerant crops and fruits as an alternative livelihood options and income generating to cushion farmers against crop loss due to unprecedented extreme climatic conditions; Minimum or zero tillage to reduce moisture and mineral loss and improve production per unit of land; and Use of weather advisories to reduce the risk related to climate.

Dissemination and uptake of new sorghum and legume technologies is mainly done to enable farmer to plant drought tolerant crops which can do well under minimal rainfall and can survive drought. Lastly, CBA projects explore opportunities to create farmer market linkages to maximise on existing market for sorghum and legume produce and avoid middlemen from exploiting and reduce post-harvest loss

The approach by KALRO on CBA's has been pilot-based; consequently, it has not provided sustainable solutions in addressing the climate change challenge. Although the concept of CBA is still novel; it is quickly peaking up in other parts of the country such as Isiolo and Marsabit. There is need to make these projects long-term activities and programmes; this will enhance ownership and sustainability.

The CBA approach by KALRO is as part of the country's efforts in enhancing food security in the Agricultural sector as provided by the Kenya's Climate Smart Agriculture Strategy (KCSAS) 2017-2026. KCSAS therefore provides a mandate to KALRO it envisions to link to the other policies and strategies in relation to agriculture and climate change. Whilst KALRO is a national institution, its projects there should be coordination with the County policies, plans and programmes.

## 1.2. Statement of the Research Problem

Small rural communities, which are often characterized by poverty and least equipped to adapt to the effects of climate change, are the most vulnerable to climate change. Current studies, local observations and more than 30 years of climatology records by Kenya Meteorological Department show that there is increasing extreme weather events such as droughts and floods (KMD, 2017). Makueni County is entirely semi-arid and different parts of the County are experiencing the effects of climate change differently thus threatening the economic livelihoods of its residents (CGM, 2013; Mutua et al, 2016).

In a bid to curb this trend, community-based adaptation has been identified as a major strategy in climate change legislation, policies, and action plans by the government. Community-Based Adaptation projects often seek to augment efforts at climate resilience within communities or the

ecological units upon which their livelihoods rely (Fiona, et al 2015). Institutions such as KALRO, Climate Care, Care International, National Drought Management Authority, African Development Bank, the World Bank, the Department for International Development, Danida, and the International Financial Corporation amongst others supports climate change adaptation projects in Kenya through grants and loans.

However, most of the Community-Based Adaptation projects are just pilots. Progress within this adaptation framework has been slow despite the involvement of many stakeholders, farmers and support from the policy and legal framework.  In various parts of the country, farmers continue to experience adverse effects of droughts, loss of crops, threatened livelihoods and significant loss of economic livelihoods.

While it is important to acknowledge the efforts made through such adaptation measures and innovations, it is increasingly evident that such approaches and innovations are not enough to guarantee extensive adaptation to climate change. This is because, the communities' attitudes and perceptions of these projects is not well understood. In addition, there are barriers at implementing institution's level and gaps at the policy level.

It is therefore important to understand what are the factors that hinder the success of adaptation projects, ability of communities to cope with the impacts of climate change, extend to which the projects improve the adaptive capacity of the communities and how the approach is aligned with policies at the national and county levels. This knowledge will assist the incorporation of other strategies or strengthen the local adaptation strategies to support the capacities of the inhabitants to adapt to climate change. This study will therefore assess the effectiveness of KALRO - supported Community Based Adaptation projects in Makindu SubCounty, Makueni County, Kenya.

**1.3.Research Questions**

The main research question is; what is the efficacy of Community Based Adaptation (CBA) Projects in Kenya? This question is operationalized into the following specific questions:

1. What is the perception of KALRO implemented CBA projects in Makindu SubCounty towards communities' adaptive capacity?

2. What factors hinder the success of CBA projects in improving the livelihoods of communities in Makindu SubCounty, Makueni County?

3. What are the gaps in policies that need to be addressed to promote Community Based Adaptation initiatives at county level?

**1.4. Objectives of the research**

The main objective of the projects was to investigate the efficacy of Community Based Adaptation (CBA) projects in Kenya. This is operationalized into the following specific objectives;

1. To analyse the perception of KALRO implemented CBA projects in Makindu Sub County towards communities' adaptive capacity.

2. To assess the factors that hinder the success of CBA projects in improving the livelihoods of communities in Makindu SubCounty, Makueni County

3. To examine gaps in policies that hinder effective implementation and promotion of Community Based Adaptation projects at county level.

**1.5 Justification of the Research**

This research is significant for Community-Based Organizations, Non-Profit Organizations and even Government institutions that are funding or running a number of climate change adaptation

initiatives at the local level. While appreciating that there are many such initiatives in existence and others that are coming up, it is important to put into perspectives how these initiatives are going to be sustained and eventually leading to success. By having information relating to why such operations fail or not effectively responding to climate change vulnerabilities, such organizations are going to be better placed to structure their projects/activities in ways that deliver anticipated value to the communities being served.

Policy makers will also be keen on the results of this research. For a very long time, the focus was on mitigation of climate change, and specifically on cutting of greenhouse gases. Hence, when it comes to making policy, it will be important that as more institutions and organisations seek ways to mainstream climate change in their polices and plans that such policies are informed by the roles each partner is expected to play so as to make adaptation programs successful. If policies are not informed by causes of failure of climate change response measures, then it is given that policy will become a stumbling block to implementation of climate change programs.

It is noteworthy that the results of this research will be important to county governments in arid and semi-arid areas of Kenya which are often hardest hit by the effects of climate change. These institutions are poised to take a prominent role in climate change adaptation in their various jurisdictions. In particular, the links between the county government and the national government, as well as linkage between county government and various organisations running climate change adaptations in the counties need to be redefined and restructured so as to achieve synergy. Hence, the research is going to point out areas that have not worked and needs to be improved, so that county government are able to redirect their efforts so as to achieve much more impact in adaptation processes.

# CHAPTER TWO: LITERATURE REVIEW

## 2.1. An Overview of Climate Change in Kenya

Kenya is already experiencing rising temperatures, changing rainfall patterns affecting agriculture, rising sea levels, increase in extreme weather events, changing disease vectors, loss of biodiversity and ocean acidification. One visible impact of climate change in the country has largely been with regards to the persistent drought in the country. The droughts have led to huge losses of livestock, significant declines in crop production as well as loss of lives through starvation and malnutrition (Conway & Schipper, 2011).

While droughts are nothing unusual, the occurrences of droughts have become much more regular. For instance, in the 1960s, droughts would occur at intervals of 20 years, which later reduced to 10 years in the 1990s, and since 2000s, drought occurrence has been between one to three years (Kimani et al, 2015). Pastoralists and those that depend on rain fed agriculture have been the worst hit by this situation as they have no time to replenish their stocks or recover losses suffered.

Globally, for a very long time, there was a notion that climate change could be addressed through reduction of greenhouse gas emissions (Kamau & Matiovo, 2013). However, this was never successful due to mistrust among countries, leading to failure of agreements such as Kyoto Protocol. Even today, Paris Agreement of 2015 is not clear if it will succeed, especially following opposition for United States' president Donald Trump (DiChristopher, 2017).

The Paris Agreement sets the standards of how the world should address climate change issues. Amongst others, it proposes improving adaptive capacity; supporting efforts towards resilience and reducing susceptibility to climate change. With these in mind, the globe will contribute to sustainable development while guaranteeing sufficient adaptation responses towards the temperature goal (UNFCCC, 2015). The universal adaptation objective was a major decision for

developing countries in fostering climate change adaptation which is highly prioritized in countries like Kenya. There is a realization that even if all greenhouse gas emissions were to be reduced, the effects of climate change would continue to be suffered by communities for several decades (Fiona et al 2015).

To that extent therefore, helping communities adapt to impact of climate change has become imperative. By reducing vulnerabilities of communities to climate change effects and improving their capacities to deal with the new environmental realities, they are better able to survive. Otherwise, the situation may worsen beyond what we have today, as impacts of climate change such as intensity of droughts, water scarcity and high temperatures, malnutrition and diseases, as well as conflicts become much more severe (Conway & Schipper, 2011).

## 2.2. Community Based Adaptation to Climate Change

Adaptation plans and strategies are developed through a participatory process i.e. the bottom up approach. The aim of these processes is to address the primary sources of poverty that often renders some groups of people susceptible to the effects of climate change. To achieve this, these processes often build on communities' cultural norms and experiences. Community Based Adaptation (CBA) is an imperative component in attaining more comprehensive and sustainable development. Proponents of the CBA approach believe that every community has systems of knowledge, and also capacity and resources, which they are already using to adapt independently (Fiona et al 2015).

In this case, CBA approaches often seek to empower communities that are vulnerable to the effects of climate change and other interested parties to understand how variations in climate are already affecting and how they will continue to affect their lives if they do not change the status quo. It also helps vulnerable communities to access new knowledge, networks and resources; organize together to make well-versed and progressive choices. It also helps them to continually adjust their

livelihood and strategies for managing risks as they respond to new and uncertain conditions (Fiona, et al 2015).

Essentially, CBA aims to benefit the communities within which such programmes are carried out. Conway & Schipper (2011) notes that the success of such programmes are influenced by many factors, chief among them the attitudes and perceptions that the communities have on the activities involved in the programmes. Most of the projects aimed at climate change adaptation tend to fail because of an assumption among the program officers that the communities will naturally embrace projects meant for their benefits. However, communities that suffer the most out of climate change impacts are much more likely to be poor and illiterate, hence unlikely to readily change their attitudes and perceptions (Aberra, 2012).

Consequently, climate change programs being run in communities have to take into account the attitudes and perceptions present in those communities. At the core of the programs should be to develop enthusiasm among community members so that they become active participants in the programs being run by the organisations. To this end, Huq et al. (2015) advices that it is important to engage community leaders and groups to be the visible faces behind the programme. When officers who come out of that community take the vampire role, then mistrust may ensue.

CBA programmes must also be cognizant of indigenous knowledge already present in the community. Aberra (2012) stipulates that organizations encounter major problems with while running the climate change adaptation programmes because they tend to ignore such knowledge. Yet, this type of knowledge has been embraced in communities and passed on from one generation to another, and hence cannot be discarded easily.  For example, the Teso in Busia district of Kenya used their indigenous knowledge on weather forecasting, as a way of confirming the weather reports they were getting form the radio (Egeru, 2012).

In this sense therefore, in the event the two sets of information did not match, they were more likely to distrust information they were getting from the radio and rely on their indigenous knowledge. This is also true when it comes to following instructions given by program officers. According to Egeru (2012) traditional knowledge is not in line with the best practices propagated, it will be important to change the attitudes and perceptions even as the programs are being rolled out. Therefore, there is need to work directly with extension officers or community leaders. These officers should be trained in the best practice, and used to teach other community members (Egeru, 2012).

Success is likely to be assured because they are in contact with the community for much of the time and are able to make the requisite follow-ups. Ogalleh et al (2012) opines that it becomes even more important when they are residences of the community because this increases the extent to which they are believed by the other members. Bies (2012) also makes a point that the indigenous knowledge should be integrated with the best practices being promoted so as to create enthusiasm and help community members easily deal with their mistrusts and adopt the new methods.

Awareness also plays a key role in promoting success of the climate change adaptation programs. Communities must be made aware of the programs being rolled out, and what it entails. Mutimba et al (2013) notes that it is important for the community members to get to know why they are being asked to adopt new methods which are different from what they are used to. The level of awareness is directly linked with the level of adoption of the best practices being promoted (Conway & Schipper, 2011). Having the right information empowers people to make the necessary investments and steps to ensure that they adopt the new practices so as to reap the benefits.

Hence, there is a need to ensure that the community being targeted is sensitized to a great extent through a number of approaches such as community groups, schools, churches, house to house outreach, local radio among other avenues of getting information out (Othieno, 2014). Giving information also involves giving room for questions and answering them honestly and openly in a way that win the trust of those targeted (Mutimba et al, 2013).

## 2.3. Capacity Status and Needs in Adaptation Programmes

There are a number of gaps that impair the capacity of organisations that run adaptation programs. One such problem has to be the funding gaps experienced owing to the vastness of the problem. Biesbroek et al (2013) notes that funding gaps come as a result of a lack of mainstreaming climate change intervention and adaptation within the policies of most governments. As a result, adaptation programmes tend to receive little funding from government institutions. Therefore, Community Based Organizations' resources involved in climate adaptation efforts are never enough to reach out to all the areas to be covered.

In any case, this limits the extent to which the targeted area will be covered in terms of information delivery, follow up and other support the communities require (Kithiia, 2014). Besides, Othieno (2014) observe that even though countries are aware of the need to promote adaptation, the programmes by regional and national governments are normally drawn with the assumption that the private sector and other non-profit organisations will fill the funding gaps. It is therefore common to find nations with good adaptation programs but which have not been rolled out to help communities in dire need (Huq et al., 2015).

Moreover, poverty has proved to be one of the major stumbling blocks to the adoption of the new climate adaptation programs. CBOs that promote climate change adaptation programs in communities will normally come across communities whose livelihoods have been destroyed

(Mwangangi et al 2012). The high levels of poverty mean that these communities can barely make ends meet. Good agricultural practices such as use of improved seeds and fertilizers for farming, adoption of green energy to reduce deforestation, keeping improved breeds of livestock, or even adoption of crop irrigation become difficult because communities cannot afford to purchase these inputs (Dupuis & Biesbroek, 2013).

When communities are preoccupied with their survival, there are unlikely to make requisite investments to improve their crop and animal production. Unless they are supplied with the improved inputs being promoted, which is normally not the case; the information given to them largely becomes useless. Additionally, Huq et al. (2015) notes that adaptation programmes will normally run into headwinds because culture tends to hold communities back. For instance, Kamau & Matiovo (2013) gives the example of some communities that insist on planting staple foods such as maize regardless of declining production or using indigenous fertilizers such as cow dung because of distrust of organic fertilizers sold in the shops.

Still, in pastoralist communities, having a huge number of livestock is seen as wealth, and they are unlikely to give up such practices, regardless of huge loses they suffer during droughts. The worst part of it is that such communities will tend to rationalize their situation (Mwangangi et al 2012). Hence, unless the culture of communities is not going to change in line with the needs of the adaptation programs, then investments made to help them adapt to climate change effects will not realize anticipated returns. Furthermore, coordination between various organisations involved with the communities is very important.

Fiona et al (2015) notes that there is a tendency to have several non-profit organisations, including regional and national governments, running various adaptations programs within the same community. In such cases, it is important that such organisations coordinate their practices so as

to achieve synergy. Field (2012) notes this is normally compromised by selfish ends, such as a need to take credit for the success. The problem with this approach is that some programs will normally compromise achievements of other programs by other organisations. In other instances, duplication of efforts, which basically leads to wastages of resources, will occur (Kithiia, 2014). In such instances, it is the community that loses out.

Lastly, supply chain linkages also play a role in impoverishing communities and therefore prevent adaptation of new practices. Owuor et al (2015) notes that less developed marketing channels means that the farmers are normally at the mercy of the middlemen who buy their produce or livestock at a throw away price and later sell them at a higher price. What this means is that the adaptation mechanisms aimed at improving productivity of the farmers do not reward them as it should. Hence, whereas food security and improved productivity is important, getting the produce to the markets is important in making such programs more sustainable.

## 2.4. An Analysis of Relevant CBA Programmes Policy Framework

Community- Based Adaptation programs can only have desired impact on the communities if they are in line with a given policy framework. Having in place a policy framework within which different players work is important in giving a sense of direction and ensuring that the resources contributed by a variety of players deliver value (Ogalleh et al, 2012). Without a policy framework, there is a danger that adaptation efforts will be disjointed, and as a result, resources will be wasted while efforts of some stakeholders will compromise achievements of anticipated objectives.

Policy and institutional frameworks that guide and address climate change have been formulated and created. The Constitution of Kenya (2010) guarantees all Kenyans a right to clean and healthy environment under the bill of rights. For this to be achieved, the country has developed various climate change policies, plans and programmes including; the National Climate Change Act

(2016), the National Climate Change Policy (2014 Sessional paper), National Climate Finance Policy (2016 Sessional Paper), National Climate Change Response Strategy of 2010, National Climate Change Action Plan (2018-2022) and the National Adaptation Plan (2016-2030).

In enhancing climate change response with regards to the country's development paradigm, climate change has been mainstreamed into the 2018-2022 medium term plan (MTP) III of Vision 2030. Counties are also mainstreaming climate change into the various County Integrated Development Plans and also enacting legislation and policies which prioritize adaptation mechanisms at the local level. There are also a number of climate change financing mechanisms for adaptation; these include the Green Climate Fund (GCF) and Adaptation Fund (AF), created under the UNFCCC. Others include Bilateral and multilateral financing mechanisms as well as domestic resources.

At the national level, a National Climate Change Fund (NCCF) has been established according to the National Climate Act of 2016. Counties like Makueni have established County Climate Change Fund Regulations; they state that 1% of the overall County Budget should be channeled to climate change response. The National Policy for Sustainable Development of Northern Kenya and other Arid Lands (NPSDNKAL) seeks to build the resilience of communities in towards the drought and therefore strengthen their livelihoods. The Agricultural Sector Development Strategy 2010-2020 is a policy that requires the promotion of sustainable food production and agro forestry. Despite all these developments, adaptation activities continue to be carried out at pilot scales.

One major problem that Kenya's counties face is the policy incoherence at the national level which makes implementation of adaptation programmes difficult (Schilling et al, 2014). To be specific, there are different bodies which compete with the same resources, hence creating loopholes in policy implementation. The matter was even made worse with devolution of governance, as

multiple levels of public implementation were introduced. For instance, with regards to water, we have different bodies such as Water Resources Management Authority (WRMA), Catchment Areas Advisory Committees, Water Services Boards, and the Water Resources User Associations and others (Schilling et al 2014).

The gaps created have then been exploited by rent seekers who are out to exploit the funds for personal benefit rather than have those funds reaching the intended targets. Secondly, Field (2012) notes that the problem has made policy incoherence even worse, with very little going on in terms of tangible actions. In fact, Huq, et al. (2015) notes that most of the work, is being undertaken by non-governmental organizations, rather than deliberate action by either county or national government and the situation was still the same during undertaking this research.

While climate change adaptation policies make sense, it is important to ensure that such policies direct effort towards implementation. Huq et al. (2015) observes that most countries do have climate change policies, but those policies aim at mitigating climate change by reducing emissions. However, the most important thing at this stage in time is to ensure that such polices help communities adapt to climate change effects. To that end therefore, when polices direct efforts towards climate change mitigation, then there exists a gap which lead to very little being done about adaptation. The end result is that the effects of climate variability are gradually becoming more severe.

Kenya has several climate change-related sectoral policies, yet the number of people being affected by persistent droughts and flooding is increasing. Biesbroek et al. (2013) note that in Kenya, the number of people facing food insecurity stands at over 5 million, yet those who depend on food aid throughout the years stand at 2 million and is bound to rise. This is a clear indication that at

the policy level, the idea of adapting to climate change has taken the form of spontaneity, always reactive to episodes of droughts and flooding as an outcome of climate change.

Besides most of the planning by developing nations particularly Kenya has not been exclusive on adaptation but has tended to focus on climate change in its totality. This poor appreciation of adaptation has therefore affected funding for adaptation programmes. Inadequate funding directed at adaptation programmes have made it difficult to undertake suggested projects that will help alleviate the impact of climate change in communities (Alhassan & Hadwen, 2017). Hence, even though the effects are known and are worsening, very little is being done for lack of funds.

Most county governments have no climate change policies. In fact, at the time of doing the research it was only Makueni County that had developed a climate change policy, the County Climate Change Fund that commits the county to spend 1 percent of its budget to climate change adaptation. Nevertheless, the major gaps that are likely to emerge even as county government develop their own climate change polices, is the discrepancy between the county and national government climate change policies.

## 2.5. Analytical Framework

This section focuses both on the theoretical framework and the conceptual framework. This research adopted the Socio-ecological Systems (SES) theory to analyze the efficacy of Community-Based Adaptation projects with a focus on Makindu SubCounty.

### 2.5.1. Theoretical Framework

This research adopted the Socio-Ecological System (SES) Framework; this framework was used to analyse the effectiveness of Community Based Adaptation (CBA) projects. This framework was recommended by McGinnis & Ostrom (2014) for the management of shared resources, where

users extract resources from a common ecosystem. Proponents of this framework argue that inasmuch as the resource users have no obligation to manage these resources; they have set for themselves a number of rules and regulations that govern use of these resources. These laws are developed by an overarching governance system at the time, at that level.

This research applied the Socio Ecological Systems framework to Community-Based Adaptation approaches in Makindu SubCounty. In the first step, the researcher must select a focal level of analysis. This research was guided by analyzing the types of interactions and outcomes are relevant to the attitudes of Makindu residents in relation to CBA projects. The research also analyzed the types of stakeholders involved and the governance systems that are likely to influence their behavior.

The research focused on the existing policy frameworks, how stakeholders are engaged and capacity needs to achieve success in Community Based Adaptation projects. It also analyzed how these factors respond to the needs of the community with regards to improving their levels of adaptability to climate change. The research incorporated different actors in the research; these include communities in villages in Makindu, KALRO staff and County Government representatives. The research sought to examine their role in the execution of CBA projects. Ideally, CBA projects should be carried out under a suitable policy, legal and institutional framework. In this case, the research analyzed existing climate change related policies and laws and gaps therein and how these are addressed at county level.

The basis of the implementation of Community Based Adaptation projects is sustainable use and management of the environmental; sustainable use and management of the environment is key in the achievement of the envisioned projects results. This research was therefore undertaken whilst considering environmental issues that are related to the general implementation of Community

Based Adaptation projects. It considered the effectiveness of CBA projects in light of the SES approach and therefore analyzed projects results in a bid to make recommendations for improved adaptive capabilities and climate change resilience.

### 2.5.2   Conceptual Framework

Climate change causes droughts, which reduce the amount of rainfall. Since agriculture in this place is rain-fed, there will be crop failure, thus poor yield which will cause food insecurity. However, if CBA is integrated county policy, and CBA projects effectively implemented, they will enhance farmers' adaptive capacities to climate change. This in turn increases food security and improves livelihoods as shown in Figure 1.

**Figure 1: Conceptual Framework**



Source: Author, 2018
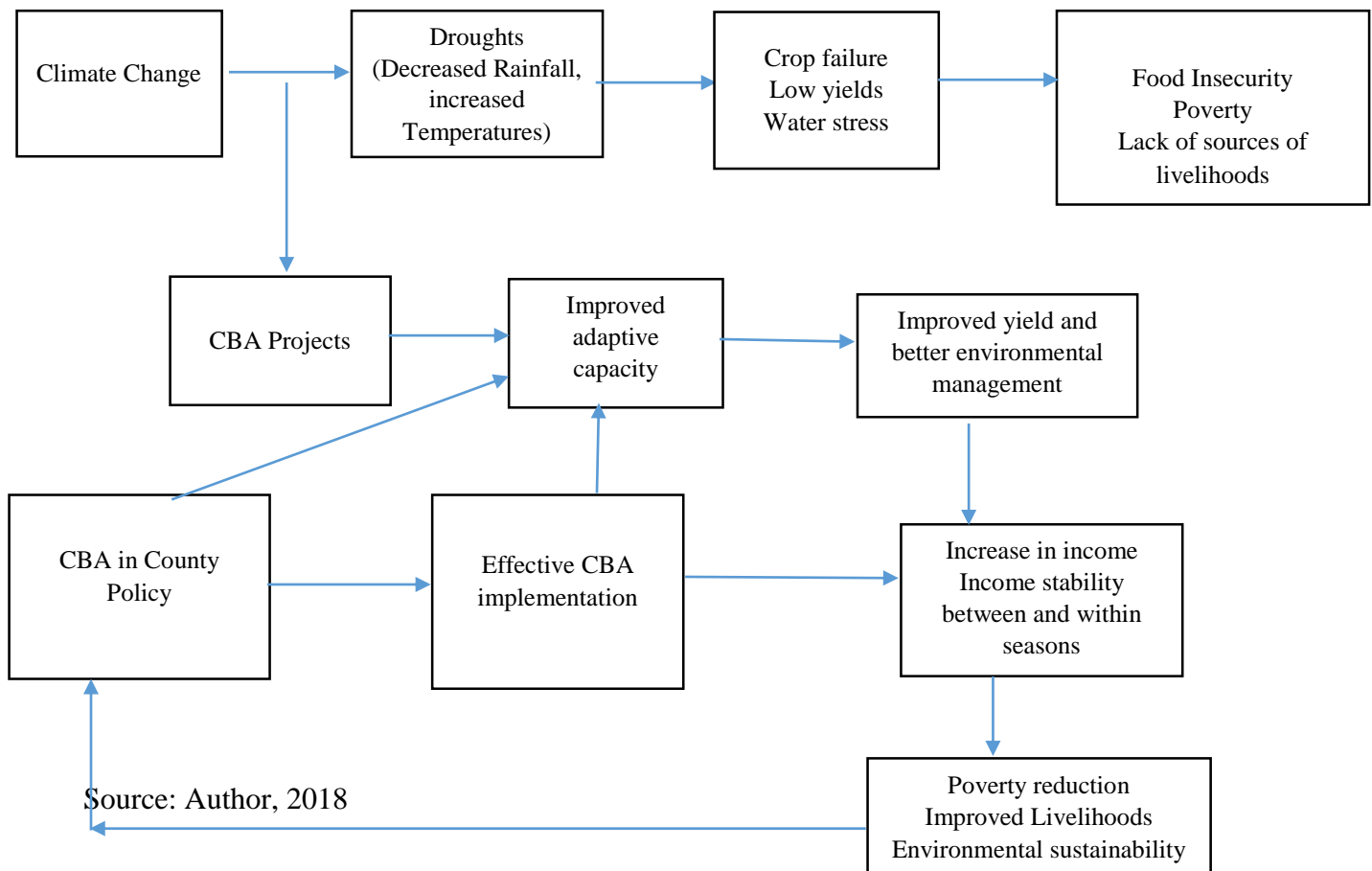
## 2.6 Research Gap

It is clear that there are gaps in information, with regards to literature review. There is no literature on community perceptions and attitudes towards climate change CBA approaches; capacity needs for better implementation of CBA projects and how gaps in climate change policy and legal frameworks at national level have affected Community-Based Adaptation Projects in Makueni County. This research seeks to fill these gaps.

**CHAPTER THREE: RESEARCH METHODOLOGY**

This chapter describes research methodology; this includes the design of the research, calculation of the research population and sampling procedures, data collection methods, methods of data analysis, research limitations and ethical considerations.

## 3.1 Study Site

This study was undertaken in Makindu SubCounty in Makueni County. Makindu SubCounty was chosen because of the heavy presence of KARLO activities which it has been implementing CBA initiatives since 2012. Makueni County, which is about 8,034 $km^2$ with a population of 987,653 people of which 84,946 reside in Makindu SubCounty, according to the National Bureau of statistics, 2019. Makindu SubCounty has 21, 756 households and 197 villages. It is a semi-arid zone; temperatures in the county usually range from 12ºC at the minimum to 28ºC at the maximum. Rainfall levels range from 150 mm to 650 mm per year; this is typical of ASALs in Kenya (CGM, 2013).

The county experiences short during the periods of October-December and long rains, in the economic subsistence. Other socio-economic activities include apiculture, trade at small scale and dairy farming. The county produces fruits i.e. mangoes, paw paws and watermelons; it is currently setting up a factory for value addition of the fruit and fruit products. It also produces cereals such as maize, cow peas, beans, pigeon peas and lentils. Farmers within the county also practice livestock keeping and dairy farming (CGM, 2013).

The county is one of those that are hardest hit by climate change. It experiences water shortages, long drought spells and this is further exacerbated by high levels of poverty, increase in population which has led to squatters and population pressure on arable land. In this case, Makueni County

has approximately 29 active Non-Governmental Organization, 444 Youth Groups, 811 Women Groups and 92 cooperative societies whose work addresses social and environmental issues (CGM 2013).

Makindu sub county experiences little rainfall throughout the year- 595MM annually- with an average temperature of 22.9°C. While the least amount of rainfall occurs in July, the highest precipitation is experienced in November, with an average of 163mm. The highest temperature is 24.8°C in March with the lowest in July at 20.4°C (Climate data.org, 2019). Makindu falls within a semi-arid ecological zone. There is no vegetation in some areas due to low rainfall. Common vegetation includes thorny shrub, baobab, acacia and euphorbia trees (Mbithi, 2017).

Permanent and seasonal sources of water are the most common- competition for these often intensifies during drought. River Kiumbi, which is the major river is seasonal in nature. Most water is obtained from wells which are dug along River Kiumbi. Cultivation is not often done but during the wet season, food crops such as green grams, tubers, cowpeas and cassava are cultivated.  Goats, cows and sheep are the most common livestock kept in this region. Aside from trade, the hospitality sector and agriculture, charcoal burning is also a common source of livelihood in Makindu (Mbithi, 2017).
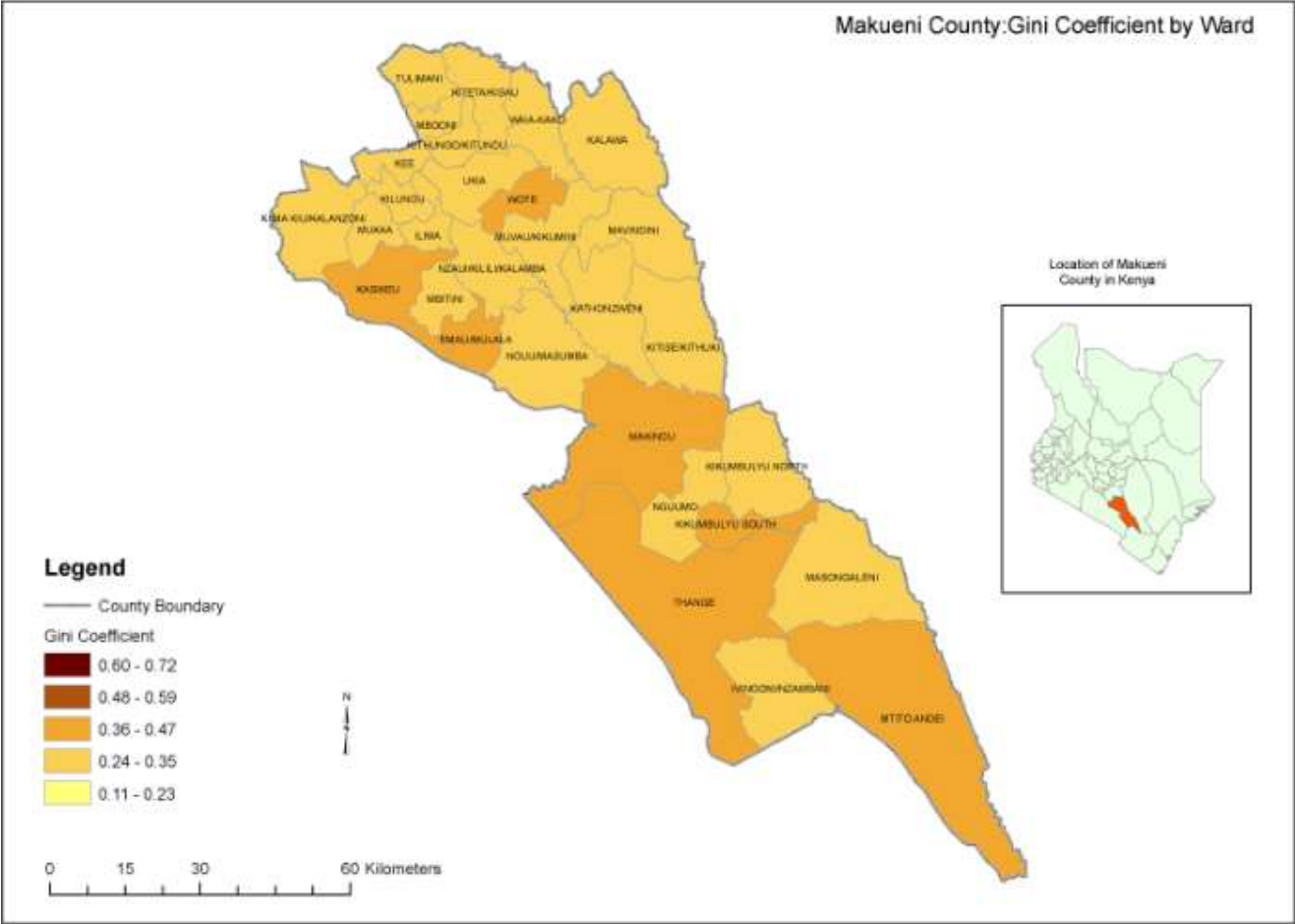
**Figure 2: Map of Makueni County (Showing Makindu SubCounty)**

Source: https://thekenyan.co.ke/makueni-county/

## 3.2 Methods

The research adopted mixed method of research i.e. the research combined elements of qualitative and quantitative research approaches to foster understanding of key findings and for the purposes of corroboration. During data analysis, quantitative and qualitative data was triangulated to form a rich analysis.

This research sought to analyze the communities' attitudes and perception on KALRO CBA projects in Makindu SubCounty, Makueni County and to examine gaps in policies that promote Community Based Adaptation projects at county level. To achieve this, the research assessed the

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benefits that communities accrue from the projects and their attitudes and perceptions of these projects. Additionally, the researcher reviewed existing climate change policies, plans and programmes at the national and county levels. The research also undertook interviews with county government officers under the department of water, sanitation, environment and climate change. The officers interviewed included the chief officer responsible for environment and climate change, chairman of the County Climate change fund board, environment officer in charge of Makindu SubCounty.

Social demographic data was collected and categorized into age, marital status, economic activities, gender, occupation, levels of education and their length of stay in Makindu SubCounty as discussed below. The gender category examined the number of women and men that were involved in the CBA projects and also those that had benefitted from the projects. Age was categorized in two groups; 18-35years, 36 and above years. The 18-35 age group represents the youth while the above 36years age bracket in this case represents the older population according to the Constitution of Kenya, 2010.The levels of education of the respondents were recorded at six different levels.

### 3.2.1 Sample Frame

This research targeted several different actors within Makindu SubCounty. It examined how these actors contribute to sustainable livelihoods through Community-Based Adaptation Projects. The researcher was guided by questions like; If I decided to research all CBA projects in Makindu SubCounty; will I be able to access data from all the villages where they are implemented? Would data from the villages where CBA projects are not implemented be helpful in the research? Will data be available for all of the years the projects have been implemented and will it be accessible? Will data be consistently available in each village? And if not, how will it impact the research?

Therefore, this research utilized both primary sources of data and also secondary desktop research. Sources of secondary data included published and unpublished government reports, articles, organizational reports and books. Primary data was collected via observation technique and interviews. A household survey, key informant interviews and Focus Group Discussions were undertaken in Makindu SubCounty, Makueni County.

**3.2.2 Respondent Selection**

A total of 102 households were randomly selected; the samples were acquired using a random number table, which was used to generate a sample list. From the detailed household lists acquired at the Village Elders office in each of the six villages that participated in the study; each village member was given a number and out of the total, 102 were chosen to participate. Of the total questionnaires distributed, only 100 were filled and returned.

From the household interviews, the interviewer identified community members, those who work directly or are indirectly involved with the CBA projects; officers from Non-Governmental Officers that work on similar projects; officers from the Kenya Agricultural and Livestock Research Organization; Agricultural Extension Officers (AEO) from the national government; County Government Officers; and Climate and Weather Focus Officers. Of these, 9 were selected to participate in the Key Informant Interviews and 24 in the three Focus Group Discussions.

The research was carried out using household survey, key informant Interviews and Focus Group Discussions. The household survey was carried out in Kiboko, Ngaaka and Nguumo villages; these were chosen because CBA projects are implemented within these areas in Makindu SubCounty. Mulili, Kisingo and Kaasuvi villages were chosen as a control group as in these villages, CBA projects are not implemented. The survey utilized both non-probability and probability sampling techniques.

Random sampling from both types of villages was used to increase the representativeness of the research sample as each participant in the target population had an equal chance of being selected (Daniel, 2012). The sample size for the quantitative part of the research was 200 CBA projects members. To determine sample size, the Cochran formula was used. This method is given as;

$$n = \frac{Z^2 pq}{d^2} \qquad (1)$$

Where, $n$ = sample size; $Z$ = standard normal deviate, which is set at 1.96 and corresponds to 95 % confidence interval; $p$ = proportion of the population having a particular characteristic for example the portion of farmers impacted by CBA projects (0.7); $q$ = proportion of households without impact of CBA projects (0.3); $d$ = accuracy usually at 0.05.

$$n = \frac{1.96^2 * 0.7 * 0.3}{0.05^2} = 323 \qquad (2)$$

However, the population size for this research is 200, less than 10,000 therefore the equation for sample size is explained as follows:

$$nf = \frac{n}{1 + \frac{n}{N}} \qquad (3)$$

Where; $nf$ is the desired sample size where the population is less than 10,000; $n$ is the derived sample size where the population is greater than 10,000 and $N$ is the estimated population size, in this case, the sampling frame population. Given the population data from the research, the sample size was derived as follows:

$$nf = \frac{323}{1 + \frac{323}{150}} = 102.431 = 102\ people \qquad (4)$$

The sample comprised 50 members of community who are not directly involved in CBA projects and 20 who are directly involved; 9 officers from Non-Governmental Officers that work on similar

projects; 8 officers from the Kenya Agricultural and Livestock Research Organization; 5 Agricultural Extension Officers (AEO) from the national government; 5County 3 Government Officers and Climate and Weather Focus Officers.

Informant Interviews utilized non-probability purposive sampling technique; which involves selecting participants who can provide the necessary information for achieving the research objectives (Daniel, 2012). In KALRO, a purposive sample of three officers, one senior projects manager and two field officers who heads and work on the CBA projects in Makindu SubCounty respectively participated in the research.

The Civil Society was represented by 9 officers from different NGOs, namely ADA Consortium, Anglican development Services (ADS), National Council of Churches, Kenya (NCCK) which implement climate change projects in Makindu SubCounty and other parts of Makueni county. The national government was represented by three Agricultural Extension Officers (AEO) and three climate and weather focus officers drawn from the Kenya Meteorological Department (KMD). Five participants from the county participated in the survey. These included two participants from the Department of Agriculture, Irrigation, Livestock & Fisheries Development; and three from the Department of Water, Sanitation, Environment and Climate Change of Makueni County.

The officers from the Department of Water, Sanitation, Environment and Climate Change included the chief officer responsible for environment and climate change, chairman of the County Climate change fund board, environment officer in charge of Makindu SubCounty. Key informants were chosen based on their experience with climate change projects in Makueni County and specifically Makindu SubCounty.

A total of three Focus Group Discussions containing of 8 people each drawn from Community Members, CBA Projects Members, KALRO, National government i.e. Agricultural Extension Officers, the Kenya Meteorological Department and the County Government. The research also used observation technique, interviews and questionnaire to collect the primary data. For the key informant interviews and FGDs, checklists were used to collect data. In the case of secondary data, the research used published literature, unpublished academic papers, research report and legislations, policies.

### 3.2.3 Response Rate

A total of 102 questionnaires were administered to households and key informants; these respondents were randomly selected to ensure that each member of the target populace has an equivalent and independent chance of being part of the research sample. Of those that were distributed, 100 of them were filled and returned. This represents a 98.04% response rate which is acceptable for a conclusive research. According to Mugenda and Mugenda (2003) a 50% response rate represents a reliable response rate for data analysis. This is as shown in the Table 1:

**Table 1: Household survey and FGDs response rate**

| Respondents | Number of Respondents | Percentage of Total |
|---|---|---|
| Community Members from the three villages where CBA projects are implemented and the three villages where CBA projects are not implemented | 50 | 50% |
| CBA Projects Members (Directly involved in the CBA) | 20 | 20% |
| Officers from NGOs (ADA Consortium, NCCK, ADS Eastern) | 9 | 9% |
| KALRO Officers | 8 | 8% |
| Agricultural Extension Officers (AEO) | 5 | 5% |
| County Government Officers | 5 | 5% |
| Climate and Weather Focus Officers | 3 | 3% |
| **Total** | **100** | **100** |

Source: Author, 2018

Among the survey respondents; there were 20 CBA Projects Members; these are the members of the community who are directly involved in CBA projects either as workers or co-managers of these projects. There are also 50 Community Members, who are not directly involved in the projects but are directly or indirectly impacted by them; these are majorly farmers who stand to benefit from the methods applied in the CBA projects and self -help groups, youth groups, and women groups in Kiboko, Nguumo and Ngaaka villages where these projects are implemented.

Others include 8 projects managers and field officers from KALRO; 5 Agricultural Extension Officers (EAO) that assigned to work in Makindu SubCounty; 9 NGOs Officers drawn from the following NGOS CARE international, ADA Consortium, Anglican development Services (ADS), National Council of Churches, Kenya (NCCK), Transparency International, Kenya (TI-K) which implement climate change projects in Makueni County and specifically Makindu SubCounty. Three Climate and Weather Focus Officers drawn from the Kenya Meteorological Department in

Makueni County were also involved in the household survey. Lastly, five participants from the county participated in the survey. These included two participants from the Department of Agriculture, Irrigation, Livestock & Fisheries Development; and three from the Department of Water, Sanitation, Environment and Climate Change of Makueni County.

The research carried out a total of three Focus Group Discussions (FGDs) at the Kiboko Community Resource Centre, at the County government offices and the KALRO offices. The participants in these FGDs were purposively selected. The FGDs comprised of eight members; all participants were engaged in the CBA projects in the research area. The Makindu SubCounty Community Policing Leader mobilized and organized the focus group discussions. The participants were chosen on the basis of their awareness of the climate change and community-based adaptation projects; and ability to understand the subject matter being researched.

### 3.2.4 Data Collection

This research relied on primary and secondary data. Secondary data included journal articles, working papers, and reports was used to provide background and analyse the efficacy of CBA projects. Primary data was acquired via mixed questionnaires for households and an interview schedule for key informants and a guide for three Focus Group Discussions (FDGs). In a bid to boost confidence of data and ensure quality, the researcher enlisted the help of two trained research assistants who are conversant with local languages, the various locations of the CBA projects, the work that KALRO does and the terrain of Makindu SubCounty.

The three Focus Group Discussions (FGDs) were carried out at the Kiboko Community Resource Centre, at the County government offices and the KALRO offices. All the Focus Group Discussions were carried out in the format of workshops. The FDG that was carried out at the Kiboko Community Resource Centre was done in vernacular. All of these discussions were

moderated by the researcher. Key informant interviews were carried out at the County government offices and the KALRO offices.

Face to face interviews were carried out with KALRO staff; Agricultural Extension Officers (AEO); the staff at the Kenya Meteorological a representative of Department and Department of Agriculture, Irrigation, Livestock & Fisheries Development; and two from the Department of Water, Sanitation, Environment and Climate Change of Makueni County. Due to time constraints, the two representatives from the two departments were only available to be interviewed via telephone. However, the researcher preferred a face to face as it provided a forum where participants could freely exchange ideas and the researcher would probe more to get detailed responses.

### 3.3 Data Analysis

Quantitative data was entered into excel sheet and cleaned to check for any omissions and errors. It was then coded and classified based on common attributes and characteristics. It was then analyzed using SPSS to obtain descriptive statistics. Specifically, standard deviation, frequencies, the mean, and percentages were the descriptive statistics used in this research. The data is presented quantitatively through frequency distributions, tables and percentages, charts and graphs.

Statistical Package for Social Sciences (SPSS) Version 24 was used to evaluate data with multiple variables. The qualitative data was used to supplement findings from quantitative analysis. The data was analyzed using themes; this was done in numerous stages. The first phase involved transcribing the interviews and typing out the data verbatim into a word document. The second phase entailed rereading the transcripts and listening to tape recording again to ensure that the researcher was familiar with the qualitative data and that the tape recording tallied with the transcript. Part of the interview, which was done in vernacular language was also translated to

English at this stage. In the last Phase, themes were identified by examining each interview to identify patterns. The themes formed the key findings of the research.

## 3.4 Ethical Consideration

During the research, the researcher considered all the social research ethics. The researcher took care of informed consent, privacy and confidentiality of the respondents and anonymity. Respondents were informed on the goals, approaches and expected benefits of the research; with these known to them, they accepted to participate.

## 3.5 Key Challenges

The research area was very wide and road network is not well covered. This could have affected the research and the timeframe. To address this, the researcher carried out a pilot research to map out areas of research. The researcher experienced language barrier as some climate change terms could not be translated to the local language. To address this, the researcher recruited two trained researchers who were able to translate the questionnaires in the local language. One of the Focus Group Discussions, which was made up of local residents was carried out in the local language.

The sample size was not diverse to give the image of all sub-counties in Makueni nor all counties in Kenya. Other challenges include; poor terrain particularly Kiboko, Kalie village and some parts of Makindu; inadequate resources made covering of some areas unreachable and ethnocentric centered challenges where also observed, certain communities in some wards view some other members as intruders. The research also experienced a lot of bureaucracy particularly obtaining permission from the KALRO institution, political challenges as the Member of County Assembly influence every decision and sometimes have misled and misinformed the community about research thereby making it difficult to deal with the community.

**CHAPTER FOUR: RESULTS AND DICUSSIONS**

This chapter discusses the results and the discussions of the findings obtained from the field responses and reactions. It includes two sections; first section begins with the descriptive analysis while the other sections highlight the other findings from the analysis as spelled in the objectives of the research.

**4.1 Socio demographic Data**

Of those that participated, majority i.e.67% of the respondents were women while 33% of the respondents were men. This is in line with the current Makueni county CIDP 2018-2022 which states that based on the 2009 census, the total population for 2018 was predicted to be 1,002, 979 people from which 514,601 would be female and 488,378 would be male (CGM, 2018).

According to the Makueni CIDP 2013-2017, the county has a labor force of 471,451 persons which include 247,321 female and 224,129 male (CGM, 2013). Majority of the women respondents were in informal employment. The current CIDP indicates that there is increased poverty amongst women due to the lack of opportunities to generate income, inequality, segregation when it comes to essential economic services, limited access to and ownership of land and the lack of a strong voice in decision making (CGM,2018).

Of those that responded, 50% fell under the category of 18-35 years while 50% fell under the category of above 36 years as shown in Table 2. The research categorized the marital status of the respondents in five different ways. These were married, widowed, divorced, separated and single. Table 2 indicates that married respondents accounted for a majority of the respondents at 60%, followed by widowed at 13%, 10% of the respondents separated, 10% divorced, while 7% of respondents are single as shown in the table below:

**Table 2: Age and Marital Status of respondents**

| Age | | Marital Status | | | | |
|---|---|---|---|---|---|---|
| 18-35 | Above 36 | Married | Widowed | Separated | Divorced | Single |
| 50% | 50% | 60% | 13% | 10% | 10% | 7% |

Source: Author, 2018

Forty-five percent of the respondents were of primary level, 20% 'O' level, 15% vocational training, 10% college diploma, 5% 'A' level and university degree 5%. The level of education was analyzed to measure the different categories of attitudes towards CBA projects based on their levels of education. The research established that most of the population had obtained primary level education; this is in line with the 2013-2017 CIDP which states that total enrolment stands at 269,752 at a retention rate of 93 per cent. The retention rate drops to 86% at secondary school level (CGM, 2013).
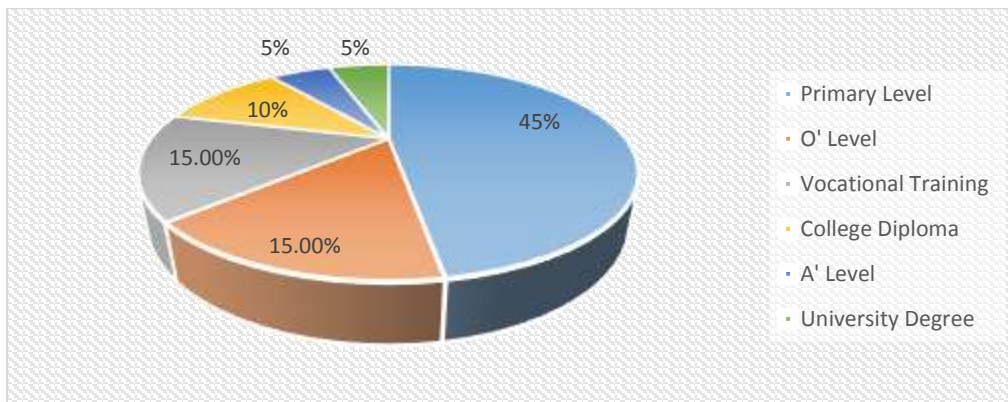


**Figure 3: Level of Education of the Respondents in Makindu SubCounty**
Source: Author, 2018

Climate change can be clearly understood or captured over a long period of time. This is achieved by the long-term observation of the weather of a particular area over a period of years. The Table below indicates that 70% of the respondents had lived in Makindu SubCounty for more than five

years, 20% of the respondents had lived between three and five years, 8% had lived in the Makindu SubCounty for less than three years. The research also analyzed the number of years that the respondents had been residing in the projects area. The number of years of residing in the area was analyzed to gauge the benefits that respondents had accrued from the KALRO-CBA projects. The length of residence in Makindu SubCounty was examined to use the experiences of these residents to show the impacts before and after the CBA projects interventions

**Table 3: Length of Residence in Makindu SubCounty, Makueni County**.

| Duration | Percentage |
|---|---|
| More than 5 Years | 70% |
| Three to five Years | 20% |
| Less than three Years | 8% |
| Less than one Year | 2% |

Source: Author, 2018

**4.2 Perception of KALRO implemented CBA projects in Makindu Sub County towards communities' adaptive capacity**

The research recorded positive attitudes towards Community Based Adaptation projects; this was informed by achievement of projects objectives, climate change resilience, improved agricultural activities, and improved standards of living. This section looks at the benefits that communities accrued from the projects.

**4.2.1 Indicators of Positive perceptions towards CBA Projects**

*Achievement of Projects Objectives*

From the Key Informant Interviews and Focus Group discussions, it was clear that most CBA projects in Makindu SubCounty achieved the desired results. The areas of success were: Enhanced capacity building through training local community farmers, improved agricultural production, promoted market for agricultural products for the local community farmers. The survey also established the degree to which the members of the local communities living in Makindu SubCounty had benefitted from KALRO CBA Projects. This is as demonstrated in table 4:

**Table 4: Benefits from CBA Projects in Makindu SubCounty**

| Item | Percentage |
|---|---|
| Training and Capacity Building | 60% |
| Agricultural Productivity | 20% |
| Dissemination Option of High Productivity | 10% |
| Market | 10% |
| Total | 100% |

Source: Author, 2018

The above table 4 indicates that the residents had benefited more from training on management of agricultural produce and marketing of products and capacity-building has the highest percentage (60%), followed by the Agricultural productivity (20%), Market (3%), and dissemination of high productivity (3%). Sixty percent of the respondents agreed that the CBA Projects has enhanced training and capacity building in Makindu SubCounty, Makueni County.

Approximately 20% of the respondents agreed that CBA Projects has improved agricultural productivity in Makindu SubCounty, 10% of respondents agreed that CBA Projects has promoted market for agricultural products in Makindu SubCounty, and another 10% of the respondents agreed that the CBA Projects in Makindu SubCounty has achieved high agricultural productivity in Makindu SubCounty, Makueni County.

*Climate Change and Adaptation*

Majority of respondents (65%) strongly agreed that the projects have caused them to adapt better to climate change. Farmers are now planting drought-resistant crops such and that the agricultural extension services have been revived and expanded. Only 5% of the respondents could not quantify the impacts of these projects on climate change as shown in figure 2:
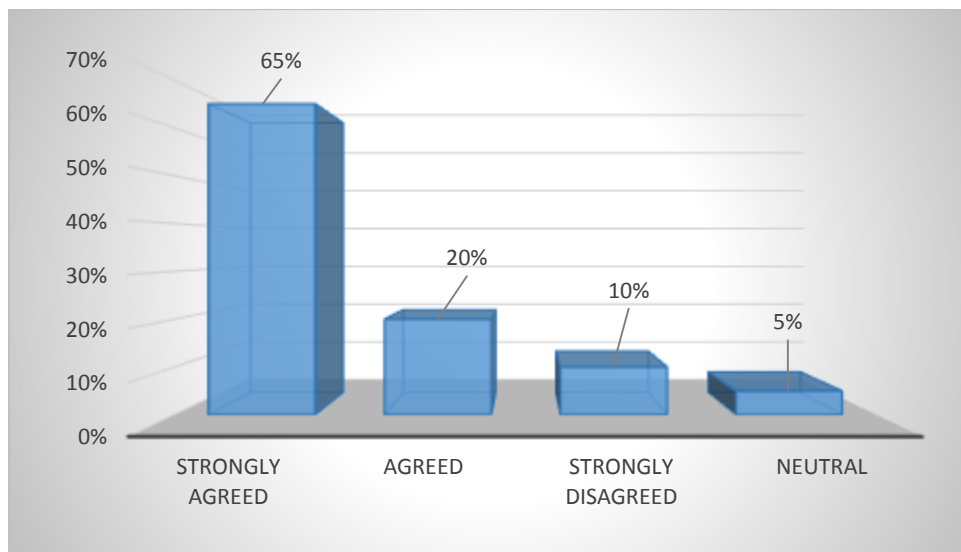


**Figure 4: Climate Change and Adaptation**
Source: Author, 2018

Figure 4 indicates that over half of the respondents i.e. 65% strongly agreed that CBA projects Makindu SubCounty have contributed to the SubCounty's resilience to the effects of climate change. Only 10% of the respondents strongly disagreed that CBA Projects had promoted climate

change resilience. The research therefore infers that CBA Projects in, Makueni County have helped residents address some of the impacts of climate change.

*Impact on Living Standards*

The research found that the impact of the KALRO CBA projects on the living standards of the respondents varied amongst different participants. Improved living standards indicators in this case included an increase in income levels, access to education and access to food. While most people strongly agreed (50%) that there was an impact on the living standards, a smaller percentage of the population least agreed on the impacts on living standards as shown in the figure below:
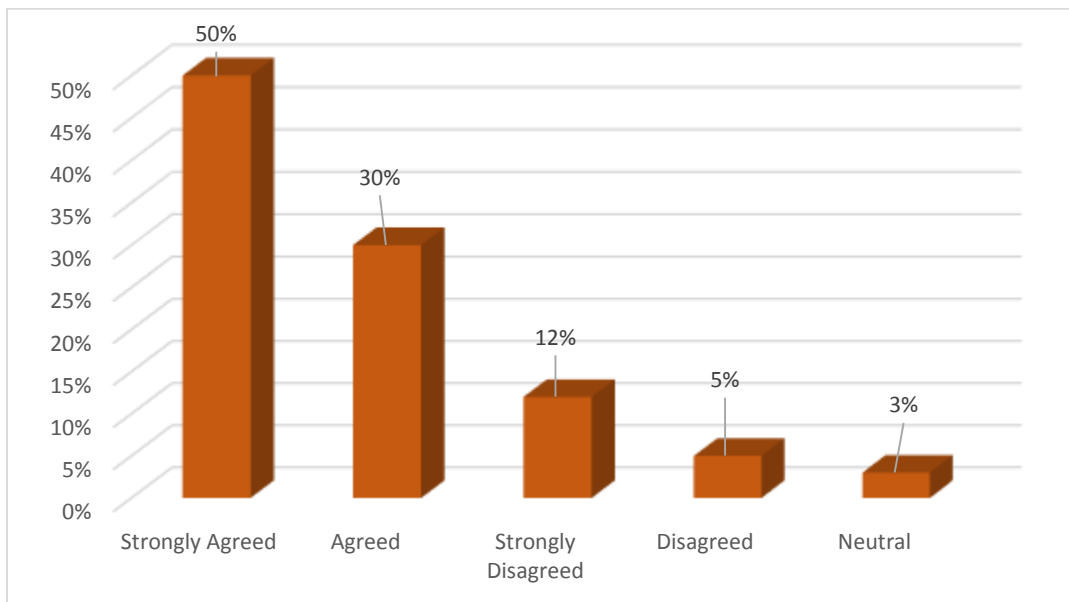


**Figure 5: Impacts on Living Standards**
Source: Author, 2018

Figure 5 indicates that 50% of the respondents strongly agreed that CBA Projects has had a positive impact on living standard of the local community, 30% of the respondents agreed that CBA Projects has had a progressive effect on the standards of living of the local community in Makindu SubCounty. 12% of the respondents strongly disagreed that CBA Projects had positive impact on

living standard of the local community in Makindu SubCounty, 5% of the respondents disagreed while 3% of the remaining were neutral.

Impacts included an increase in income due to an increase in yield and improved markets; improved health care through diet diversification; and increased literacy levels- since 2010, the period when the CBA projects were rolled out, there has been a steady increase in primary and secondary school attendance in villages where CBA projects were implemented. This increase in levels of literacy can be attributed to an increase in income so that parents can afford to pay for school fees for their children. The research carried out indicted that CBA Projects in the research area had positive impact on the local community members. These included improved market, improved yield and better methods of agricultural production.

The research also found that CBA Projects has improved income levels for the local community. This can be attributed to improved markets and better yield. Approximately 65% of the respondents interviewed strongly agreed that CBA Projects has improved income levels of the local community in Makindu SubCounty. Moreover, 20% of the respondents agreed that CBA Projects has improved income levels, 10% of the respondents strongly disagreed that that CBA Projects has not improved income levels of the local community yet while 5% of the respondents remained neutral as shown in figure 6: This is because while some were still skeptical of the new methods of farming and were still using traditional methods, some did not feel like part of the ownership of those projects; they still viewed them as a national government venture that would soon come to an end.

Those that had participated directly or indirectly indicated that they had increased their income levels; before CBA projects, farmers could earn about 10,000 shillings on average per month from their produce. After the introduction of CBA projects, the amount of income almost tripled to an

average of up to 25,000 shillings; the more they employ knowledge they gained from the trainings, the more yield they have, the more money they gain. This income has enabled residents to access diversified meals during droughts; more can afford to pay for schooling and medical expenses for their children and themselves and access other basic needs, which they couldn't before the CBA projects.
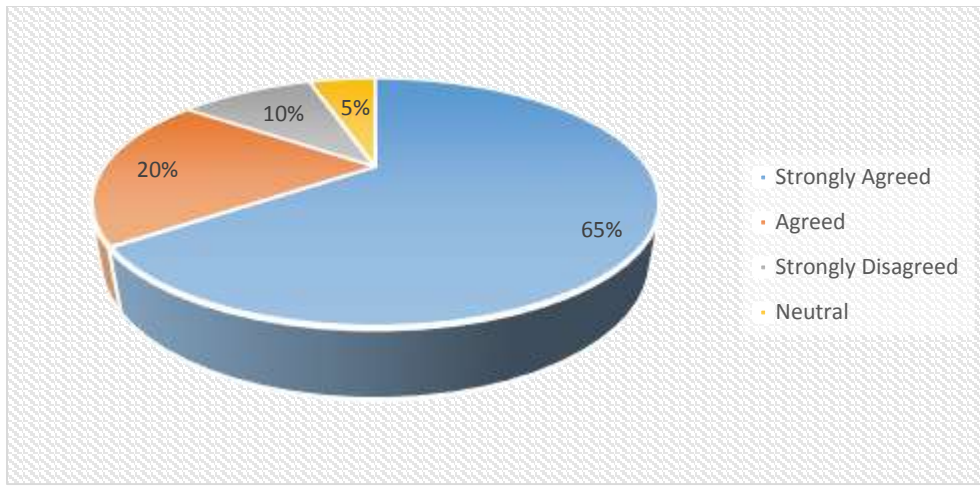


**Figure 6: Income Levels**
Source: Author, 2018

*Improved Markets*

Most of the local community members (70%) agreed that the CBA Projects in Makindu SubCounty has enhanced agricultural productivity. While 30% of the respondents agreed that the CBA Projects have uplifted the agricultural productivity in the Makindu SubCounty in Makueni County as shown in the tables 5.

**Table 5: Agricultural Productivity and Markets**

| Category | Productivity | Market |
|---|---|---|
| Local Community Members | 70% | 67% |

| | | |
|---|---|---|
| Others | 30% | 33% |
| Total | 100% | 100% |

Source: Author, 2018

Table 5 indicates that CBA Projects have enhanced agricultural market in the Makindu SubCounty. This is demonstrated by 67% of the local community members who agreed that the CBA Projects had promoted the agricultural market for the local community farmers. These results are in line with Makueni CIDP which indicates since most residents of Makueni county depend on agricultural activities of their livelihood, most of the county's land is used for the purposes of Agriculture and livestock keeping. These results are also in line with a research by FAO on Community Based Adaptation in Action; A case for Bangladesh which noted an enhanced capacity to adapt to climate change to achieve sustainable livelihoods in the sector (Stephen & Selvaraja, 2008).

Moreover, 33% of the respondents agreed that the CBA Projects had promoted agricultural market for local community farmers' products in Makindu SubCounty as shown in figure 6 below:
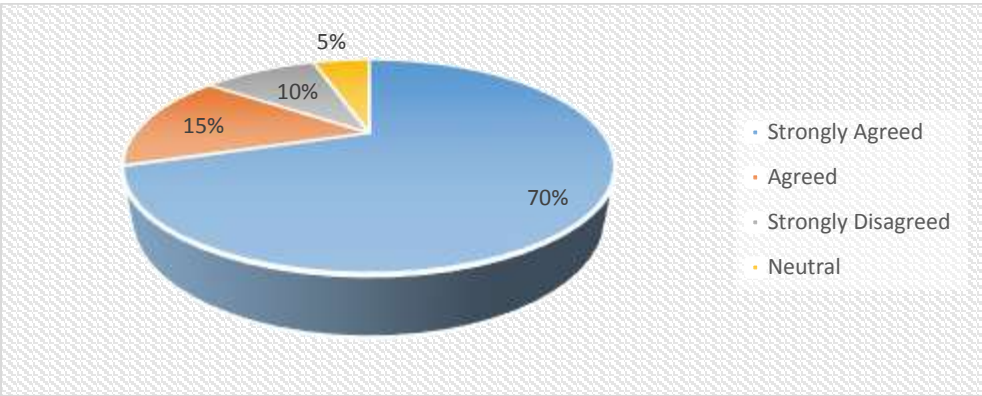


**Figure 7: Agricultural Production in Makindu SubCounty, Makueni County**
Source: Author, 2018

The bulk of the respondents interviewed strongly agreed that CBA Projects have widely spread information about agricultural production skills and techniques in farming in within the SubCounty. CBA Projects have also created awareness on the concept of climate change and adaptation in the field of research; most of the respondents of the community members interviewed, 70% strongly agreed that CBA Projects have widely spread information about agricultural production skills, techniques, climate change and adaptation.

Moreover, 15% of the respondents agreed that CBA Projects in Makindu SubCounty have spread information about agricultural production skills, techniques, climate change and adaptations, 10% strongly disagreed, while 5% were neutral. These results indicated that CBA these projects have improved agricultural production in Makindu SubCounty, Makueni County. These results are in line with the previous CIDP which states that there are about 92 state and non-state registered organizations, whose role is to promote agricultural activities within the county. These include Non-Governmental Organizations, youth groups, self -help groups, and women groups whose aim is to promote agriculture in the county (CGM, 2013).

### 4.2.2 Indicators of Negative Attitude towards CBA Projects

The research noted that despite the benefits that accrued to Makindu residents through CBA projects, they still had a negative attitude towards the projects. These were expressed in ownership and Technology.

*Ownership*: Many projects have been collapsing or are deserted completely when a donor leaves and yet people still need the services provided by the projects. The lack of ownership of development projects by the concerned communities is often to be blamed for such a collapse (Kinoti, 2011). The Focus Group Discussion noted that Makindu residents did not effectively

participate in the establishment of these projects and do not actively participate in decision making; so, to Makindu SubCounty residents, these projects remain KALRO/Government projects.

*New Technology*: Most communities carry out activities in a certain way. Culture, levels of literacy and exposure plays a key role in the success or failure of any projects. Introducing new technology usually means abandoning the old way of life and adopting new improved methods. The Focus Group Discussion noted that when KALRO introduced improved agricultural production skills, markets, techniques, climate change and adaptation, Makindu residents were reluctant to accept them. This, they attribute to culture, high degree of illiteracy and lack of exposure.

## 4.3 Hindrances to the success of CBA projects in improving the livelihoods of communities in Makindu SubCounty, Makueni County

This research sought to assess communities', KALRO's and County Government's capacity needs for effective implementation of CBA projects in Makindu Sub County, Makueni County. To achieve this, the research examined the level of capacity among KALRO staff, communities and county government.

### 4.3.1 Capacity Needs for KALRO Staff

The Focus Group Discussions and the key informant interviews noted that KALRO staff did not have the necessary experience to implement CBA projects at community level. Most KALRO projects are often done on demonstration plots; the research noted that the staff, who had never worked with communities before, were not trained prior to implementing CBA projects within the community. This made it hard for them to achieve the desired results.

Sekine et al (2009) argue that for a CBA projects to be successful, the implementing organization must provide leadership, promote trust, create a network for distribution of information and technology within the community and ensure that the community understand the benefits that accrue to them when such projects are implemented. However, this wasn't the case during the first year of implementation of the CBA projects in Makindu SubCounty.

Secondly, the study found that county government structures and national government structures have not been collaborating on climate change matters. Focus Group Discussions and Key Informant interviews with KALRO staff established a lack of clarification of the roles and lack of coordination between the Climate Change Officers who are County Government employees and the Agricultural Extension officers who are employees of the National Government and the local communities who are the direct beneficiaries of the projects.

Sekine et al argue that an implementing organization plays a vital role in connecting the community to both the local and the national governments through such projects (Sekine et al 2009). Together with both governments, they ought to play a facilitative and supportive role; this can be done by delegating power to the community through existing community structures (Kirkby et al, 2017).

Lastly, for a CBA projects to be sustainable, it should have community buy-in and should be driven by the community. The aim is to strengthen the capacity to adapt to climate change at the community level. However, in most developing countries, CBA projects are donor-driven; they are funded by International Non-Governmental Organizations and Bilateral overseas aid agencies such as those in Australia, the United Kingdom and the United States amongst others (Kirkby et al, 2017).

Likewise, the research noted that CBA projects implemented by KALRO in most parts of Kenya are donor dependent and similarly the case research in Makindu SubCounty is funded by World Bank and Care International. This therefore poses a challenge with regards to their sustainability because they lack community ownership and buy-in despite the benefits accrued to them.

### 4.3.2 Capacity Needs for Communities

The research found out that capacity building efforts amongst community members focus more on improving agricultural production to boost efforts at adapting to climate change. This research noted that before CBA projects were introduced in Makindu SubCounty, there were capacity gaps in agricultural production. The research established that the introduction of CBA projects has contributed to the strengthening of capacities of populations that live in projects areas. This has been achieved through trainings especially on agricultural production. The trainings focused on good practices in planting, ploughing, use of the right seeds for planting, preparation of organic manure and use of pesticides as shown in table 6:

**Table 6: Training and Capacity Building**

| Training and Capacity Building | Percentage |
|---|---|
| CBA Projects Members | 40% |
| Local Community Members | 20% |
| FGDs | 20% |
| Others | 20% |
| Total | 100% |

Source: Author, 2018

Table 6 indicates that majority of the respondents living in Makindu SubCounty said that CBA Projects in Makindu SubCounty enhanced the capacity of the local community members of Makindu SubCounty through training of them on marketing. Approximately 40% of CBA Projects members agreed that the CBA projects has enhanced their capacity in marketing and agricultural production. Likewise, 20% of the FGDs agreed that the CBA Projects have improved the capacity of local community members in the above-mentioned areas.

According to Kiprop et al (2017), continued investment, lack of capacity of the community and community structures to absorb the resources and the inability to demand for accountability in a transparent manner accounts for the failure of donor-funded projects in Kenya. In Makindu SubCounty, the research indicated a lack of agricultural extension officers; there are only a few of them within the county. Moreover, the community lacked knowledge about sustainable agricultural production on dry land amongst and are thus unable to meet projects goals. Lack of seed varieties was also an obstacle to the CBA Projects. Poor infrastructures such as roads, feeder road, network communication and remoteness of some areas were noted to be some of the major obstacles to the CBA Projects.

The Practice of CBA has also been adopted in other parts of Makueni County including Wote where CCAFS (research program on climate change and food security) has enhanced the adaptive capacity of the community through the following activities: - Testing of legume varieties, sorghum and maize that have been technologically advanced by KALRO, ICRISAT and CIMMYT. These often address the issues of on-firm constraints; thereafter, lessons learnt are used to inform policy at county level. CBA also builds and empowers farmer and women groups to enhance their capacity to adapt to climate change and to increase uptake of this knowledge. Within Makueni County, the CBA approach is championed by donors.

### 4.3.3 Capacity Needs for the County Government

The research established gaps in the capacity of the county government of Makueni to effectively implement CBA Projects in Makindu SubCounty. First, the climate change officers that are employed by the county government lack knowledge and skills to drive the climate change agenda. About 65% of FGDs strongly believed that the county government lacked the much-needed capacity to implement CBA projects. They thus agreed on the need to strengthen the capacity of the county Government to implement CBA Projects as shown in the figure 5. In a bid to enhance continuity and replicate results at a higher level, residents stated the need for the county to put measures in place for follow up with such projects even after they have been completed.

In the developing world, sub-national governments play a key role in climate change adaptation; they are proximate to where the impacts of climate change are felt. They play a critical role in institutionalizing climate change into work programs, budgets, provides monitoring and evaluation elements and determine the legal and policy environment for such projects to take place. However, the governments at this level do not have expertise in climate change and its effects and their susceptibility to these impacts (Bourne et al, 2017).

To achieve this, FGDs indicated the need for and the Government's capacity needs to be addressed. This confirms the findings by a research done by CARE International which noted that CBA projects often empower those communities that are vulnerable and their leaders at local level and service providers to comprehend and examine the impacts of climate change on their lives, whilst making knowledgeable and pre-emptive decisions on important adaptation actions, and continually alter their livelihoods and strategies of managing risks to respond to new and uncertain circumstances (Fiona et al 2015).
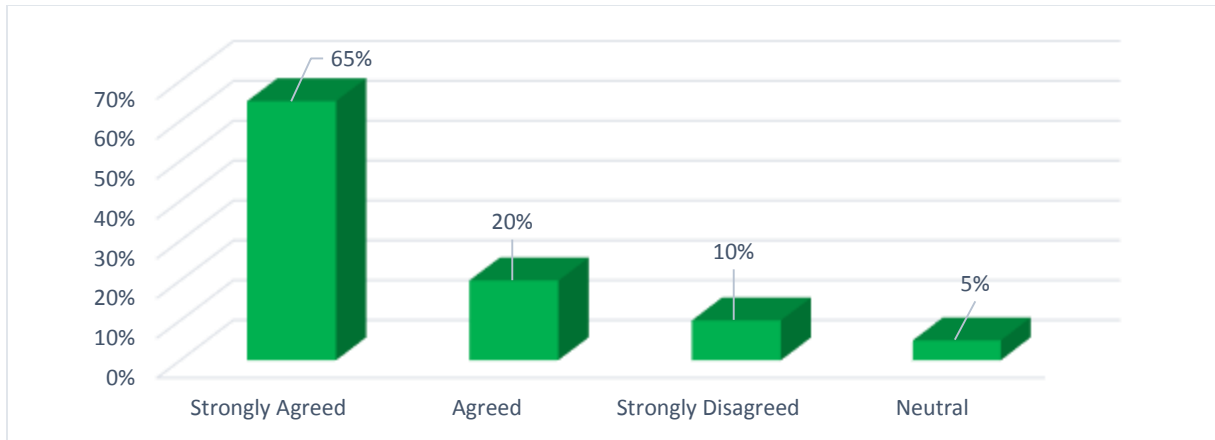
**Figure 8: Capacity Needs for Effective Implementation of CBA Projects**
Source: Author, 2018

Secondly, the study found that the county government did not budget for approaches like CBA. KALRO is an institution under the national government which is also funded by CARE International and World Bank through the national government. While the county budgets for projects focusing on food security; water development; urban planning and development; universal health care; ENE microfinance; Youth, women and PWD economic empowerment; ward funding and completion of pending/ongoing projects (CGM, 2019); In addition, CBA projects do not feature in the Makueni County Fiscal Strategy Paper for 2019 (CGM, 2019).

Moreover, county government institutions lack the capacity to implement Climate Change - Community Based Adaptation projects. The FGD's noted that Makueni County has established Ward Climate Change Planning Committees (WCCPC) through the Climate Change Fund Regulations of 2015. Their role includes monitoring implementation of projects that are under their jurisdiction and ensure that service providers meet the set standards and the desired goals; pay suppliers and service providers; draft projects progress reports; implement a monitoring plan and advise the County Climate Change Planning Committee and the County Climate Change Fund Management Board when payments are made. They are also critical to the implementation of CBA

projects at county level (CGM, 2015). However, the WCCPC lack capacity and are not financially resourced to implement their mandate.

## 4.4 Gaps in Climate Change Policy Framework at National and County Level

### 4.4.1 Existing Climate Change Policies plans and programmes

The Kenyan Constitution, 2010 commits to attain environmentally-friendly and sustainable development; thus providing a solid foundation for addressing issues related to climate change whilst striving to achieve the goals of development set out in Kenya Vision 2030 (GoK, 2012). Article 10 of the constitution sets out standards and values of national governance, which include devolution of power, sustainable development, and public participation. These values are obligatory to the State and all persons, when implementing the Constitution, making and implementing any law or public policy.

Article 69(2) of the Constitution provides that individual and companies have a duty to work together with government organs to safeguard the environment and ensure that ecologically sustainable development in Kenya is realized. Kenya has taken key steps to implement measures to identify and guide appropriate actions to respond to climate change. From a law and policy perspective, Kenya has been active both at the international level, and the East African Community (EAC), is part of the EAC Climate Change Policy, Master Plan, and Strategy, and the EAC regional Climate Change Master Plan 2011-2031, which guides climate change response processes at the regional level over the long-term.

Universally, Kenya is a party to and has ratified the 1992 United Nations Framework Convention on Climate Change (UNFCCC), as part of Kenyan law; and on 28 December 2016, the Parliament of Kenya ratified the 2015 Paris Agreement on Climate Change, which became applicable to Kenya from 27th January 2017. At the National level, Kenya has taken important legal, policy and

institutional steps to lay the foundation for, and to commence climate change actions; these include the National climate change act, 2016; and Sessional paper no. 3 of 2016 on the national climate change framework policy.

Others include the National Climate Change Response Strategy (NCCRS, 2010); 2015-2030 National Adaptation Plan (NAP); Climate Finance Policy (2016); Climate Change Directorate at the Ministry of Environment and Natural Resources to coordinate climate change actions in Kenya; National Drought Management Authority (NDMA); 2018-2022 National Climate Change Action Plan (NCCAP); Nationally Determined Contributions (NDC) to the decrease of Greenhouse Gas (GHG) emissions, in July 2015, with an objective of decreasing GHG emissions by 30% from current levels by the year 2030; and the 2018-2027 Kenya Climate Smart Agriculture Implementation Framework.

**4.4.2 CBA gaps in the national climate change policies, plans and programmes**

The Climate Change Act (CCA) was enacted by Parliament to provide Kenya with a legal framework seeks to support the coordination of efforts directed at tackling the effects of climate change. It provides a structure of governance for climate change in Kenya and supports development and implementation of strategies to enhance climate resilience and through low carbon actions. The legal framework has established the Climate Change Directorate- this body is responsible for organizing the technical aspects of climate change governance. It stresses that all the sectors of the economy should build resilience and adaptive capacity of the human and environmental systems to the effects of climate change.

However, it doesn't propose any approaches or strategies like the CBA to achieve the goal of building resilience and the capacity to adapt as it facilitates the execution of climate change actions through the climate change policy and the national climate change action plan. The national

climate change policy, 2016 on enhancing climate resilience and adaptive capacity stipulates that the capacity to adapt is necessary to design and implement effective adaptation plans in order to minimize the probability and scale of harmful results from climate change. The Policy further stresses that, Kenya's ability to enhance its capacity to adapt is therefore vital for enabling sectors and institutions to accrue benefits from climate change.

The policy proposes that the government will recognize and implement important adaptation activities across crucial environment, economic and social sectors under the agenda of a National Adaptation Plan (NAP) and therefore also leaves a gap on which adaptation approached like CBA can be undertaken. The National Climate Change Action Plan 2018-2022 as an implementation tool for the CCA also is not explicit on climate change adaptation approaches like CBA as also gives responsibility to county governments as it indicates that County Governments need to integrate climate change in their CIDPs.

The vision of the NAP is to enhance climate resilience to attain Vision 2030. Some of the objectives of the NAP linked to this research include; Assimilating adaptation to climate change into county and  national level development plans and processes of budgeting; enhancing the flexibility of the public and private sectors to invest into transforming the national, economic, social and pillars of Vision 2030 to climate shocks. The NAP is aligned to the NCCAP and CCA. The NAP also doesn't propose concrete interventions like CBA as it also pushed the climate change responsibilities to the counties like Makueni as it proposes that, in the preparation of County Adaptation Plans, counties will be stimulated to recognize their important activities from the activities presented herein and customize them to fit their county context after carrying out risk and vulnerability assessments.

The NAP further emphasizes that, Counties may also include climate adaptation actions that are not listed in the national list of precedence as long as they are in tandem with their CIDP priorities and do not cause maladaptation.

The Kenya Climate Smart Agriculture Implementation Framework (KCSAIF) is aligned to the Constitution of Kenya 2010, Kenya Vision 2030, Climate Change Policy Framework 2015, National Climate Change Response Strategy (NCCRS), 2018-2022 National Climate Change Action Plan (NCCAP), 2015-2030 Kenya National Adaptation Plan; and the 2017-2026 Kenya Climate Smart Agriculture Strategy. The 2018-2027 Kenya Climate Smart Agriculture Implementation Framework (KCSAIF) was developed to provide guide advanced and transformative initiatives and good practices which seek to address challenges brought about by climate change.

With its vision on providing innovative initiatives, the KCSAIF doesn't mention CBA as one of the initiatives and these impedes implementation of approaches like CBA which is a climate smart agriculture approach especially for agriculture dependent areas like Makueni County. Overall, the various national climate change policies, plans and programmes generally prioritize adaptation in general but they don't further identify climate change adaptation approaches like the CBA which should be pursued by counties and other relevant state departments.

The Kenyan Constituency Development Fund (CDF) was established in 2003; its aim was to grow and support development projects at grass-root and constituency level. Its objective was to enhance equitability in the distribution, access, utilization and control of development resources cross regions and to reduce the imbalances in regional development brought about by partisan politics. Targeted development projects include those that sought to address poverty-related issues at the grassroots. Key amongst them include establishment of new water sources, education and

health and facilities in all parts of the country. Rural areas were the target; these areas had been previously overlooked during the allocation of funds in the national budget. Climate change is already exacerbating poverty at the grassroots level but there lacks a linkage of the climate change interventions with the CDF as a funding mechanism for implementation of climate change initiatives (GoK, 2015).

### 4.4.3 CBA gaps in County climate change policies, plans and programmes

The above-mentioned policy, plans and programmes as related to climate change propose the mainstreaming of climate change adaptation actions into county integrated development plans, develop relevant specific climate response actions and adopt adaptation approaches that align with the local circumstances and should not lead to maladaptation. The failure to mention or highlight concrete climate change adaptation approaches like CBA in the national frameworks impedes uptake of such interventions at the county level and this is gap in localizing climate action at the local level.

*Mainstreaming*, as proposed by the various national frameworks is defined as integrating climate change activities into making decisions and effecting functions by the different ministries, state bodies and county governments. All the 47 CIDPs that were established in 2018-2022 have listed the effects of climate change and several including Makueni County have acknowledged the needed actions to address these effects. Adaptation activities are of significance for numerous County Governments including Makueni County.

In a bid to integrate climate change actions at the county level, Makueni County has developed the following policy interventions: the 2018-2022 County Integrated Development Plan (CIDP) and the Public Financial Management -Makueni County Climate Change Fund- Regulations 2015. The 2018-2022 Makueni CIDP has mainstreamed climate change actions through different sectors and

the agricultural sector predominantly comes out strongly with local initiatives to be undertaken as climate change adaptation but doesn't explicitly mention CBA as an approach. The County has also established the Climate Change Fund Regulations of 2015 which seek to provide finances for climate resilience actions that are embedded in the Makueni CIDP.

The regulations oblige the County Government to reserve 1% of its yearly development budget for climate change. The regulations also give mandate to Ward Climate Change Planning Committees (WCCPC) which should facilitate implementation of local actions under the CIDP and initiatives like the CBA. Execution of the climate change actions under the CIDP will however require a county climate change policy, act and an action plan. In the county climate change policy documents, there lacks a linkage to the overall policy environment at the national level and this is a gap in facilitating implementation of local actions like the CBA.

The CIDP and the climate change fund regulations do not mention or adopt initiatives that would help the county adjust to the effects of climate change at the county level. According to Freeman (2017), an existing policy and legal framework should be able to create an environment for climate change adaptation and help those implementing to create and foster structures of implementation. However, there has been a disengagement between central government institutions, local governments, and local societies; and poor cooperation between the national and local stakeholders and across departments.

The Climate Change Fund Regulations of 2015 establish the Climate Change Fund Board and local structures like the Ward Climate Change Planning Committees (WCCPC). They are supposed to spearhead implementation of Climate Change initiatives but inadequately resourced. The structures also lack capacity to support the implementation of CBA approaches. Makueni County Climate Fund Regulations are supposed to be anchored in a climate change law and policy.

However, the research noted that they lack supportive Climate Change Policy, Act and an Action Plan which ought to enforce implementation of adaptation approaches like CBA. This has made it hard for the county to implement these kinds of projects. These results are in line with a research carried out by Girot (2014) which states that there exist gaps between current policy intentions in National Adaptation Plans and CBA projects. This is also confirmed by the lack of existing policy framework on CBA approaches to climate change as most of the national climate change policy frameworks are broad and at the county level, the local mechanisms do not take into consideration the principles of approaches like CBA.

For instance, in Makueni County, there are the Climate Change Fund Regulations which lacks a comprehensive policy framework for the implementation of local adaptation initiatives under the Ward Climate Change Planning Committees (WCCPC) established by the regulations. Makueni County also mainstreamed climate change into its second generation of the CIDP which promotes community-based approaches like CBA, but the County lacks a policy framework to facilitate the implementation of such approaches like CBA. This confirms the findings from the research of the existing awareness on community-based adaptation projects but little knowledge about the supportive policy framework. Climate change policies should provide an environment where counterincentives and breaches that could possibly impact adaptation at local level are addressed.

Lastly, Makueni County has developed a public participation framework; its role includes informing, consulting, involving, collaborating and empowering the public and places the power to make decisions in their hands (CGM, 2018). The Focus Group Discussions noted that despite the county's emphasis on Public Participation in all projects, policies that support climate change in Makueni such as the County Integrated Development Plan and the Climate Change Regulatory Framework lack emphasis on community-based tactics to climate change like Community-Based

Adaptation projects. This poses a challenge in contextualizing how to engage and prioritize CBA as climate responsive approach.

CBA projects are not integrated into county government development planning. Most of these projects, which were pilots of the national government, remain pilot projects of the national government. The Focus Group Discussion and the Key Informant Interview noted that Makueni county has not taken any of the projects up or scaled them up to increase the positive impacts.

# CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Conclusions

Generally, there is excessive potential for the CBA approach to enhance community climate change resilience. In Makindu SubCounty, from the research, it is noteworthy that there is great potential for the CBA approach to enhance community climate change resilience. Key indicators of communities' attitudes towards CBA projects include enhanced capacity building through training local community farmers, improved agricultural production, promoted market for agricultural products for the local community farmers.

First, the research noted that the local community farmers have no challenges of getting market for their harvested crops. Additionally, information dissemination regarding climate change adaptation and mitigation has been enhanced; has generally raised standard of living and increased income levels of the local community of Makindu SubCounty, through improved agricultural productivity. The research also established that CBA Projects had improved agricultural production in Makindu SubCounty through educating the local community farmers the new technology in farming. Consequently, there is ready market for agricultural products for the local community. This has been attributed to trainings that the farmers acquired from the CBA projects.

Other benefits include market for agricultural products for the local community; enhanced dissemination of information about the climate change and adaptation amongst the residents of Makindu SubCounty; provision of farmers with knowledge on dry land seeds varieties and availability; increased livestock production; resilience to the effects of climate change improved living standards and increased income levels of the local community in Makindu SubCounty, Makueni County.

Despite these benefits, there arose exists a debate whether communities in Makindu will be able to continue with the activities once KALRO is no longer involved in the projects area and also the role of the County government of Makueni in scaling up the CBA approach for enhanced climate resilience of Makindu SubCounty residents.

The CBA Projects suffered from the inadequate funding from the National Government and the County Government. Moreover, the research revealed that there was lack of enough agricultural extension officers and personnel in research. The CBA Projects experienced lack of knowledge about dry land. The research also revealed that the lack of seed varieties was an obstacle to the CBA Projects. The research further established that the poor infrastructures such as roads, feeder roads, network communication and remoteness of some areas were a big obstacle to the CBA Projects. This is what informed their attitude towards such projects.

This research concludes that the Community Based Adaptation (CBA) Projects in Makindu SubCounty have enhanced capacity building through training the local community farmers, improved agricultural production and promoted local market for agricultural products for the local community farmers. This has led to resilience to the effect of climate change and adaptation in Makindu SubCounty. CBA Projects have also improved the living standard and income levels of the local community in Makindu SubCounty.

The research identified a number of capacity gaps within the county to implement CBA projects. First, the research noted that most CBA Projects suffer from inadequate human resources from the National and County Governments. This was expressed by the inadequate numbers of agricultural extension officers and research officers from the national government and climate change officers at the sub county level. Moreover, KALRO staff do not have the necessary experience to implement CBA projects at community level.

Secondly, with regards to community members, the introduction of CBA projects has contributed to the strengthening of capacities of populations that live in projects areas. This has been achieved through trainings especially on agricultural production. Thirdly, climate change officers are employed by the county government lack knowledge and skills to drive the climate change agenda. Thus, there is need for the county and national governments capacity needs to be addressed.

The research also revealed that the enhanced capacity on CBA approaches did not translate to 100% production of agricultural produce as well as access to markets. This therefore means that apart from implementation of CBA projects, other consideration with regard to how such projects can be up-scaled to meet community demands as well as provision for markets for their produce. This calls for a comprehensive policy framework that takes into consideration markets, economic dynamics and scaling up of local initiatives

The research revealed that the existing legal and policy mechanism were inadequate to support full implementation of climate adaptation projects at SubCounty level. However, there was need for proper coordination, funding of agricultural research and extension services and to be included in the legal and policy framework both at national level and county level and conflicts between the roles of county climate change officers and agricultural extension officers. At the level of policy to achieve efficiency in the implementation of community-based adaptation on projects, there was need for proper training of extension personnel and funding to achieve proper coverage of agricultural areas in the SubCounty.

The policy documents however propose that counties should mainstream climate change actions and adopt adaptation approaches that align with the local circumstances and should not lead to maladaptation. In Makueni County, there are the Climate Change Fund Regulations which lacks a comprehensive policy framework for the implementation of local adaptation initiatives under the

Ward Climate Change Planning Committees (WCCPC) established by the regulations. Makueni County also mainstreamed climate change into its second generation of the CIDP 2018-2022 which promotes community-based approaches like CBA but the County lacks a policy framework to facilitate the implementation of such approached like CBA.

## 5.2 Recommendations

The findings of this research demonstrated that CBA projects have greatly benefited Makindu residents and if scaled up, they have the ability to improve living standards while at the same time protecting Makueni county residents from the negative effects of climate change. However, the lack of ownership on the part of the community, the lack of capacity, and the lack of appropriate legal and policy framework could be detrimental to the success of the projects.

The research therefore recommends that first, the country should adapt and institutionalize the National climate change legal and policy documents; Climate Smart Agriculture strategy (2017-2029); mainstream climate change in Makueni County's other sectoral laws and regulations. This will ensure that the projects are not just implemented in a vacuum. Secondly, before such projects are rolled out, the County Government should ensure that it carries out civic education to create awareness of the importance of the projects. Makueni residents should also be allowed to actively participate in decision making processes regarding such projects; this will foster ownership.

Moreover, in order to further foster ownership of projects, communities should be part of projects ownership; this can be achieved by encouraging Makueni residents to contribute their own resources towards development projects for sustainability. Also, development partners, NGOs and other key stakeholders in development should encourage communities to choose their own projects, instead of imposing on them before implementing a projects in their community.

Alternative mechanisms for financing climate change adaptation should be sought. The CDF has not been explored as a funding mechanism for climate change adaptation at the local level as the focus has been on infrastructure projects and other development initiatives. Climate change is still perceived as an environmental issue and therefore in order to vouch for CDF as a financing mechanism for climate change at the local level, it's important for practitioners to package climate change as a development issue.

Thirdly it is important to examine national policies, plans and programmes vis-à-vis the county policy environment with regard to support for local initiatives in responding to climate change. There needs to be a comprehensive policy framework on CBA at the county levels that align with the national framework or influence the need for CBA approach in the national climate change policy framework.

Lastly, most of the adaptation activities in Makindu SubCounty are agriculture related and that's why it's very vulnerable to climate change. Proper training of extension personnel and funding to increase the coverage of agricultural areas in the SubCounty is required for enhanced results.

### 5.3 Suggestions for Further Research

Currently, there is scanty information about community Based Adaptation and their response to climate change in the public domain. This research suggests a baseline research on the knowledge needs about CBA as an approach to adapt to the impacts of climate change. This will go a long way in packaging CBA projects, designing projects implementation tools, and designing training modules and how to create awareness on the CBA approach. From the findings and the available literature review, further analysis of the CBA approach and studies can provide new knowledge that can make the CBA approach better for enhanced adoption hence enhanced climate resilience in Kenya. Further examination is required on how to integrate CBA in the climate change policies,

plans and programmes at the local level taking into consideration the national policy environment.

Lastly there is need for an economic survey for optimal value for investment in CBA projects.

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**Online resources**

Online: http://www.starckplus.com/index.php/starck-components/technical-assistance/kenya-ndc-sector-analysis

Online: http://espas.eu/orbis/sites/default/files/generated/document/en/KENYA2030.pdf

Online: http://kccap.info/images/docs/nap_final.pdf

Online: http://www.devolutionplanning.go.ke/wp-content/uploads/2015/04/MTP2.pdf

Online: http://www.environment.go.ke/wp-content/uploads/2015/07/Kenya_INDC_20150723.pdf

Online: http://www.kenyalaw.org/lex//actview.xql?actid=Const2010

Online: www.kccap.info

Online:http://www.environment.go.ke/wpcontent/documents/complete%20nccrs%20executive%20brief.pdf

**EFFICACY OF COMMUNITY BASED ADAPTATION (CBA): A CASE OF KALRO PROJECTS IN MAKINDU SUBCOUNTY, MAKUENI COUNTY, KENYA**

**Objectives of the Research**

- To analyse the perception of KALRO implemented CBA projects in Makindu Sub County towards communities' adaptive capacity.

- To assess the factors that hinder the success of CBA projects in improving the livelihoods of communities in Makindu SubCounty, Makueni County

- To examine gaps in policies that hinder effective implementation and promotion of Community Based Adaptation projects at county level.

*Dear Participant,*

I am a graduate student undertaking Master of Arts Degree in Environmental Policy at the University of Nairobi. I am conducting a research entitled '*Efficacy of Community Based Adaptation (CBA): a case of KALRO CBA projects in Makindu SubCounty, Makueni County, Kenya.*' The purpose of this research is to collect information for purely academic purposes. All information collected during the research will be treated confidentially and will be coded. This questionnaire is quite confidential. Your participation in this research projects is completely voluntary. You may decline altogether or leave blank any questions you don't wish to answer. Please answer the following questions to the best of your knowledge and ability.

**Thank You.**

**UNIVERSITY OF NAIROBI**

**EFFICACY OF COMMUNITY BASED ADAPTATION (CBA): A CASE OF KALRO PROJECTS IN MAKINDU SUBCOUNTY, MAKUENI COUNTY, KENYA**

**HOUSEHOLD SURVEY QUESTIONNAIRE**

This questionnaire seeks to analyse the perception of KALRO implemented CBA projects in Makindu Sub County towards communities' adaptive capacity.

## SECTION A: SOCIO DEMOGRAPHIC DATA OF RESPONDENTS

1. **Name of respondent** (optional): ------------------------------------------------------------

2. **Gender**    [1] Male                    [2] Female

3. **Age:** (1) 18-25            (2) 26-35            (3) 36-45

    (4) 46-55                (5) 56-65            (6) Above 65

4. **Marital Status**

    (1) Married            (2) Divorced            ( 3)Separated

    (4) Widowed            (5) Never Married        (6) Cohabiting

5. **Highest educational level attained by respondent**

    [1] Primary level        [2] O-level        [3] A-Level        [4] Vocational Training

    [5] College Diploma        [6] University Degree        [7] other (specify): ----------------

6. **What is your employment status?**

    [1] Casual labourer [2] Public sector [3] Private Sector

    [4] Small scale business [5] Unemployed            [6] other (specify)

7. **For how long have you been residing in this area?**

    Less than 1 year [ ]        Less than three years [ ]

    3-5 years   [ ]        Over 5 years   [ ]

## SECTION B: ATTITUDES AND PERCEPTION OF KALRO CBA PROJECTS

1. **Are you aware of any Community-Based projects that is implemented by KALRO?**

   Yes [ ]                                          No [ ]

2. **Please indicate the extent to which you agree with the following statements regarding KALRO CBA projects:**

1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree

| KALRO PROJECTS | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| I | KALRO CBA projects have improved agricultural produce | | | | | |
| II | KALRO CBA projects have led to increased livestock production | | | | | |
| III | KALRO CBA projects are likely to lead to resilience to the effects of climate change in Makindu SubCounty, Makueni County | | | | | |
| IV | KALRO CBA projects has had a positive impact on your living standards | | | | | |
| V | KALRO CBA projects has improved your income levels | | | | | |

3. **Do you consider these projects to be sustainable?**

   Yes     [ ]                                      No     [ ]

Explain your answer-------------------------------------------------------------------------------------------
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4.  **On a scale of 1-5, with one being the lowest and 5 being the highest score, how would you rate the success rate of KALRO CBA Projects?** -------------------------------------------
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Give a reason for your assessment above -------------------------------------------------------------------
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5.  **Do you think that in the next five years, KALRO CBA projects would have changed your life?**

    Yes     [ ]                                                                No       [ ]

Please explain -----------------------------------------------------------------------------------------
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8. **Please indicate the extent to which you feel the following factors have led to failure of KALRO CBA projects. Rate the factors on a scale of 1 to 5 where: 1= Strongly Disagree , 2= Disagree, 3= Neutral,    4= Agree, 5= Strongly Agree**

| | Statement | Response | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| I | Poverty | | | | | |
| II | Poor understanding of officers of local culture | | | | | |
| III | Lack of support e.g. funding from county and national government | | | | | |
| IV | Poor access to markets | | | | | |
| V | Lack of coordination with other organizations running similar programs | | | | | |

6. **Please indicate any other factor (s) you think has/have negatively affected KALRO CBA Projects in Makindu SubCounty, Makueni County**.-------------------------------------
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7. **What are some of the solutions you think needed to be implemented to make the projects a success?** ------------------------------------------------------------------------------
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8. **Has the KALRO CBA projects contributed to local climate action in Makueni County?**

Yes [ ]                              No [ ]

What changes have you observed? ------------------------------------------------------------------
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**9. How has the community contributed to the projects? Tick (√) as appropriate**

    a.  Resource mobilization

    b.  Financial management

    c.  Material donation

    d.  Expertise and skills

    e.  Others ----------------------------------------------------------------

**Thank you!**

**UNIVERSITY OF NAIROBI**

**EFFICACY OF COMMUNITY BASED ADAPTATION (CBA): A CASE OF KALRO PROJECTS IN MAKINDU SUBCOUNTY, MAKUENI COUNTY, KENYA**

**KEY INFORMANT INTERVIEW SCHEDULE**

This research seeks to examine gaps in policies that promote Community Based Adaptation projects at county level.

## SECTION A: KEY INFORMANT PROFILE

| | |
|---|---|
| Key informant's name and Rank<br><br>…………………………………………………………………………… | |
| Key informant's profession<br><br>…………………………………………………………………………… | |
| Key informant's experience in the profession *(in years)*<br><br>…………………………………………………………………………… | |

## SECTION B: POLICY AND LEGAL NEEDS

1. **What legal and policy mechanism support climate change adaptation at SubCounty level?**

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2. **Do you think the existing legal and policy mechanisms are adequate to support full implementation of climate adaptation projects at SubCounty level?** --------------------------
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3.  **In your opinion what changes would you propose to be implemented in the legal and policy framework both at national level and at if any at county level**? ----------------------

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4.  **In your opinion, what are some of the measures you would like the national and county governments take to support success of projects such as the ones undertaken by KALRO?**

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5.  **At the level of policy, what do you think should be done to achieve efficiency in the implementation of Community Based Adaptation Projects?**

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6.  **What is the county government and other key stakeholders doing to have those policies in place?  Please explain**---------------------------------------------------------------------------

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7.  **What in your opinion is the future of Community-based adaptation projects?**--------------

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**Thank you!**

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**EFFICACY OF COMMUNITY BASED ADAPTATION (CBA): A CASE OF KALRO PROJECTS IN MAKINDU SUBCOUNTY, MAKUENI COUNTY, KENYA**

**FOCUS GROUP DISCUSSION GUIDE**

This questionnaire seeks to assess the factors that hinder the success of CBA projects in improving the livelihoods of communities in Makindu SubCounty, Makueni County.

1. To what extent have you been involved in the implementation of any CBA projects?

2. What is your opinion about Community Based Adaptation projects in Makindu SubCounty, Makueni County?

3. What issues prevent effective implementation of CBA projects in Makindu SubCounty, Makueni County?  How best can KARLO engage in delivering its work?

4. Despite having such projects already in place, Community resilience to climate change remains a challenge in many parts of the country. How can you explain this trend?

5. What is your opinion about the role of culture in the failure or success of CBA projects?

6. What issues have emerged during the projects implementation period? How have these issues been resolved?

7. How would you have wanted these CBA projects carried out?

8. What is the future of Community-based adaptation projects?


**Thank you!**