Youth Decision Making in Agricultural Adaptation to Climate Change

An Analysis in East Africa

Working Paper No. 206

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Kelly Amsler, Chloe Hein, Genêt Klasek

CGIAR

RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security

CCAFS

WorkingPaper

Youth Decision Making in Agricultural Adaptation to Climate Change

An Analysis in East Africa

Working Paper No. 206

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Kelly Amsler, Chloe Hein, Genêt Klasek

Correct citation:
Amsler K, Hein C, Klasek G. 2017. Youth Decision Making in Agricultural Adaptation to Climate Change. CCAFS Working Paper no. 206. Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

Titles in this Working Paper series aim to disseminate interim climate change, agriculture and food security research and practices and stimulate feedback from the scientific community.

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic partnership of CGIAR and Future Earth, led by the International Center for Tropical Agriculture (CIAT). The Program is carried out with funding by CGIAR Fund Donors, Australia (ACIAR), Ireland (Irish Aid), Netherlands (Ministry of Foreign Affairs), New Zealand Ministry of Foreign Affairs & Trade; Switzerland (SDC); Thailand; The UK Government (UK Aid); USA (USAID); The European Union (EU); and with technical support from The International Fund for Agricultural Development (IFAD). For more information, please visit https://ccafs.cgiar.org/donors.

Contact:
CCAFS Program Management Unit, Wageningen University & Research, Lumen building, Droevendaalsesteeg 3a, 6708 PB Wageningen, the Netherlands. Email: ccafs@cgiar.org

Photos: Maps are screen shots from Google maps.

Abstract

In conjunction with the contemporary narrative of Africa's "youth bulge" and young people's perceived disinterest in pursuing agricultural livelihoods, this paper explores the extent to which youth (18-35 years old) have decision making power in the implementation of agricultural adaptation practices due to climate change in East Africa via the utilization of a comparative political ecology framework. Focus groups discussions, key informant, and individual interviews were conducted with a total of 155 rural youth and 42 policymakers and stakeholder representatives in selected sites in Tanzania, Kenya, and Uganda to assess youth's knowledge of adaptation measures and their role in the decision to implement them at the household, community, and national levels. Our findings suggest that young people have an understanding of climate change and how to adapt to it. However, they are unable to do so due to lack of agricultural inputs and financial capital, insufficient land ownership, indirect participation in decision making and limited access to markets.

Keywords

Agriculture; Youth; East Africa; Climate-Smart Agriculture; Climate Change; Adaptation

About the authors

At the time of writing, all authors were Master's in Development Practice (MDP) candidates in the School of Geography and Development at the University of Arizona.

Kelly Amsler, B.B.A., Email: amsler@email.arizona.edu

Chloe Hein, MDP, Email: chein@email.arizona.edu

Genêt Klasek, MDP, Email: gklasek@gmail.com

Acknowledgements

This research was implemented by three Master's in Development Practice students at the University of Arizona School of Geography and Development in Tucson, Arizona as partial fulfilment of the requirements toward the Master's in Development Practice degree. Thank you to the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) Gender and Social Inclusion Flagship, including Sophia Huyer and Mary Nyasimi, for funding the research on which this paper is based, and the Priorities and Policies for CSA Flagship, including Philip Thornton, Laura Cramer, and Anne Miki, for their advisory role and administrative support. Thank you to the CCAFS East Africa team, including Maren Radeny, John Recha, Philip Kimeli, Catherine Mungai, Elizabeth Ngungu, Tabitha Muchaba, and Alex Virero, for providing connections within the research sites and advice on local context. Thank you to the University of Arizona Master's in Development Practice program for supplemental funding for the completion of this research and ongoing mentorship.

The authors would like to thank all individuals who took the time to share their views and opinions with us through our methods design, evaluation, and writing processes.

Contents

Acronyms

ACTS	African Centre for Technology Studies (Kenya)
AKU	Aga Khan University (Kenya)
AYICC	African Youth Initiative on Climate Change (Kenya)
CCAFS	CGIAR Research Program on Climate Change, Agriculture, and Food Security
CSA	Climate Smart Agriculture
CSV	Climate Smart Village
EA	East Africa Region (Kenya, Uganda, Tanzania)
EAI	East African Institute (Kenya)
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
FRI	Farm Radio International (Tanzania)
FSDT	Financial Sector Deepening Trust (Tanzania)
GAF	Green Africa Foundation (Kenya)
GAME	Global Agribusiness Management & Entrepreneurship (Kenya)
IFAD	International Fund for Agricultural Development of the United Nations
IITA	International Institute of Tropical Agriculture (Kenya)
INGO	International Non-Governmental Organization
MGLSD	Ministry of Gender, Labour, and Social Development (Uganda)
MI	Mazingira Institute (Kenya)
MLG	Ministry of Local Government (Uganda)
MoALF	Ministry of Agriculture, Livestock, and Fisheries (Kenya)
MoCDWGC	Ministry of Community Development, Women, Gender, and Children (Tanzania)
NAADS	National Agricultural Advisory Services (Uganda)
NARO	National Agricultural Research Organization (Uganda)
NEMA	National Environment Management Authority (Kenya)
NGO	Non-governmental Organization
TADB	Tanzanian Agricultural Development Bank
TIRDO	Tanzania Industrial Research and Development Organization
TMoA	Tanzanian Ministry of Agriculture
TMoE	Tanzanian Ministry of the Environment
TMoYL	Tanzanian Ministry of Youth and Labour
UMoWD	Uganda Ministry of Water Development
UNEMC	Uganda National Environment Management Council
USAID	United States Agency for International Development

USIU-Africa	United States International University Africa
YDI	Youth Development Index
YLF	Young Lawyers Foundation (Tanzania)
Yofchan	Young Farmers Champion Coalition Network Uganda

Introduction

This working paper considers the extent to which young people have decision making powers to undertake agricultural climate change adaptations at the household, community, and national levels, within the context of a rapidly growing youth population and environmental impacts of climate change throughout East Africa (EA). For the purposes of this paper, "youth" includes individuals between the ages of 18-35 years old, in accordance with CGIAR's and the African Union's categorization, and the understanding of the youth, policymakers, and stakeholders we interviewed. We define adaptation as purposeful change(s) with an intended outcome made to agricultural practices in response to climate and/or weather patterns, while decision making power is defined as the ability to influence a specific course of action among several alternative possibilities that results in a tangible outcome(s).

The continent of Africa is currently experiencing a "youth bulge", with the fastest growing youth population proportionately in the world (Pandve et al. 2009; te Lintelo 2011; Hartley 2014). "A youth bulge occurs when more than 20% of a country's population is comprised of youth" (Hope 2012 p. 221). Although the age range categorized as "youth" varies around the world, the Global Youth Index acknowledges that "adolescence is widely understood as the period of life that begins with puberty and ends once physical and emotional maturity is established" or "a period of semi-dependency during which young people achieve personal autonomy while still remaining dependent on their parents or the state" (2016 p. 6-7). In Africa, much of this demographic is comprised of individuals between 18-35 years of age who are "the healthiest and best educated", tech-savvy, and in pursuit of a career with higher status and pay than what a traditional agricultural lifestyle allows (World Bank 2007).

The youth demographic is understood in the literature to be adaptable and innovative, and should be considered an asset (Pandve et al. 2009; Hope 2012; Hartley 2014). The concern is that Africa's economy cannot support the increasing number of job seekers; educated youth are entering the workforce and being met with little

opportunity. In order to take advantage of youth as an important and underutilized labour source (Mwakalila 2006; Hope 2009), and to address the assertion that agriculture, in its current state, cannot sustain projected population needs for long term food security (Mwakalila 2006; Moore et al. 2009; Thornton et al. 2010), the governments of Kenya, Uganda, and Tanzania have begun to consider adopting a "youth in agriculture" strategy. Nevertheless, the real or perceived non-interest of largely urbanized youth to engage in agriculture is thought to be exacerbating the youth unemployment crises (Leavy and Smith 2010; Thornton et al. 2010; Swarts and Aliber 2013).

At the same time, changing weather patterns are decreasing expected crop yields, forcing farmers to adapt the agricultural methods that have been reliable for generations (Challinor et al. 2007; Lobell and Field 2007; Schlenker and Lobell 2010). To maintain food security and commercial viability, farmers are turning to agricultural trainings, inputs, and techniques designed to help them adapt their farming practices and keep their livelihoods sustainable in the face of climate change. According to much of the world, the life of an agricultural worker is perceived as backbreaking, poor, and unpredictable. Yet, considering the reality of a growing population, it is imperative that young people get involved in agriculture, despite the fact that East Africa's youth are commonly described as urbanized, tech savvy, educated individuals seeking white collar employment. The Global Youth Development Index and Report corroborates this hypothesis by acknowledging that today's youth will experience the worst of the effects of climate change, and therefore, "whether they want to or not, young people will bear the burden of leading their countries and communities through this uncharted territory" (Commonwealth Secretariat 2016).

The effects of climate change are rampant and global, and the African continent is particularly vulnerable (Challinor et al. 2007; Hope 2009). Agriculture, and youth, are affected most by the changing climate, making it critical to address this intersection, to benefit from an opportunity that "can result in exponential socio-economic gains for individual countries and the world at large" (Commonwealth Secretariat 2016). Although measures are being taken to address agricultural adaptations to climate

change, “a failure to capitalise on this ‘demographic dividend’ could bring untold misery to families, communities and entire countries as the youth cohort instead becomes disenfranchised and disillusioned” (Commonwealth Secretariat 2016). It is important that opportunities to adapt are made possible for the youth, to ensure they have the ability to be accountable for their own lives, resulting in positive impacts for their future and the world around them.

The decentralization of Kenya’s government in 2010 has left policy and status of youth in flux, leaving them unsupported in a time where they desire direction and a voice. The government of Kenya believes young people are a critical population to the future of Kenya, and although they have published policies detailing how they will represent and support youth, there is not much funding or action behind them. Kenya adopted a National Youth Policy in 2006 and a National Youth Council in 2009, both articulating Kenya’s symbolic stance on the representation of youth. The National Youth Council is responsible for coordinating youth activities and supporting youth policy, yet has not been granted any funding, and the National Youth Policy “falls short of offering specific affirmative action guidelines on the representation of the youth in governance bodies at local, regional, and national levels” (youthpolicy.org 2014a). Therefore, action is being attempted at the grassroots and international levels, but lack of centralization and communication results in “duplication of efforts and limited impact” (youthpolicy.org 2014a).

As of 2015, the Global Youth Development Index and Report[1] ranked Kenya at 125 out of 183 countries, with a rating of 0.563. While this places Kenya’s youth status as “medium”, this is one of the largest improvements of all countries in the past five years:

> “Kenya’s overall YDI score increased by 22 percent between 2010 and 2015, the biggest improvement not just in Sub-Saharan Africa but also globally. Improvements were recorded in all domains, the largest being in Civic Participation (61 per cent), Health and Well-being (39 per cent) and Political

[1] The YDI measures youth development by country, by accounting for indicators within the categories of education, health and wellbeing, employment and opportunity, political participation and civic participation, all within the youth community. The YDI categorizes youth as 15-29 years old (Commonwealth Secretariat 2016).

> Participation (38 per cent). Indicators that contributed the most to this progress are volunteered time, voiced an opinion to official, helped a stranger, youth mortality, alcohol abuse and mental disorder. Kenya scores above the Sub Saharan African average in all domains" (Commonwealth Secretariat 2016 p. 55).

Kenya's government recognizes that the youth population is increasing, with 75% of their population under 30 years old, ready to enter the job market at its slowest growing time. As of 2015, 85% of young men were literate and 87% of young women, for a total of 86% of Kenya's 15–24-year olds being literate (youthpolicy.org 2014a). Despite this high literacy rate and job-ready demographic, there are too many youth, without enough directly employable skills, to enter the job market. These young people need mentorship, training, resources, and policies that support them. At this time, "existing structures within public and private sectors and the prevailing attitudes...do not provide an enabling environment for the youth to participate in decision making, planning, and implementation processes" (youthpolicy.org 2014a).

Similar to the situation in Kenya, Uganda boasts an increasing youth population (78% under 30 as of 2011) and high unemployment rate (youthpolicy.org 2014c). There has been a National Youth Council in Uganda as of 1993, a National Youth Policy in place as of 2001, and in 2011, the National Employment Policy targeted youth as a priority for employment among other youth-specific ventures (The Republic of Uganda 2011). As of 2015, the Global Youth Development Index and Report ranked Uganda at 135 out of 183 countries with a rating of 0.544. Uganda boasts a high literacy rate of 90% among 15–24-year olds, with both men and women achieving the same rate (Commonwealth Secretariat 2016).

While the relationship between the government of Kenya and its youth is tenuous due to lack of policy implementation and action on behalf of the government, Uganda is more centralized, with all related policies and procedures in place under the Ministry of Gender, Labour and Social Development (MGLSD). However, the people's distrust of the government hinders their transparency, partnership, and follow through.

Tanzania's status is a combination of Kenya's lack of policy follow through and Uganda's distrust of government. Tanzania published a National Youth Policy back in 1996, and formally critiqued it in 2007, with the intention to prioritize employment

opportunities and social security for youth. As of 2009, it was acknowledged that this policy was created and critiqued in haste, to maintain status quo with the trending youth narrative, and therefore not accurately representative of what young Tanzanians want or need. The country proposed a National Policy on Youth Development initially in 2007, revisited this in 2012, and has since tabled it. It is Tanzania's Ministry of Labour, Employment, and Youth Development and the Ministry of Information, Culture, Youth and Sports that are deemed responsible for Tanzania's youth. However, the status of Tanzania's government on youth is uncertain due to lack of clarity and follow through regarding existing policies and limited data. Of the three East African countries addressed in this paper, Tanzania ranks the lowest on the Youth Development Index, at 168 out of 183 countries, with a rating of 0.436 (Commonwealth Secretariat 2016). Compared to Kenya and Uganda, Tanzania has the lowest literacy rate amongst 15–24-year olds at 76% (specifically 76.76% for males and 75.83% for females as of 2015) (youthpolicy.org 2014b).

The youth are such a significant portion of the East Africa region's population that working with them and supporting them is for the betterment of all moving forward. Studies show that young people do have an understanding of climate change, including how this will impact them and future generations (Pandve et al. 2009; te Lintelo 2011), yet governments give few opportunities for direct participation in climate change adaptation processes, especially for the poor (Devas and Grant 2003). Although some organizations do take youth participation seriously, for many others, the youth role is largely symbolic in these processes (Dyer 2013; te Lintelo 2011).

In addition to the limitations of indirect participation, the entrance of young men and women and/or their success in agriculture is difficult due to a lack of access to, or control over, productive assets, particularly land and capital (Swarts and Aliber 2013; Dyer 2013; Hartley 2014). Young farmers in EA are widely portrayed by the literature and in our interviews as having an interest in agriculture beyond maintaining the subsistence farming systems of past generations, but rather, to expand beyond subsistence and into income generation. "Young people's interest in making farming an important element of their livelihood will likely be positively related to their ability to put together or gain access to the resources needed to farm on a "commercial" basis

(i.e. land, credit, labour...)" (Leavy and Smith 2010 p. 10). Furthermore, this gap in access and agricultural production varies by gender (Leavy and Smith 2010; Lodin et al. 2012; Goldstein et al. 2015), as we will further explore in this paper.

Aims and Objectives of the Research

This research aims to enhance the understanding of youth specific needs as agricultural production practices are being adapted to incorporate climate smart techniques. It is imperative to address youth perspectives on agriculture as a long-term livelihood option, particularly due to EA regional concerns of mounting youth unemployment in the face of continued population increases. Whether it is public or private, government or grassroots, a myriad of funding, trainings, conferences, research, materials and programs have been directed at youth-specific initiatives throughout the EA region.

The purpose of this research is to complement the work of CCAFS on youth involvement in agricultural adaptations. This paper aims to enhance the understanding of youth-specific needs as agricultural production practices shift to incorporate climate smart techniques, as well as examine the extent to which youth have decision making power in regards to agricultural adaptations to climate change. To do so, we compare and contrast national discourses with youth experience and perceptions. This understanding will help determine if efforts towards youth are effective, how they can more accurately reach young people according to their needs, and how young farmers can influence agricultural adaptations in response to climate change within their household, community, or nation.

Methodology

This research was conducted in June and July of 2016 by three University of Arizona graduate students as part of the CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS). CCAFS research work is conducted in five

regions: East Africa, West Africa, South Asia, Southeast Asia, and Latin America. This study was conducted in East Africa.

Prior to this research, the CCAFS research sites of Hoima, Uganda; Wote, Kenya; and Lushoto, Tanzania (Figure 1) had been established and selected as sites for trialling climate smart agriculture practices. The researchers used these sites to conduct focus group discussions (FGDs) and key informant interviews of young farmers to capture a household, community, and rural perspective.

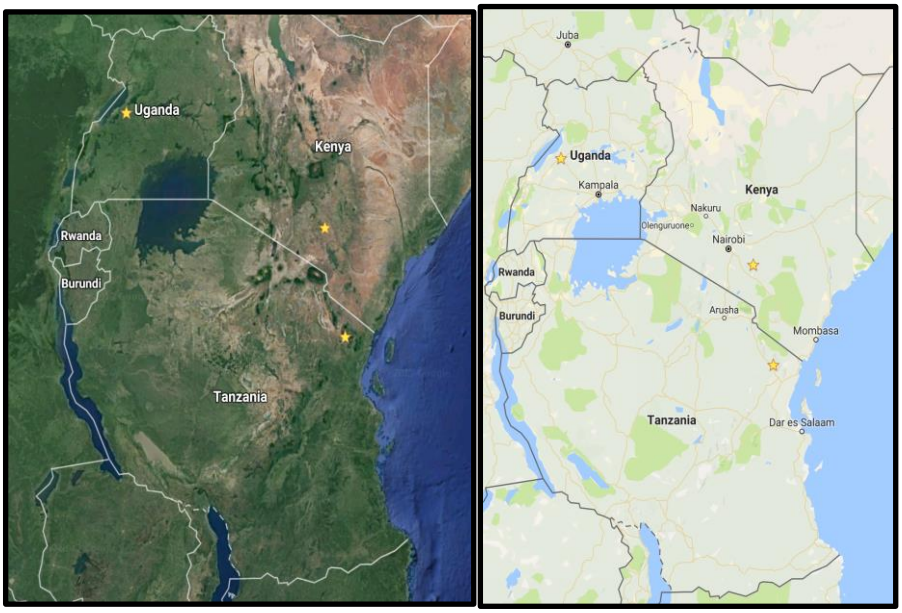

Figure 1 Google Map Images of research sites locations (2017)

All three sites are CCAFS Climate Smart Villages (CSV), part of a project launched in 2011 targeting high-risk areas that will be affected significantly by a changing climate. The goal of the CSV program is to test a range of agricultural interventions with the goal of increasing farmers' resilience and food security. The participatory project creates a steering group including community representatives and researchers collaborating to identify climate smart options, which can include climate smart technologies, climate information services, local development and adaptation plans and supportive institutions and policies, all tailored to the specific community.

Key Terms

Youth: individual(s) between 18 and 35 years of age, in accordance with East Africa initiatives and the work of CCAFS in this region. Throughout this paper and for the purposes of this research, "youth" and "young people" refer to individuals within this age range. All interviewees in Hoima, Wote, and Lushoto were youth as a requirement of their participation.

Adaptation: a purposeful change with an intended outcome made to agricultural practices in response to climate and/or weather patterns.

Decision Making Power: the ability to influence a specific course of action among several alternative possibilities that results in a tangible outcome(s).

Policymaker: those who have direct influence on and the ability to create and enforce laws and regulations and are thus beholden to all constituents and unable to focus on only one demographic.

Stakeholder: any organization or individual with a vested interest in any of the topics included in this research, and with the ability to cater to the interests of specific groups.

Data Collection

This study used mixed qualitative methods to collect data, including FGDs, in-depth key informant interviews and policymaker and stakeholder representative interviews. Topic outlines consisted of 24 questions for FGDs, 39 questions for key informant interviews, and 15 questions for policymaker and stakeholder representative interviews. A proxy site in Nakuru, Kenya was utilized as a field test for interview materials to ensure clarity in the questions and for the researchers to ensure they would be able to collect the appropriate responses to capture youth decision making power and understanding of climate change in their agricultural practices. In Nakuru, two FGDs, one young woman key informant, and one stakeholder representative interview with the local extension officer were conducted. After this pre-testing, the topic outlines for FGDs were edited to 24 questions, and contained sections for

assessing current farming practices, the understanding of climate change, current resource utilization and/or barriers, and future aspirations.

All young people included in the FGDs and key informant interviews were selected by the site coordinators contracted by CCAFS, in conjunction with local leaders and agriculture extension officers. This resulted in a total of 15 FGDs and nine key informant sessions across the three sites. Four FGDs and two key informant interviews were conducted in Wote, Kenya, six FGDs and four key informant interviews in Lushoto, Tanzania, and five FGDs and three key informant interviews in Hoima, Uganda. The variability in number of interviews was due to time constraints as well as different site coordinators at each location, with varying organizational abilities and personal connections within the research sites. Each FGD lasted for an average of one and a half hours, and typically included eight to ten individual participants. At each session, a facilitator (who doubled as the site coordinator), translator, and researcher were present. Half of all sessions were conducted with women and half with men. In total, 155 youth were interviewed through this process, 79 men and 76 women.

Table 1 Total numbers of youth farmer interviews and respondents

CATEGORY	KENYA	TANZANIA	UGANDA	TOTAL
	No. Respondents	No. Respondents	No. Respondents	No. Respondents
Focus Group Sessions	4	6	5	15
Key Informant Interviews	2	4	3	9
Focus Group & Key Informant Respondents	34	72	49	155
Men's Focus Group & Key Informant Respondents	17	33	29	79
Women's Focus Group & Key Informant Respondents	17	39	20	76

After completing a preliminary analysis of the findings, the researchers incorporated the responses from the youth to formulate the interview questions for stakeholder representatives and policymakers, designed to evaluate the extent of youth engagement and decision-making power at national levels. The interview consisted of

15 questions, including sections on assessing understanding of climate change, connectivity to constituencies, knowledge of existing youth advocacy, and extent of youth participation in decision making processes. Due to the different roles and perspectives of these two groups, policymaker and stakeholder interviews were each conducted individually, and separated by group for the purposes of analysis. For the purposes of this research, we define policymakers as those who have direct influence on and the ability to create and enforce laws and regulations and are thus beholden to all constituents and unable to focus on only one demographic, whereas stakeholders are any organization or individual with a vested interest in any of the topics included in this research and with the ability to cater to specific groups.

In total, 16 policymakers and 26 stakeholders were interviewed, 32 of whom were men and 10 women, and included national government appointed and elected policymakers, NGO directors and employees, youth advocacy group founders, youth lawyers, researchers, academics, and economists. These interviews took place in Nairobi, Kenya; Dar es Salaam, Tanzania; and Kampala, Uganda.

In total for this project, 197 individuals participated in interviews. Out of all 197 respondents, 164 (83%) were youth.

Table 2 Total number of respondents included in research.

CATEGORY	KENYA	TANZANIA	UGANDA	TOTAL
Total Focus Group & Key Informant Respondents	34 17 men 17 women	72 33 men 39 women	49 29 men 20 women	155 79 men 76 women
Total Stakeholder and Policymaker Respondents	13 8 men 5 women	20 17 men 3 women	9 7 men 2 women	42 32 men 10 women
Total Youth Respondents	39 20 men 19 women	74 35 men 39 women	51 31 men 20 women	164 86 men 78 women
Total Youth Stakeholder and Policymaker Respondents	5 3 men 2 women	2 2 men 0 women	2 2 men 0 women	9 7 men 2 women
Total Respondents	47 25 men 22 women	92 50 men 42 women	58 36 men 22 women	197 111 men 86 women

Research Findings

Youth Farmers

Sites Overview

Each research site included in this project shared similar socioeconomic and environmental challenges. Utilization of data collected from these three sites as a comparison is beneficial in generating an overall sense of the youth experience in the East African region. Because each site is a CCAFS CSV, they all have had access to educational and technological inputs via the CCAFS program. Therefore, our evaluation of young people's level of understanding of climate change and the various adaptations they have practiced may have been influenced by their, or a family member's, participation in any of the trainings or access to materials provided, as opposed to other sites or young farmers in the region who have not been included in a CSV or similar program. While the sample size is small and may be biased toward those with more exposure to potential means of adapting to climate change, the results are still relevant to decision makers who may be interested in creating a more enabling environment for young farmers to improve their agricultural practices because the barriers faced by those who participated in this study are likely similar to those faced by young farmers throughout the region.

The three sites all have bimodal rainfall patterns, with rainy seasons typically lasting from March–May and October–December. Although all three are situated in very similar elevations, ranging from 1,100 to 1,400 meters above sea level, Lushoto in Tanzania is classified as a mid to high altitude ecology, Wote in Kenya is arid to semi-arid, and Hoima in Uganda is a tropical climate (Förch et al. 2013).

Youth Agricultural Livelihood Perceptions

In all three sites, agriculture has been the primary livelihood for the resident populations for generations, and children begin working on their family's farm very early in life. The majority of FGD participants had inherited the agriculture livelihood from their parents, rather than making a conscious decision to practice it. A young

man in Hoima noted: "*even unable to talk, a child learns to grow food*", while in Lushoto, young men reported assisting their parents with the household farming between eight and ten years of age, and young women a little later, between ten and fifteen years of age. Their livelihoods "*depend totally on agriculture*", and this is perceived as a reasonable but difficult life. The primary reason youth cited for engaging in agriculture is for family consumption. In Wote, men reported taking on farming simply to fulfil a basic need, with responses such as: "*to get food*", "*cash for food*", "*basic needs*", and "*food becomes cheaper*". This was echoed in Hoima and Lushoto, where one young woman elaborated: "*we don't want to have hunger for our family and we have some land, so we farm*". In Lushoto, a young man explained, "*agriculture is like employment*", because after the harvest they can sell excess produce and use the income to purchase basic goods. Members of both women's FGDs in Lushoto gave more concrete responses, estimating that 75% of crop harvest is used for household consumption, and the remaining 25% is sold. As one young man in Lushoto astutely noted, "*farming is like life insurance, even if the price is low [on the market to sell], you can store excess food and save it to sell or eat later*". This reliance on agriculture for household food consumption becomes problematic as many participants also reported a decrease in crop production in the last five to ten years.

In both Hoima and Lushoto, youth reported having limited non-agricultural employment opportunities, whereas in Wote, the youth often cited additional occupations they depended on for income. A woman FGD participant noted, *"[we] do farming because there is not anything else available and [we] do not have enough of an education [to do anything else]".* Others corroborated this, citing a lack of education and unemployment as their reasons for continuing their families' agricultural livelihoods, explaining that the majority of people in their area only complete primary school. Despite this limited educational achievement at the research sites, young farmers were very forthcoming about their future aspirations, and if given the opportunity and financial capital, they would further improve their farming practices, purchase land, invest in livestock, access larger scale commercial farming practices, or diversify their livelihoods, moving away from a sole dependence on agriculture to engage in wage labour, with some expressing a desire to migrate to larger cities.

While men's and women's responses were largely similar regarding climate change and agricultural adaptations, responses diverged when describing their overall agricultural practices and roles, particularly the kinds of crops produced and avenues of income generation. Although all youth mentioned selling excess farm produce as a method of income generation, only the men's FGDs in Lushoto mentioned specifically planting cash crops for this purpose, saying "*as he grows up he knows agriculture can provide money after selling cash crops like coffee, tea, sugarcane, and vegetables like tomatoes and peas*". Narratives from the site coordinator and researcher observation further supported this gender divide. The men in Lushoto generally plant cash crops chosen specifically to cater to markets on the islands of Zanzibar in larger plots on flat fields at lower elevations (valley bottoms). The young women plant closer to their homes on smaller plots at higher elevations and steeper slopes. In Wote, women earning income tended to sell fruit, eggs or poultry, or to do non-farming activities such as tailoring, salon work, or casual labour, while men earning non-farm income tended to be a 'boda boda' (motorcycle) driver, call people into 'matatus' (privately owned minibuses used for public transport), assist a parent in their shop, or do casual labour.

Youth Understanding of Climate Change and Implemented Adaptation Measures

The young people interviewed not only demonstrated a clear understanding of what climate change is and how it has affected their agricultural practices, but also how they could adapt their current techniques to changing climatic conditions. All participants were familiar with the term "climate change" and identified it as something that affected them directly, in the sense of needing to adapt to changing weather and environmental patterns, and connected these experiences with agriculture and production yields (or lack thereof). Generally, youth perceived the weather changes to be negatively impacting their lives, in terms of harming their farming practices, incomes, and nutrition.

When asked how they would define climate change, a female respondent in Lushoto replied "*the term climate change means drought*", another said "*climate change means change of soil structure and change in soil fertility and low yield of crops*". Tree loss (deforestation), rain variability, decrease in soil fertility, increasing

temperatures, decrease of natural vegetation, loss of local varieties of produce, poor performance of local seed, low crop yield, and disappearance of natural water sources were all cited as changes in the environment that youth are currently experiencing that they associate with climate change. The reported temperature increases were also cited as a primary cause of increased incidences of crop diseases and widespread pest issues. In Hoima and Wote, drought and lack of adequate rainfall were primary concerns for the farmers, whereas although rain variability and unpredictability was of a concern in all three sites, a male farmer in Hoima specified: "*[in] the past ten years we have a lot of drought or not enough water. Now we have to gamble about the weather, we used to know the weather cycles*". One young woman farmer in Wote simply explained that when it is supposed to be a rainy season, it does not rain, and another elaborated on the changing rain patterns and intensity compared to what they used to be years ago. In Hoima, the youth discussed the day to day reality of unpredictable weather, leading to periods of extreme drought and other times heavy rainfall, both extremes leading to failed crops due to lack of water and/or crop rot from excessive rainfall. A male participant in Lushoto summarized: "*all of these things are happening in the last ten years due to environmental destruction, there is change in the environment*".

Young farmers had an extensive knowledge and many techniques as ways in which they were adapting their farming practices. Ways in which the youth cited changing their agricultural production practices in the last five to ten years include utilization of:

- Improved seed (exclusive and mixed usage[2])
- Fertilizer (inorganic, organic, and manure)
- Pesticides
- Herbicides
- Irrigation installation (and improvements/expansion of existing systems)
- Rainwater harvesting

[2] "Exclusive" refers to farmers reporting *only* using improved seed varieties, while "mixed" refers to farmers reporting mixing improved and local seed varieties together and using both simultaneously.

- Afforestation
- Maximizing tillage
- Shade cropping
- Specific plant spacing
- Early land preparation
- Soil conservation structures
- Crop rotation
- Utilization of new crop varieties
- Planting drought tolerant/more adaptable crops
- Changing crop selection
- Terracing (*Lushoto only)
- Reforestation (*Lushoto only)
- Contour farming (*Lushoto only)

Use of improved seeds, fertilizers and pesticides/herbicides were mentioned often and particularly emphasized as a method by which young farmers have adapted their agricultural practices in the last five years. The youth explained that these agricultural adaptations were inevitable for their production to adapt to shifting weather patterns and continue to produce adequate yields. As a woman farmer in Lushoto explained, "*if you don't use the proper technology now you don't get [any harvest]*". The importance of educational opportunities to learn about the new technologies was included in the list of ways youth at all sites have changed their practices, some specifically citing this is due to extension officer placement and climate smart agriculture (CSA) trainings (which are part of the CCAFS program) in their area. In Hoima, youth specifically cited trainings provided by NARO and NAADS, where a man farmer claimed: "*these trainings give us better outcomes; especially if you can spray we have higher yields. The trainings help us target the seasons better too*". Often, youth in Hoima and Lushoto referenced visiting demonstration plots and extension officer visits to their home fields as helpful educational opportunities; for the majority of the participants, this was where the knowledge of how to implement the aforementioned adaptation measures originated. One man in Lushoto explained, *"[we] make changes after getting information from extension officers and*

researchers, experts, and also get more information from each other by seeing what other people are doing". In Kenya, the youth are pleased with the training offered, but reported they need resources, such as water, and capital, both financial and physical, to implement and sustain the adaptations about which they are learning.

In addition to training, young farmers also access information via television, radio, weather stations, meteorological reports, and farmer groups, and this knowledge is combined with past experience and traditional knowledge passed on between family members. Participants also cited sharing information amongst themselves and with other farmers in the area, explaining that especially when one farmer has a particularly strong yield, others will try to learn from them, with one woman in Lushoto explaining, "*knowledge will transfer to other farmers after they have seen what [others] have done*". One participant in Lushoto cited that only 10% of the information she uses comes from television, and the rest is shared in community meetings and between friends, while in Wote, several of the men participants also mentioned the utilization of the mobile phone application Whatsapp to facilitate communication amongst their friends and community members. This indicates youth have a high reliance on direct social networks to access new information.

To give a sense of the prevalence of the agricultural changes and perceptions of the environment and new demands on agriculture, in Lushoto the FGD participants estimated between 40% and 90% of all farmers in the area are practicing such changes, while the majority of participants claimed that only 10% of farmers are still using local seed varieties. The most widely implemented adaptive practices were utilization of improved seed and fertilizer inputs, which the young farmers viewed as nearly universal practices at all sites. One young person in Wote explained that the only reason a farmer would not implement these changes would be due to "*ignorance*".

In some cases, the uptake of improved seed due to the decreased yields from local seeds is leading to a shift in crop selection and household consumption. In Wote, the majority of FGD participants reported opting out of planting maize and beans, in favour of early maturing and drought tolerant crops, such as cowpeas, millet, green grams, and sorghum. Similarly, in Hoima some farmers discussed moving towards

drought resistant crops, such as cassava. In Lushoto, one woman participant explained *"[we] used to be able to grow sweet potato crops, but now that is impossible because of climate change, the yield is very low, so we cultivate them, but do not invest as much in them as we have in the past*", and "*the way of eating has changed, [we] have switched from cassava to maize and potato consumption*". This indicates a diversification of diet due to climate change.

The money to invest in necessary agricultural inputs such as seed and fertilizer is typically generated from the crop production the households are able to sell, but due to decreasing crop yields, the youth are unable to predict from one season to another the reliability of this income. Due to this uncertainty, a few of the participants also cited diversification of their livelihoods, seeking opportunities for generating additional income outside of growing crops via providing transportation services, brick making, construction work, and livestock keeping. Livestock keeping, for the purposes of this paper, is considered a diversification, as farmers specifically cited adapting or a desire to adapt their livelihoods by shifting from exclusively subsistence cropping to taking on cattle, goats or poultry as well.[3] These shifts, reported in all sites, were primarily undertaken by young men, as opposed to the women participants or their older relatives or household members. Even those who reported maintaining another income generating activity in addition to agriculture still estimated that 80% of livelihoods in Lushoto is purely agricultural work, so livelihood and income diversification, although present, is limited.

Barriers in Adaptation Implementation and Youth Perceptions of Governmental Impact

Youth farmers have an understanding of climate change and which changes in the environment are manifestations of a changing climate, and they are adjusting their agricultural practices to ensure their households can maintain or increase crop production. However, in order to implement these adaptation measures, which the

[3] While these were the only farming alternatives mentioned in the youth FGDs, a group of male youth included in our Nakuru proxy site reported that they are they are turning to rabbit breeding as an alternative source of income. Some policymakers and stakeholders mentioned beekeeping as a viable adaptation and alternative source of income, but this was never mentioned by the youth themselves.

youth regarded as necessary in order to produce adequate yields, it is imperative for youth to have the capital available to invest. A woman participant in Lushoto stated *"[we] are reliant on improved seed, but it is expensive and buying the improved seed for everything is very expensive, so sometimes we mix and use half local and half improved seeds*". Youth at all sites noted that the cost of improved seed varieties is particularly high compared to local varieties because in the past, they were able to save seeds from one season to the next, but now with the improved seeds they cannot be reused and must be purchased each season. Although young farmers in both Hoima and Lushoto mentioned that there are instances in which they have access to government subsidized seed and fertilizer, they did not feel this was adequate. Additionally, despite recognizing that the governments did provide basic infrastructure such as basic roads, health centres, schools and in some areas electricity, the lack of improved roads and permanent market spaces made accessing important inputs such as improved seeds, fertilizers, and pesticides a difficult and lengthy process.

More so than tangible agriculture inputs, one shortcoming that all youth reported was a lack of financial capital to invest in their farms. This was specifically linked to a fault on behalf of the government, as the perception was that the government should grant young farmers more land and provide access to funding. To bypass the lack of available funding mechanisms from the government, FGD participants described group savings and loans. They were able to access capital in the form of a loan from a group pool from which group members were able to borrow and pay back with interest. There were many complications with this, such as spending the funds on situations not related to farming (emergency or otherwise), inability to pay back the loan or interest in a timely fashion to resupply the pool, and the squandering of funds by some individuals that inevitably affects the entire group.

In Hoima, when asked if the government was helpful to the farmers, one man replied: *"[n]ot really, there is a lot of government corruption. There is the youth livelihood fund but only few benefit from it. [There is] not a lot of access, because just getting to Kampala is hard enough. We are discounted, [as a] sub county and are ignored often*". In Lushoto, even when specifically asked about youth funds and sources of

funding available to them, the FGD participants seemed to only have a vague sense of what sources would be available to them, and did not know how they would access them or what the requirements were. One young man reported that sometimes young farmers have been able to get loans from a "*big group*" when there is an extension officer who forms the group for them first. The general consensus between all FGD sessions, though, is that the youth in Lushoto did not have enough basic education or literacy to know how to access agricultural loans. Furthermore, all youth cited a desire for increased access to education and agriculture specific training from the government.

Youth Decision Making Power and Perceptions of Decision Making Role

One of the questions posed to the youth participants asked them to describe the qualities of a decision maker. Experience, knowledge, wisdom, land ownership, wealth, and education were mentioned in every interview. Although not stated outright, gender in addition to land ownership were universally the ultimate determinants of who held decision making responsibility. Often, youth in both FGDs and key informant discussions stated that "*a person who is the head of household*", is usually the father or man, and "*the one who owns the land makes the decisions*", which again is typically the man head of household. Both men and women participants estimated that the man head of household makes 90% of all household decisions. As a male respondent in Hoima explained, "*in the end, a man makes the decision*".

There were a few caveats to the assertion that men household heads are inherently decision makers. For men heads of households to maintain their status as decision maker, they have to be physically present. At all sites, youth explained that there are periods or instances in which a man may be away from his home, during which time the decision-making falls to his wife, the mother, or more rarely, to the eldest son. Furthermore, especially in Lushoto "*good behaviour*" is very important, as a man participant explained, "*it depends on the nature of the man, is he wise or is he drunk?*" Drunk men, in the eyes of the youth participants in Lushoto, do not count as decision makers. In Wote, men participants explained there could be somebody older who is lazy, so the one who works harder, even if he is younger, will be listened to.

Household decision making is interestingly the only facet in which men and women fundamentally disagreed, reporting opposite experiences. The women claimed that household level decisions, meaning decisions made directly affecting the immediate members of the family, were made together, with the women and men in a household participating in discussions equally and arriving to a consensus together. The men's perspective, in stark contrast, was that men made the decisions on their own without outside influence or participation of their wives or family members.

Youth of both genders explained that the primary way in which they can influence change in their households is via the sharing of information, as a young woman in Lushoto explained, a decision maker can "*use their education and experience to decide what to do*". Basic education was perceived as helpful because of the literary and mathematical skills needed for farming, such as discerning what pesticide to buy, or measuring for crop spacing. Participants in Wote explained that education is helpful for "*general knowledge*", for reading the "*labels to use for farming*", and "*to socialize and interact with other community members*". The general consensus was that youth have achieved a higher level of general and agriculture-specific education via specialized trainings and more access to primary and secondary education than previous generations, including that of their parents. It is this knowledge that the youth today hold that allows them to participate in household discussions and provide input. The extent to which their opinion can be taken seriously, one respondent in Lushoto asserted, "*depends on the quality of the idea*". One male participant in Lushoto further explained: "*you can transfer knowledge to another person by educating them and you can use your education to defend your idea*".

Across all three sites, the youth in the focus groups and key informant interviews positively affirmed that their education, in various forms, empowered them with knowledge and confidence to play a role in the decision making process. Some participants were the final decision makers in their households, but even if the final decision rested with someone else, participants acknowledged that their input was considered, in part due to their education. Across all three sites, male and female focus group participants and key informant interviewees agreed that their education had an impact on their decision making power in regards to how they practice

agriculture; if they had an educated opinion on an agricultural aspect, they were able to share that with their household and thus be included in the decision making process, if not make the decision themselves. The youth explained that education via training, demonstration plots, extension officers, weather updates via text message, and conventional schooling empowered them to share with their families at the household level and be a part of the decision making process. Any youth who was educated in agriculture to some extent felt that their knowledge and experience in agriculture was what empowered them to contribute to or make decisions at the household level.

For example, when asked if she had more farming knowledge than other members of her family, one married female farmer in Wote responded positively, *"…mainly due to training"*. She acted as the decision maker in her household, due to her experience, education, and subsequent success in farming. A young, married male farmer in Wote expressed similar sentiment that he had more knowledge than other members of his family *"due to exposure"* and that he was the one who made the decisions because he was the one who *"is moving about"* in terms of attending trainings and gathering agricultural information and technologies.

Education fosters knowledge for decision making, as well as empowerment. Wote's aforementioned female and male interviewees both answered feeling confident in terms of understanding what changes need to be made to make agricultural practices more successful, as well as the opportunities and inputs available to help with this. When asked if other members in the community felt the same way, the female farmer said no, because they *"don't attend training"* and the male farmer said no, because *"some are not interesting in farming"*. These responses express that their education provides them knowledge and confidence to make decisions, but not everyone in the community experiences this.

Across all three sites, the focus group participants were asked if their education has had an impact on their decision making in regards to how they practice agriculture, and the group consensus was yes. Therefore, young farmers with some form of education have the knowledge and experience to contribute to, or make, a decision in their household.

In addition to educational level, there is an age dimension to decision-making as well in Hoima and Lushoto, which suggests that in those areas, youth do not typically see themselves as decision makers. Several groups in Lushoto stated that a decision maker must be thirty or older, and that "*they have to be older, because everyone expects an older person [to make decisions]*" and that it is also imperative to "*respect older people and men because of culture*". Furthermore, participants of both genders cited 18 to be the age when they could start to be included in household discussions. In Hoima, youth shared this sentiment, stating that age is a factor in who is perceived to be a decision maker by the community, citing the "elders" as decision makers. In Wote, however, age was specifically cited as not being an important factor in decision making, compared to other elements of credibility (land ownership, marital status, education, and experience).

Many FGD participants explained that until they got married and thus created their own, new, household of which they were the heads, their power to influence change in their household's agricultural practices was limited. In this point, women perceived their role after marriage to be particularly elevated, as a joint head of household, one who has the ability to speak "*freely and directly*" with her husband, whereas before marriage, this open dialogue with their father was not present. Although both genders cited having more power to make decisions after marriage due to being in charge of their own household as opposed to a child in their parents', the married women participants in Lushoto noted: "*sometimes [we] can share [our] ideas but the husband has the final decision*", while in Wote women participants cited sharing decisions with their husbands. From the purposes of this research alone, the gender dynamics are not clear and should be further explored in future research.

Policymakers

The policymakers interviewed in Nairobi, Dar es Salaam, and Kampala expressed that youth, particularly those already engaged in agriculture, have some understanding of climate change. A representative from the Tanzanian Ministry of the Environment (TMoE) remarked, "*youth do understand climate change, more than I expected, actually … and they have a better understanding of how they are impacted*".

However, in all three countries, policymakers acknowledged that this understanding varied based on a person's level of education, and whether they lived in a rural or urban area. For example, in Tanzania, "*environmental topics are taught in school"* and there is *"more awareness and youth engagement in climate change at the university level*" according to the TMoE policymaker. A policymaker with the Uganda Ministry of Water Development (UMoWD) explained that while those living in urban areas may have more access to formal education and therefore understand the term "climate change" and its effects from an academic perspective, "*city people don't complain about their livelihoods; they can just go to the market if they need something*" as opposed to those living and working in rural areas who are directly affected and more dependent on these resources, so "*if a crop fails, then people do not eat*".

Despite having a more practical, rudimentary understanding of climate change, a representative from the Tanzanian Ministry of Agriculture (TMoA) explained that farmers would at least "*notice changes in the environment*" and that "*farmers find their own way to adapt to climate change*", citing the extension officer program and the media as primary reasons for this. The TMoA policymaker explained that these "*extension officers are there to promote smart agriculture through demonstration and daily practice… the extent and quality of this, of course, depends on the extension officer*" (TMoA). A representative from the TMoE noted that media transmitting information about climate change and its impacts, including television, radio, and mobile messaging, is primarily targeted in rural areas because the transmission of information to rural areas is "*in general doing well in the area of climate change and development*". This increased availability of information in rural areas, in conjunction with generations of agricultural experience is what policymakers deem has allowed farmers to understand changes in the environment.

There is a youth knowledge gap between understanding what climate change is and connecting it to adaptation measures that need to be addressed, according to a Kenyan National Environment Management Authority (NEMA) policymaker, who said that the youth "*are a critical mass in the country and they are the change agents*" who should be involved in climate change adaptations, since it is the "*generation of*

children who suffer more from the impacts if no action is taken now". Uganda's UMoWD policymaker expressed what was echoed by other policymakers, saying "*youth are the backbone of our economic environment, if they don't understand climate change now they will have nothing in the future*." The majority of EA policymakers interviewed agree that since youth are the largest population proportionately in East Africa, with those living in rural areas being the most impacted by climate change, their involvement in adaptation efforts is necessary in coping with climate change; they are the ones who need to be educated and empowered with adaptations and solutions.

Policymaker Perception of Youth

Throughout Kenya, Tanzania and Uganda, the consensus amongst interviewed policymakers is that youth are a crucial and growing demographic in need of more and enhanced engagement. Widely citing the "youth bulge" phenomenon and concerns of youth unemployment, a representative from the Tanzanian Ministry of Community Development, Women, Gender, and Children (MoCDWGC) stated that the "*government is now starting to realize the importance of youth*". However, one respondent from the Uganda National Environment Management Council (UNEMC) stated, "*youth are not always regarded highly and not taken seriously, they are seen as lazy doing drugs, criminals, many negative perceptions*". A majority of policymakers brought attention to the issues around unemployment in all three countries, hoping that the urban youth unemployment problem will serve as a catalyst to steer youth towards agriculture.

Within this positive perception of youth's status and role, there is a distinct divide between that of urban and rural youth, and how this relates to their knowledge of climate change. A representative from the Tanzanian Ministry of Youth and Labour (TMoYL) explained that the majority of Tanzanian youth live in rural areas, in which "*less than 10% are educated and 80% don't know we have a number of youth NGOs advocating for youth and on climate change issues*". The number of educated, or "*highly skilled*" urban youth is higher, as "*living in a city there is more information flow*" (MoCDWGC) as well as better schools and more opportunities. Policymakers acknowledged that those with a more advanced education, in an urban area, may

better understand climate change and adaptation measures at a theoretical level, although they may not need to know adaptation measures for practical, livelihood purposes.

In general, urban areas are appealing for their numerous opportunities, but a representative from the Tanzanian Ministry of Youth and Labour (TMoYL) explained that the allure of urban life has been problematic at best for Tanzanian youth, as "*many youth, who are unskilled formally, come into urban areas, but are not useful or productive in urban areas*" and struggle with unemployment. Similarly, Kenya and Uganda policymakers expressed negative perceptions in regards to youth migrating from rural areas, selling off land, and purchasing a 'boda boda' (motorcycle) to make a living in an urban area. One policymaker from the Uganda National Environment Management Council (UNEMC) reflected on the changing desires of youth, and the perception that impatient youth are ditching agriculture for a more exciting and quick-money lifestyle, saying that "*youth are leaving the agriculture fields, drawn to driving boda bodas, making fast money and hanging out with friends all day, this is seen as lazy and just a way to make quick money*." A Ministry of Agriculture, Livestock, and Fisheries (MoALF) policymaker in Kenya explained that youth do not find agriculture attractive because "*you become very vulnerable"* and *"they don't see money in agriculture"* so they *"move to urban areas where they can make money*". This Kenya MoALF policymaker echoed the generalized perception that "*youth want simple things, easy things, fast things...they are anxious…"* and see agriculture as *"a peasant way*". Youth's aspirations for quick money may discourage them from staying in agriculture, or even getting involved at all, because the financial benefits are delayed and uncertain. In addition, the youth perception is that agricultural work is "*dirty*" or "*undesirable*" as compared to "*white collar jobs in the city*" as explained by a representative of Tanzania's MoA.

Therefore, policymakers are attempting to revamp how youth see agriculture. In Kenya, the MoALF policymaker reported that there is a policy being drafted to entice youth to be in agriculture by involving three diverse practices: livestock, beekeeping, and indigenous poultry. This policy is a specific action taken by the MoALF branch of

the Kenyan government to help youth embrace agriculture, to enhance productivity, and secure future farmers.

Policymaker Perception of Youth Engagement in Climate Change Adaptations

Policymakers reported that since the effects of climate change will impact youth the most, youth need to be educated on potential methods of mitigation and adaptation, and be engaged in developing solutions. Kenya's NEMA policymaker referred to youth as "*a critical mass*", "*the change agents*", and "*the leaders of now*" with "*energy and strength to do various initiatives to address climate change*". Uganda's MLG policymaker likened youth to "*puppies*" who are "*easily adaptable [and] just need a bit of direction*". These statements are representative of the majority of interviewed EA policymakers, who have a positive perception of youth and a belief that assisting the youth is a wise social, political, and financial investment.

Table 3 Policymaker/Stakeholder Perceptions of Youth

CATEGORY	**Positive** Perception of Youth	**Negative** Perception of Youth	TOTAL PM/SH INTERVIEWED
KENYA	13 8 men 5 women	0 0 men 0 women	13 8 men 5 women
TANZANIA	18 16 men 2 women	2 1 man 1 woman	20 17 men 3 women
UGANDA	8 6 men 2 women	1 1 man 0 women	9 7 men 2 women
TOTAL	**38** **30** men **8** women	**3** **2** men **1** woman	**42** **32** men **10** women

This table illustrates that 90% of interviewed policymakers and stakeholders had positive overall perceptions of the youth demographic in EA and held the perception that current leaders must support the youth now, for the betterment of the future.

Despite this positive perception of youth held by the majority of interviewed policymakers, some interviewees[4] expressed concerns in putting their trust and efforts in the youth. In Kenya, for example, a MoALF policymaker explained that young

[4] See the numerical breakdown of policymaker/stakeholder perceptions of youth in Table 3.

people are particularly vulnerable due to their lack of "*adaptive capacity…ownership…[and]…capital to invest*". Therefore, even though policymakers acknowledge that youth need to adapt, some expressed uncertainty as to how, or the extent to which they will do so. Youth are considered at risk by these few policymakers, without "*coping mechanisms*" or the "*financial measures*" to address increasing threats of unemployment, said a Kenyan NEMA policymaker. A response like this reflects that even though policymakers agree that youth involvement is critical, some doubt youth's ability to succeed if they are not adequately supported.

Adequate support comes in various forms of financial and agricultural inputs, education, training, and ensuring that the youth voice is heard at both the grassroots and policy level. According to interviewed policymakers, the most common involvement youth currently have in the political arena is the existing training on climate change adaptation strategies, via the facilitation and support of extension officers. In Tanzania, the policymakers interviewed understand that farmers are responding to climate change by improving their agricultural practices, with financial investments in fertilizers, pesticides, and improved seeds. A Tanzanian MoA policymaker explained, "*the major problem to farmers now is that we have technology and access to affordable drought resistant seeds, but the inputs are not always available due to poor infrastructure*". Even if farmers could afford these adaptations, they might not be physically available or accessible. Not one of the policymakers interviewed in Tanzania cited any additional adaptations or practices that youth are implementing in their agricultural practices in response to climate change.

A far less common form of support for the youth, but regarded as critical, is the direct application of the youth voice. Policymakers acknowledge that incorporating youth participation into decision making is important, yet rarely does this happen. "*The youth is the future of any country…whether agriculture, IT, business, technology…the youth are very important and they have to be on board in decision making and also participation"* said a Kenyan MoALF policymaker. Many Ugandan policymakers pointed to the Ministry of Gender and Labour to be at the forefront of youth programs for engagement, in addition to other programs working towards encouraging youth to

be part of the discussion of climate change adaptations. A UMoWD policymaker in Uganda explained, "*we elect local officials to encourage youth engagement around climate smart matters such as water smart strategies within agriculture*."

Policymaker Knowledge of Youth Programs and Funding Opportunities

Every policymaker interviewed in Uganda was familiar with funding opportunities for youth through the MGLSD Youth Fund. The fund is said to be available to groups of responsible youth with a viable business plan. However, many of the Ugandan policymakers brought attention to the complexity of these funds, citing the difficulty of youth being able to mobilize themselves and create successful business plans; a policymaker of the Ministry of Local Government (MLG) remarked that "*access can be difficult, as many times youth cannot get organized and need guidance in creating successful groups and business plans*." Another policymaker with the UNEMC stated "*These funds have requirements: can they start a business? Do they have an education? These questions can determine whether or not youth are excluded*". A Ugandan policymaker concluded that there is a need for more youth leadership examples in Uganda to model how to create sustainable business plans and saving/credit circles, and that this will foster successful groups who can be eligible for such funds.

Similar to their Ugandan counterparts, Kenyan policymakers cited the availability of funding sources, such as the Uwezo fund, a government-established fund available to women, youth, and the disabled "to promote businesses and enterprises at the constituency level" (Uwezo 2017). Contrary to what the youth perceived about this fund, a Kenyan NEMA policymaker positively referred to the loan as a grant, because the "*loan interest is very little*", and perceived it as a sensible and seamless process to procure and pay back the loan, and become an independent entrepreneur. In addition to difficulty accessing funding, a Kenyan MoALF policymaker explained that youth do not have collateral and they do not have trust, both of which hinder their financial competency. This policymaker explained, "*the problem is that the youth don't have property which they can put as security to acquire funds"* adding *"there isn't much trust in the youth*" referencing the perception that if youth are provided money, there is doubt it will be used responsibly.

In all three countries, the majority of policymakers agreed the application process for funding is difficult for young people, and despite professing to support youth receiving benefits and being involved in agriculture, there are not easily accessible funds or services supporting this. According to one MoALF policymaker in Kenya, in addition to funding difficulties, extension officers may not be available or motivated to assist youth. With no one holding the extension officers accountable, these behaviours ultimately hinder the youth's successful involvement in agriculture.

Tanzania has a slightly different case specifically regarding youth's ability to access funding, compared with Uganda and Kenya. A representative from TMoE stated that "*within that ministry there is no loan system and [they were] not aware if there was a functioning loan system for youth in any other ministry within the national government*". A representative from the Tanzanian MoA stated: "*as far as funding, for youth to get funds they have to be working with an NGO or be a part of an NGO project, the Ministry [of Agriculture] doesn't really do that…. there are lots of NGOs who do that [give loans to youth farmers] but the ministry is not involved*".

Throughout the EA region, policymakers were aware of funding available via government, NGOs, or other organizations, yet nothing specific to youth in agriculture. Therefore, this particular demographic competes for funding within a much wider pool. Perhaps a fund is within agriculture, but not age-specific; or perhaps it is age-specific, but open to any field of interest. A Kenyan MoALF policymaker simply stated, "*we haven't set aside funds for youth in budgeting*". Region-wide, youth in agriculture can apply for funding, but given the (1) limited availability of funding, (2) the difficulty in accessing these funds, and (3) the wide variety of competition, it is rare for this demographic to be chosen, once again hindering their involvement in agriculture.

Stakeholders

Similar to policymakers, stakeholder representatives had a sound, scientific understanding of climate change and its effects. In addition, stakeholder representatives had enhanced knowledge in their respective fields regarding the

entwined relationship between youth, agriculture, and climate change. All stakeholder representatives interviewed throughout the EA region agreed that youth have a rudimentary understanding of climate change and how it personally affects them. Stakeholder representatives agreed that the majority of youth do not have a uniform definition of the term "climate change", but are able to identify it by the changes in weather patterns. For example, an interviewee from USAID in Tanzania explained that youth will describe climate change by saying "*there is no rain now*" or "*the harvest is not good*".

An independent researcher in Kenya explained that the term "climate change" does not translate exactly from English to Kiswahili (the national language spoken in the Lushoto and Wote sites), so it may not be adequately understood in predominantly Kiswahili-speaking communities. Therefore, this particular stakeholder discovered that when talking with Kiswahili speakers about climate change, it is necessary to break this term down into a series of simpler questions that explore the various effects of climate change, allowing respondents to conceptualize climate change in a relatable, practical sense. This experience was reflected in the farmer FGDs of this research, where young farmers defined their understanding of climate change according to personal agricultural experiences. The EA youth who have a more academic understanding of climate change are those who are English-speaking and/or university educated. This was accurately reflected in the English-speaking interviews of this research, where stakeholders and policymakers expressed an overarching academic definition of the term "climate change". This juxtaposition between the theoretical and the practical understanding reflects the claim of a representative from Kenya's African Youth Initiative on Climate Change (AYICC) that "*climate change is still an elitist idea*".

Interviewed stakeholder representatives varied in their perceptions of how youth understand climate change, but all responses reflected that youth have an incomplete understanding of climate change, in some form or another. Some stakeholder representatives acknowledged that youth understand climate change at a personal, experiential level with their own farming and how it is affected by the changing

weather patterns, whereas others see that there is much more to climate change and its effects that youth are not educated on.

Stakeholder Perception of Youth

Youth encompasses 18–35-year olds, but Tanzanian stakeholder representatives explained that there are certain qualities that foster hierarchy in the youth category, such as if one is married, has a college education, or is in their 30s. Although still seen as youth, these qualities enhance a young person's credibility. As the Farm Radio International (FRI) representative explained, "*Before you are married, no one trusts you because you can't handle such a resource [such as land ownership or large amounts of capital] because you're too immature*".

The majority of interviewed stakeholder representatives in the EA region expressed a positive perception of youth, as well as the intent to be inclusive of all youth. While some organizations truly are welcoming of all youth, others aggregate based on interest, or ask the youth groups themselves to select representatives for certain events. Stakeholder representatives are familiar and collaborate with other organizations to support youth voice. Networking is not only beneficial for stakeholders, but for the youth themselves.

Although some stakeholder representatives acknowledged that youth may be burdened by a negative perception within society at large, the majority of interviewees recognized the youth as a growing and vital population to the EA region, making it critical to incorporate the youth voice in planning and decision making[5]. However, there exists a disconnect between stakeholders recognizing the need for youth involvement, and stakeholders actively including youth. An independent researcher in Kenya remarked on the "youth bulge" and rationalized that "*young people have a large role to play and yet most do not consider and include them*". This interviewee further explained that the youth are a significant portion of Africa's population who will be affected by climate change, yet they do not have input in the decision-making process, explaining that others think of youth as "*a problem to solve*" and are creating

[5] See Table 3 for numerical breakdown of policymaker/stakeholder perception of youth.

solutions without consulting the needs of the youth; this can be inaccurate, inefficient, and unsustainable. Tanzania's USAID representative corroborated this sentiment by explaining, "*Policymakers recognize youth importance as they want them on their side, in their cabinet, and the idea is then [that] the cabinet becomes more vibrant…[however] youth are not involved in policymaking*". Stakeholder representatives explained that it is difficult for policymakers to involve youth living in rural areas; those who live in rural areas are more spread out and difficult to monitor, compared to urban youth.

Ugandan stakeholder representatives, despite having their own positive perception of youth, acknowledged that society's perception of youth is largely negative, saying that youth are perceived as lazy and as simply wanting to trade in the farming lifestyle for that of a 'boda boda' driver in the city. A Uganda private consultant explained that "*many think youth are a nuisance and don't know about life; that they are reckless and up to no good. [This is] quite unfortunate as many [youth] are not"*. Ugandan stakeholder representatives believed that youth have innovative ideas to combat climate change effects and implement adaptation strategies.

Tanzanian stakeholder representatives had a similar positive perception of youth, with a stakeholder representative from the Tanzanian Agricultural Development Bank (TADB) articulating that "*the best thing is to invest in youth*" and the Tanzania Industrial Research and Development Organization (TIRDO) stakeholder representative explaining that the involvement of youth in conversations on how to adapt to and mitigate climate change is critical. Like Tanzania's policymakers, the stakeholder representatives believe in the youth's adaptability, relatively high educational attainment, and ability to implement changes. For example, the representative from TADB stated, "*youth are hard workers, aggressive in pursuing their projects and getting more funds*".

Despite this majority opinion, dissenting perceptions exist[6]. A Tanzanian stakeholder representative, from Financial Sector Deepening Trust (FSDT), a development bank, expressed a negative perception of youth, stating, "*Youth are less educated and have*

[6] See Table 3 for numerical breakdown of policymaker/stakeholder perception of youth.

less life skills [than previous generations], their level of education is largely only the primary level and quality of education is not very good"; another Tanzanian development bank stakeholder representative had similar sentiments. This unfavourable assessment of youth characteristics from development bankers themselves explains why youth encounter barriers in receiving loans. Tanzanian stakeholder representatives expressed that youth have the perception that once a college education is obtained, then employment will follow, but that has not been the case. Youth unemployment is a prevalent issue in all three countries, therefore, employing the youth is critical to prevent and mitigate the fallout of youth unemployment. Tackling this issue is a burden left to policymakers. The primary barrier to employment in Tanzania, according to the interviewee from TIRDO, is that there are "*not enough various industries*" thereby limiting the number of jobs and variety of employment available to this rapidly changing and adaptive youth demographic. Regarding the youth who do venture into entrepreneurship or the small start-up field, the representative from the Tanzania's Young Lawyers Foundation (YLF) described them as "*very ambitious but in need of a lot of technical and financial support*". These stakeholder perceptions of youth express how youth embody a drive for success, yet lack the resources (such as financial capital, business knowledge, job market) to be successful.

Kenya stakeholder representatives further acknowledged the aforementioned urban versus rural divide, and the various education levels of youth, as reasons for those who understand the practical or theoretical side of climate change. For example, an East African Institute (EAI) stakeholder representative in Kenya discussed the modernization of agriculture in the form of developing technologies to inform and assist farmers to be more secure and effective in their livelihood. This interviewee explained that targeting youth is crucial to these developments, because the youth are "*the ones who will do it, they're the ones who are struggling to practice agriculture, the ones who risk losing investments…so adaptation measures and investment should really target this demographic.*" Not only do youth have an understanding of the term "climate change" but the ones who are farming "*feel the impacts*" first-hand, and are motivated to find a solution. This is the reason to include youth in adaptation measures.

An African Centre for Technology Studies (ACTS) stakeholder representative detailed that there are now a large number of highly educated youth, unable to secure white-collar jobs, taking advantage of opportunities in agriculture and agribusiness in Kenya, thereby addressing youth unemployment. This is true for Uganda and Tanzania as well. In addition to stakeholders, EA policymakers recognize the rising number of youth, and the impending rise in the unemployment rate, and are attempting to combat that with efforts to involve youth in agriculture. This focus assumes that all youth are interested in agriculture, which is not the case, and neglects the youth who are already invested in agriculture that would benefit from assistance to be successful.

With feedback that youth are anxious, impatient and results-oriented, the stakeholder perception is that youth are not interested in agriculture because they will not be able to experience immediate results. A stakeholder representative from the Mazingira Institute (MI) believed that the more youth know, the more they will contribute positively, and that the reason that youth have not cared to be involved, or have created negative impacts, is because they simply did not know the effects of what they were doing. Therefore, disseminating information, providing trainings and working with youth within the communities are the main functions of this organization. The trainings focus on climate change adaptations and mitigation, such as growing gardens, river cleanings, tree plantings, or livestock production. Such trainings have urged some of the youth involved to pursue higher education, or to be change makers in their communities. The MI stakeholder representative recounted one young person who developed a technology for water harvesting in order to grow vegetables, another who is growing vegetables in an informal settlement, and others who are in agribusiness.

According to stakeholder representatives interviewed, young people are disproportionately heavily involved in the grassroots advocacy and community engagement stages, and not involved in a meaningful way in the policy and decision-making phase. A representative of Kenya's Green Africa Foundation (GAF) noted that this is not necessarily intentional, but this is "*the way the system has been*". The Kenya AYICC interviewee remarked that youth are usually involved as

representatives, but not actual contributors. This stakeholder explained how "*young people scare the status quo...they're too aggressive, they want things to move faster*". Recently there was a positive movement to get the government on board with having young people involved. As a 'marginalized' population, youth are still on the outskirts, as AYICC's representative described, fighting for opportunities "*to be included in policy formulation, analysis, [and] implementation*" because, according to the International Institute of Tropical Agriculture (IITA) stakeholder representative in Kenya, "*young minds are the best to get change going*".

Kenyan stakeholder representatives remarked on how youth utilize the mobile messaging service Whatsapp with each other, which has allowed the communication between young people to vastly improve. Extension services and advisories reach young farmers via online platforms, where youth can receive information, as well as engage in conversations with fellow farmers for support and ideas. This informal exchange, which occurs online in Kenya but to a much lesser extent in Tanzania and Uganda, represents the valuable insights that youth have, and that can influence policy decisions, if given the opportunity.

In conducting their own independent research, one Kenyan stakeholder representative was able to gauge the perceptions of young people, and concluded: "*Most of the stakeholders have the assumption that young people are a problem to solve*" and do not *"[consider] the real needs of the young people*", resulting in projects and policies that do not incorporate the viewpoint of youth. The viewpoint of Kenya's ACTS interviewee compounded this: "*The question is not if [the youth] are important—they are—but how do they contribute in meaningful ways*?" This respondent was not only cognizant of utilizing and supporting the youth, but acknowledged that there is a limited window of time in which to prepare youth "*for the way the world is changing*" and build their capacity for employment and access to credit. Overall, stakeholders perceive youth as energetic and valuable to the cause of climate change adaptation.

Stakeholder Perception of Youth Engagement in Climate Change Adaptations

The stakeholder representatives interviewed expressed that there is opportunity for the youth to be involved in decision making, but they are in need of guidance. A representative from Kenya's Mazingira Institute said that youth do not know what is

next after they experience agricultural setbacks due to climate change. This interviewee explained that "*As [the youth] go into planting and farming, they need to know what grows best...how the cash flows will be, if the rains are not coming them what's Plan B, where is the water coming from, what kind of fertilizer is needed…[what] will help you to maximize produce to make profits*" and that all of this is location specific. This is where the opportunities to offer agricultural programming and services occur.

Throughout the EA region, youth may be engaged in agriculture, but the changing weather patterns, lack of financing, land, and various agricultural inputs is discouraging. A stakeholder representative from Tanzania's YLF explained, "*People don't have the...inputs and infrastructure to make agriculture successful*". Therefore, youth who want to be involved in implementing climate change adaptations experience significant setbacks. A representative from TADB echoed this sentiment, further explaining the challenges that prevent youth from being successful in agriculture: "*Youth have no capital, they cannot work in large scale, but in groups they can develop basic plans*" and their "*literacy level is not that high*" which makes funding applications and business development difficult. Another challenge this stakeholder elaborated on was that "*Youth are not aware of banking services and finances*" and "*Youth do not have land*".

Lack of financial capital, agricultural inputs and land, as well as limited knowledge of business strategies and financial services present significant barriers to the involvement of young people in agriculture. Although the extent of these barriers differed according to CSV, these characteristics are ubiquitous in this research in the EA region. What is not lacking, though, are various educational programs and services on climate change adaptation measures, which have been implemented widely across the EA region. Trainings, forums, seminars, and workshops are made available to the public, including youth. In Uganda, the National Agriculture Research Organization (NARO) conducts trainings for the public, as well as those specific to youth, citing youth in agriculture as one of the "*most vulnerable [populations] in regards to climate change*". Another Ugandan organization, the National Agricultural Advisory Services (NAADS) supports farmers through planting and stocking

materials, farm machinery, as well as value addition equipment. Multiple young farmers and stakeholders labelled NARO and NAADS as supporting farmers in Uganda with extension officers, trainings, and sometimes inputs. The goal of the Young Farmers Champion Coalition Network Uganda (Yofchan) "is to work with and empower youth farmers, improve their livelihoods and jobs engaging youth in agriculture". Services include advocacy, employment, education, governance surrounding youth, and raising awareness through social media.

In response to these difficulties, the EA region is responding in support of young people. A stakeholder representative from Tanzania's YLF remarked, "*the government has started engaging youth*" thereby "*show[ing] young people are being prioritized*". For example, Tanzania included youth delegates in the COP21 delegation, which both policymakers and stakeholder representatives referenced as an opportunity for youth engagement.

With financial capital still a strict limitation, the respondent from Tanzania's TADB noted that once young people are able to garner funding, there are plenty of opportunities in agricultural production and processing throughout EA, such as poultry, beekeeping, dairy farming, beef, sunflowers, and maize. As mentioned above by the representative from the Mazingira Institute, young people are undertaking agribusiness ventures if they have the chance. Linking up opportunities for access to financial capital and agricultural training can assist youth, particularly in urban areas, to engage in agriculture as a business and invest in cash crops, as opposed to being limited to only subsistence farming.

Stakeholder Perception of Youth Programs and Funding Opportunities

Kenya, Tanzania, and Uganda allocate funding to various programs and trainings for climate change adaptation, but rarely provide funding to youth directly. All stakeholder representatives interviewed had knowledge of funding that was available, but complained of its inaccessibility. The governments of Uganda and Kenya have a specific fund available for which youth in agriculture (among other demographics) can apply, which includes stipulations, monitoring, and pay back policies. Therefore, direct funding is available in the form of government loans, but this is often inaccessible or unattainable. In both Uganda and Kenya, the nationally available

Youth Fund and Uwezo Fund respectively, require a small group to organize themselves (10–20 people) and create a business plan. Stakeholders acknowledge that simply these two components can make the application process daunting. However, even if youth succeed in doing this, their funding is not guaranteed, it is only awarded to a select few. Being a recipient of funding is rare, due to the volume of applicants, and the various demographics and business plans against which groups of youth are competing. Both Ugandan and Kenyan stakeholder representatives explained a lack of transparency in terms of how funding is awarded, who it is awarded to, and what the responsibilities of management and payback entail. One Ugandan interviewee discussed the lack of transparency, "*People paint rosy pictures how youth can make money and sell their goods, but in the end, the youth can struggle to sell their goods and in turn the youth are exploited*". A Yofchan stakeholder representative pointed out, "*The youth fund is not exclusive to agriculture and it's really hard for youth to pay back, coupled with being very political*". Lack of accessibility due to bureaucratic red tape, lack of transparency, and inability to achieve the requirements exemplifies how, "*Youth have the will, but lack skills; the government forgets youth are in the learning process and need capacity to grow*" according to a Ugandan respondent. A professor from Aga Khan University (AKU) in Kenya noted that despite being "*sufficiently educated*" on the effects of climate change and how to adapt, the youth are experiencing barriers in doing so, referencing lack of financial capital and agricultural inputs, and difficulty acquiring land, which is reflective of the EA region.

When prompted, Ugandan stakeholder representatives cited the NGO Yofchan as the only agricultural programming specific to youth, explaining that Yofchan encourages youth involvement in policymaking in order to increase advocacy for young farmers. Despite all the difficulties surrounding funding, only in Uganda was corruption particularly noted as a rampant issue.

In Tanzania, although youth lack necessary capital, none of the interviewees cited a specific fund through the government or avenue for youth to obtain funding, aside from obvious and non-specific international level funding from international organizations such as FAO. Although stakeholder organizations provide loans, the FRI representative noted, "*it is easier for youth to get a loan for a business than it is*

to get a loan for agriculture, because agriculture is so uncertain". It is believed that "*the microcredit institutions are kind of running away from giving agriculture loans, but the youth themselves are also not confident to take out a loan in case the crop isn't good, the yield isn't higher, there isn't rain or there are pests, but there are some programs that specifically give loans to farmers at planting seasons so they can buy the inputs they need, but many youth farmers won't take them...because it is too risky*" and for fear of being unable to pay back the loans. The risk concern is on both sides, as the stakeholder representative from Tanzania's YLF explained, "*It is really rare to get a donor fund*" because "*there is less trust of young people with money*". This respondent provided examples of funds that youth can apply for via the International Fund for Agricultural Development (IFAD) and Food and Agriculture Organization of the UN (FAO) which "*are not sufficient and not very accessible to youth*". According to the YLF representative, there are "t*oo many technicalities and forms required...the initial start-up is very hard*". The "*bias against youth*" was cited as one of the prohibitions to youth successfully accessing this fund due to the perception that young people are irresponsible and lack experience and knowledge in order to properly manage money or a successful business. The FRI interviewee aptly surmised, "*Everybody is talking about youth in agriculture, but let's step back and ask ourselves, have we laid a foundation for them to be successful? Have we created an enabling environment for the youth to do this? In my opinion as a Tanzanian, no, we have not*".

Stakeholders are working to provide a solution for this, especially since "*many young people don't have access to traditional banking systems*" according to Tanzania's FSDT representative. Therefore, FSDT is working to "*build an inclusive financial system in Tanzania to ensure the majority [of citizens] have access to financial services to improve their lives, and unleash the potential of young people, especially*". Similarly, TADB, whose business tagline is "The Farmer's Bank", stated that one of their primary objectives is to "*promote agricultural transactions for youth*" and "*engage youth in agribusiness throughout the value chain*". TADB would like for this to cater to unemployed youth in particular, but their services are available to all, as they "*have to work with everyone*". At the time of the interview, TADB was planning youth-specific projects in which "*youth can promote their own projects through a*

proposal process", but they do not have a strong youth establishment as of yet. An interviewee from TIRDO commented that they do not target youth specifically in their trainings, but it is predominantly "*almost exclusively youth*" who will approach them for advice troubleshooting an issue with agricultural practices.

In addition, representatives from the development banks FSDT and TADB asserted that the funding process will become increasingly easier for youth due to investments and improvements in 'digital finance'. This concept refers to the process of using mobile phones for banking, making banking more available and accessible to the general public. In addition, stakeholders would like to facilitate cross-industry partnerships, in an attempt to bridge the communication gap between youth and stakeholders to bring youth on board. For example, the TADB representative explained that they "*do outreach in conjunction with local government authorities in rural areas*" at district and ward levels. During this time, TADB staff travel to farmers and assist them in establishing working groups, since "*the youth have to register [apply for a loan] as a group, have a functioning management of that group, and all of the proper records and paperwork must be in order*" for youth to access financial opportunities. These records and paperwork include financial statements and proof that each member has undergone certain training and has a bank account. This group work is encouraged, as it will combat a previously cited issue of not being able to locate and keep track of rural farmers; forming youth groups makes this demographic more accessible for support, and by default enhances collaboration and information sharing amongst the youth as well.

Throughout the EA region, it is common for youth to be dependent on their parents for financial and land capital. Because of this, the TADB stakeholder representative argued, "*The government has to increase land ownership to youth groups [as] this would have the most impact on youth*". Government assistance for youth to obtain land would positively impact youth involvement in agriculture, as would government funding. Tanzania's government now "*has higher transparency and leadership*" and

is "*clear and accountable now*"[7], so it is assumed that the previous practices of the Tanzanian government would not have made financial and land assistance possible, but now young people should be able to benefit from this.

"*I think there's quite a lot of effort to support youth, tightly linked with employment and opportunity,"* remarked the Kenyan East African Institute interviewee, referring to the involvement of youth and agriculture with various organizations around the country. Specific examples include targeting youth agribusinesses and youth 'agripreneurs'. In addition, there are many young people involved at the grassroots level, with various advocacy and common interest groups. This organization specifically is "*actively in the business of engaging, speaking with, amplifying the voices of young people*". They organize public forums, conduct surveys, and put on events called "program encounters" and have candid conversations with pre-university youth from over 50 countries around the world. These conversations concerned political participation, voting habits, discussing various current events and getting different youth perspectives. While some events are public, these "program encounters" are comprised of youth who are self-selected, aspiring leaders. Each participant sends in an application to express their interest, and they must self-fund their experience. This organization in particular was involved in a variety of unique programs, in pursuit of unique ways to reach and engage youth.

The grassroots organization, AYICC, focuses on climate change innovation and providing funding for such innovative projects. It now has multiple chapters globally, and recently started an international, annual climate change conference, where "*young people come with ideas that they have towards climate change mitigation and adaptation in an African context*". This organization approaches this area of need with the angle of combating food insecurity and youth unemployment, and fostering sustainability.

The Mazingira Institute in Kenya prides itself on being directly involved with young people on an individual, extended basis. This might involve a phone call, a visit to a

[7] The respondent was referring to the election of President John Magufuli, who assumed office in November 2015, the year preceding the interview.

farm, training, networking with a government extension officer, and personal follow-ups. The interviewed stakeholder for this organization shared that this allowed for the understanding of the effectiveness of the efforts. His model also encourages youth to reach other youth, so he tells his participants to educate other youth on what they have learned. For this organization, since they work with the government, there is a selective application process but no one is purposefully excluded (criteria not disclosed). This organization seeks any young person, but admittedly tries to attract more women, and also assesses how youth are giving, or will be able to give, back to the community.

Another way the youth voice has been incorporated into climate change initiatives is when an independent researcher conducted qualitative research with youth via FGDs and individual interviews. This information will then be used by the researcher to advise larger organizations and policy. Some organizations employ youth, which ensures that the youth voice is involved directly, such as ACTS, GAF and USIU-Africa. Otherwise, workshops, trainings, forums, lectures, and seminars are the catchall tactics for reaching youth. Even if youth are not employed, IITA truly gives ownership to the youth and considers youth voice, by allowing them to make their own mistakes and decisions about the various projects they work on with IITA, since that is reflective of their responsibilities in reality. This is how IITA can truly say that the projects they provide are for the youth, and honour the youth role in decision making.

Programs that target youth may also aggregate based on a focus of climate change, agriculture, or policy. For example, ACTS specifically targets young entrepreneurs who are in the beginning stages of developing a sustainable agribusiness. This organization's goal is to support these young people by providing them trainings on developing business models. They do this through conferences, as well as innovative measures such as social media, podcasts, blog posts, an e-book, and training young people on how to effectively contribute to policymaking. In regards to policymaking, there is a gap between what is discussed at the grassroots level and at the policy level, so an organization such as the African Youth Initiative on Climate Change (AYICC) has assumed the responsibility of connecting this space. Through conferences and

dialogue that generate evidence, this organization synthesizes the youth voice and provides information and options to inform policymakers through policy briefs, documentaries, television interviews, and building strong relationships with government officials. The ACTS stakeholder representative explained, "*It is our mandate to conduct research and advise [the government officials], so we use that opportunity to make sure that...we support [the youth] to make substantive contributions*". This interviewee has high hopes of youth involvement and decision-making power, envisioning "*the ideal situation*" where youth are integral to the private sector, with "*substantive stakeholders*" with "*substantive contributions*". Similarly, AYICC works to connect the youth voice to policymakers by organizing youth-run events, with youth panels and youth dialogues, for the purpose of creating a unified voice that can be communicated with policymakers in regards to youth issues and policies. The AYICC stakeholder explained how these forums are an "*interactive approach…to understand everybody's school of thought and where they're coming from*". The majority of participants in this type of forum tend to be university students, simply because of the makeup and location of the organization, so it has been challenging to recruit youth from other areas, corroborating stakeholder and policymakers' statements that youth in urban versus rural areas are exposed to fundamentally different opportunities that maximize or minimize their decision-making power.

USIU-Africa takes a personalized educational approach through ongoing trainings, workshops, and mentorships with youth and "business counsellors". These business counsellors are graduates of the Global Agribusiness Management and Entrepreneurship (GAME) program, and this mentorship contributes to the sustainability of the program, the enhancement of knowledge of the graduates, and the passing on of information to new participants. To be a part of this, youth must apply with an innovative idea; the applications are scored, with the highest scorers being offered an opportunity to be a part of the program. Some are invited to interviews for a chance at a full scholarship, which will cover their GAME program tuition, accommodation, and meals (USIU-Africa 2015). For example, out of 300 applications, 220 actually attended the recruitment workshop. Of the 220 who attended, 60 were selected based on the best ideas; the top 30 females and the top 30

males. Out of the 60, only 39 attended the trainings. Of those 39, there were 20 who had implementable business plans; these 20 were provided with various forms of financial support to implement their business plans.

Similar to the Kenyan policymakers, the Kenyan stakeholders are well aware of the Uwezo fund, as well as other sources of funding available to youth, such as funding with Equity Bank, Mastercard, Price Waterhouse Coopers, and a Feed the Future initiative through USAID. Despite the availability, barriers exist, such as the bureaucratic paperwork of the application process itself. The Uwezo fund is available to women, youth and those with disabilities as a loan provision in support of their proposed business ventures. Kenya's President Kenyatta implemented the fund in 2014 in support of marginalized populations and growth of the economy (Uwezo 2016). The Uwezo fund was referred to as "*poorly designed*" by the ACTS interviewee and inaccessible by multiple other respondents, because of its request for a group of 10–15 youth and its ineffective bureaucracy. It is challenging to form such a large group with similar objectives, and even then, the money that is made from starting a business will have to be enough to pay back the loan, as well as for the business to make a profit, which is not feasible given time constraints and such limited funding. "*It's hardly anything*," said the IITA representative. Even still, this stakeholder referred to money that might be awarded unfairly, due to someone who knows someone, as opposed to the youth for whom it is intended. The ACTS representative pointed to the overarching issue that the loans are not designed to be "*transformative*" because the process inherently "*favours the very learned*" excluding anyone with the ideas and the passion simply because they cannot navigate the application process. Although a grant is a less risky path than a bank loan, the independent researcher interviewed explained that a grant application process might have a young individual or youth group competing against an established NGO; the youth might not have the support, time, experience, and knowledge for how to apply for this grant. Another barrier is the expectations that are tied to the funding, as multiple stakeholders explained that it is unrealistic to assume that a group of young people all have the same dream of being entrepreneurs (some simply just want employment), and will band together and be successful in their endeavours. This sheds light on the complications of forming a group, including time, energy, and

emotions, which all may not be worth it compared to the money that may or may not be received.

To combat this funding difficulty, some youth are pooling their own funds and lending each other money. The issue that will sometimes present itself is when an unexpected need arises for which these funds are prioritized, such as a health issue. The interviewee from the Mazingira Institute proposed that a way to alleviate this would be to provide "*cushioning*" of various social supports, so youth do not have to rely on their own funding for basic or emergency needs, whether it is a health concern or an unexpected crop failure. This stakeholder went on to explain how youth want to be involved in climate change adaptation, but they are limited financially. For example, being on a local council requires a registration fee, or volunteering to build a dam or plant trees is not feasible if they need to feed their family or pay school fees.

Another barrier might be that the youth are not necessarily making wise choices for what they want funding for, simply because they do not know, so they are lacking education on wise financial and business opportunities. The interviewed Aga Khan professor remarked, "*Sometimes we assume [the youth] just know, and they just ask for money...we need to be more respectful of the aspirations of the youth*" in terms of providing them "*value addition*". In this sense, the respondent from the East Africa Institute explained how this organization provides funding in the form of "*research that supports aspects of youth in agriculture and connecting various players in that space to support young people*". This is another way that funding is utilized to support capacity building for young people, but they do not receive the funding directly. This is similar to AYICC, which applies for grants, and allocates their funding to various conferences and sometimes to projects. USIU-Africa used to provide funding, as received from the Bill and Melinda Gates Foundation, to provide students full scholarships, but the caveat was that the GAME program was meant to create entrepreneurs, so the youth need to be trained on how to generate funds, instead of expecting 'freebies'. USIU-Africa's GAME program in turn started charging small fees for their training services, and their applicant pool became significantly smaller, since clients would be drawn to something else that did not cost anything. However,

the USIU-Africa stakeholder noted, "*The few who pay something small, they take it seriously...and they do quite well in the business*".

Considering that there are private, government, and non-profit funding opportunities, it is important to consider their accessibility. The Aga Khan professor called for accountability in terms of looking at the efficacy of the youth fund, and getting the youth involved in making this better, yet the barrier to this is that there either are not enough forums, or the youth voice is not being heard. This professor acknowledges that the solution, instead of trying to reach more youth and entice them into agriculture, as is the objective of many policymakers, should be to "*bring in [the youth] who are already working and help them move forward, and use them to mentor new farmers*". This is especially critical in terms of recognizing that not all youth are interested in agriculture, and therefore it is important to empower those who are already interested and invested. The professor explained further how to target and follow up with the young farmers: "*We will find those who are doing things, and assess their needs, and follow up. We will not do a cold call. We will find these farmers and have conversations with them about where are the bottlenecks, what's restraining them from moving forward and becoming more successful*". For example, according to this professor, youth become discouraged with the risks associated with agriculture. A way to financially support youth and alleviate this risk is to provide affordable crop insurance, which would support farming even in the face of climate change. Even if the funds are available, the independent researcher explained, "*given the numbers of young people and the money being provided, it is not sufficient*." The ACTS stakeholder remarked that the loans might be available, but credit is extremely expensive, and the interest rates are high.

The Mazingira Institute stakeholder representative explained that youth can be taken advantage of by "*power brokers*". These are people who will act like they want to partner with the youth, and in hopes of receiving money, the youth do not realize what they are giving up, and end up being scammed for money. This lack of education can be extremely destructive for individual youth, and it permeates on a grand scale as well. This interviewee noted that the youth advocacy culture in Africa is "*diluted*",

comparing how the youth in other countries stand up for their rights, but among the African youth there is no precedent for how to do this.

Analysis and Discussion

Using a political ecology framework, we compare and contrast our data on policymaker and stakeholder perceptions of youth engagement and experience in agriculture with that of youth reality. We understand political ecology as explained by Adger et al. (2001 p. 682) to be "the exploration of multi-level connections between global and local phenomena, not only in environmental functions but also in decision-making and hierarchies of power…". In this way, we are able to critically evaluate our collected responses within the context of existing power relationships inherent in our research.

Youth Farmer Analysis

Despite assertions made by national level policymakers and stakeholders, the youth interviewed did recognize the term "climate change" and gave concrete examples of how climate change is manifesting in their communities. Perhaps because as individuals who depend on agriculture and thus are highly attuned to the environment and changes within and to it, the youth interviewed used examples that directly impacted their agricultural practices and outputs. Most commonly, youth connected climate change with water availability, or the lack thereof, and identified specific things that have changed in their environment, such as soil structure and temperature. As one youth in Tanzania stated: "*climate change means drought*".

It is true that youth did not give a higher-level definition of "climate change", which usually connotes a global scale and includes phrases such as 'extreme weather events' and 'greenhouse gas emissions'. Most international organizations, scholars, and governments have also recognized that human activity is driving climate change, and include the anthropogenic nature of the phenomena in their official definitions. Although some youth participants cited population growth as prompting changes in the environment, it is unclear if the youth perceive climate change to be an

anthropogenic or natural occurrence. However, for their purposes of agricultural production, it seems that the genesis of these changes is less important than the outcomes and how those outcomes directly impact youth livelihood options. The youth interviewed thought of climate change as a deeply localized phenomenon, one that results in very specific ramifications to their lives, which for them, it is.

Furthermore, youth tie their experienced changes in the environment with tangible ways they have adapted their agricultural practices. Particularly citing lower yields than years past due to factors ranging from unpredictable rainfall variability to poor performance of local seed varieties, the youth cited 19 methods they connect as adaptations to their agricultural practices. One female participant in Hoima aptly summarized, "*we will keep adapting if we need to, whatever works, we will do!*".

To make these adaptations, the youth cited being taught how, rather than coming up with these ideas on their own. This knowledge most often was cited as coming from training and extension officers. In this way, youth are highly dependent on outside information and inputs to improve and adapt their agricultural practices.

Although some may argue that the methods presented are designed for intensification not adaptation measures, this would be misunderstanding the results of this research entirely. As the interviewed youth explained, their primary reason for practicing agriculture is production for household consumption. The FGD participants explained that in the past five to ten years they have experienced a decrease in this production which they attribute to climate change, because the changes in rain patterns have led to drought in some areas and excessive rainfall in others, negatively impacting the soil in both cases and leading to a decrease in yields. Then, young farmers adapt their agricultural practices to accommodate these changes in the environment, by planting earlier or later, installing irrigation, planting trees, etc. For youth, these changes they are making are imperative. However, this is not to say that youth do not desire to *also* intensify their production. The majority of youth interviewed cited a desire to generate cash and expand their subsistence farming into a commercial agricultural enterprise. For this purpose, participants cited many barriers. Primarily, in order to expand their agricultural practices beyond adaptation they would need more financial capital and assets, such as land and mechanized methods of production. Currently, the youth

included in this research practice their agriculture using hand tools and collaboration with neighbours and family members. In Tanzania and Uganda, the primary barrier was access, or lack thereof, to markets, both physical and economic. On these points, youth were quick to point out the lack of effort on behalf of the government in their support for agriculture.

Policymakers and Stakeholders Analysis

Throughout all three countries, the policymakers and stakeholders agreed that youth are the future of East Africa and steps need to be taken in order to help them mitigate and adapt to climate change. Youth are an important asset to the region, as they are the majority of the population. Kenyan and Ugandan policymakers and stakeholders spoke of youth funding offered by ministries within the government, where young individuals organize themselves and create a business plan in order to apply for loans. Such initiatives show that in Kenya "*the government and the president are directly concerned and keen to encourage the youth*" and the search for solutions is an acknowledgement that youth struggle to get involved or sustain themselves in agriculture, according to a MoALF interviewee policymaker. Tanzanian policymakers, on the other hand, were unable to name any specific sources of government funding specifically targeting youth, however, they did discuss funding available through NGOs working in Tanzania. Funding specifically targeted or earmarked for youth working in agriculture was cited by the majority of policy makers and stakeholders interviewed as unavailable, effectively creating a very competitive environment for youth seeking funding. In all three countries, policymakers and stakeholders explained that the government and/or NGOs are offering training and funding sources, however, the majority still agreed there are challenges in pursuing said funding. The young farmers and some stakeholders suggested that these challenges are much greater than the policymakers or government officials often report. Policymakers and stakeholders cited issues of youth lacking financial training, having poor spending habits, being careless and unable to keep track of and pay back loans of funds. Some policymakers and stakeholders mentioned a perception of youth having good ideas but being unable to connect their ideas with

sustainable business plans, or being generally irresponsible, in attempts to seemingly justify the lack of funding opportunities.

It is notable that in reference to 'youth', most policymakers were referring to educated, urban youth more so than young rural farmers, who are more vulnerable to the effects of climate change, and more limited in terms of funding and opportunities. Although in Kenya youth appeared to be more engaged with policymakers and stakeholder efforts compared with Tanzania and Uganda, this was oftentimes educated, urban youth. The researchers experienced this first hand while attending a stakeholder seminar in Nairobi entitled "Farmers of the Future? Re-Evaluating Young Farmers Needs and Perspectives of the Kenyan Agriculture Landscape." While the seminar had a variety of panellists and youth farmers in attendance, these were urban, educated youth, with access to smartphones, Internet, and social media. Therefore, the youth that the policymakers and stakeholders are more exposed to on a regular basis exhibit vastly different lifestyles and needs compared to the rural youth, whose voice and presence is not well represented amongst policymakers and stakeholders.

The youth FGD participants in Wote, Hoima, and Lushoto reported having access to training through extension officers, and that these are accessible and successful. The participants explained that the issue is not whether or not they understand how to adapt to climate change, but acquiring the agricultural inputs necessary to do so successfully. This may overlook not only the various ways in which youth understand the term 'climate change', but also fails to acknowledge the very real the barriers to climate change adaptations, by attributing youth's lack of capability to mean lack of understanding. This perpetuates the falsehood that young rural farmers do not understand climate change. In reality, the youth respondents made it clear that lack of access to agricultural inputs and funding are the barriers they are experiencing—these are not widely known/acknowledged by policymakers and stakeholders. The voice of the young rural farmer is heard passively or indirectly, if at all, at the national/regional level.

Despite this misdiagnosis of how to best address youth needs in the face of agricultural climate change adaptation, EA policymakers and stakeholders do agree on the importance of supporting youth in agriculture. This was acknowledged in

accordance with youth being the largest demographic of their population, the uncertain youth employment status, as well as this 'youth bulge' that will eventually need to take over the work of today's farmers. This focus on the future of agriculture fails to acknowledge the young farmers of today, such as our numerous respondents. The young farmers we spoke to all expressed the desire for continued training and need for access to agricultural inputs and funding to be assisted with their climate change adaptations.

Youth Decision Making Power

How the 'youth bulge' develops is critical to the economic development and political stability of EA. Climate change adaptation awareness and education, agricultural or otherwise, are prevalent in the region by governments and various organizations. They are open to youth, even if youth are not always particularly targeted, and provide information on climate change adaptation measures in farming practices. There is an overarching desire of policymakers and stakeholders to recruit and engage youth in agriculture. Therefore, it is necessary to understand the extent of the youth role in the decision-making process regarding agricultural climate change adaptations. In order to design effective climate change adaptation programs, it is critical to understand who is making decisions about agriculture, and what shapes those decisions.

Gender and Social Inclusion

There was not a unanimous response on what constitutes ultimate decision-making power due to differing perceptions between men and women in the farmer FGDs. The men FGD participants agreed that the male head of the household is the ultimate decision maker. A Ugandan participant in the men's FGD said, "*In the end, a man makes the decision*". This could mean that even if one feels empowered to make decisions at the household and community level based on merit of education or experience, characteristics that are deemed sufficient for a credible decision maker, these factors are still underpinned by gender in a way that a woman can *contribute* to decision making, but the initial consent and final decision *rests* with the man. This

was slightly different from the women's FGD participants, who said that a husband and wife consult each other and make decisions jointly. One of the Ugandan women FGD participants expressed, "*We are all equal, it doesn't matter*". It is unclear if one perception is more accurate than another, or since married couples were not interviewed, if the responses are two differing understandings of decision making.

It was mentioned that the woman acts as the sole decision maker if her husband is not present. Some of the women participants explained that they had decision making power in their household regarding certain agricultural practices, due to their expertise—the same could be said for the men as well, revealing that knowledge and experience are qualifying factors to be a decision maker. Examples of this division of agricultural labour was most obvious in Lushoto, Tanzania, where both women's and men's groups explained that typically men are responsible for cash crops while the women are responsible for, and thus have decision making power over, household gardens or subsistence farming close to the home, in which they grow the staple crops for direct consumption. However, in the Kenya women's FGD, one woman expressed interest in wanting to make agricultural decisions that could positively impact her livelihood, but explained she was not able to since she did not have decision making power. Other members of this FGD agreed. Ultimately, the EA men's and women's FGDs agreed that experience and education are crucial components of one's decision making power at the community level, even though men added that the men should still be making the decisions. In Uganda and Tanzania, age was also included as a factor, whereas Kenyan participants highly regarded land ownership and personal wealth.

Education

The extent that a primary or secondary school curriculum has assisted farmers in their adaptations and decision-making process for their farming is by way of a handful of transferable skills. This includes being literate for the purpose of discerning what fertilizer to use, doing simple math for the purpose of spacing crops, feeling confident communicating with others, or even learning agriculture or climate change as a subject in school. However, the mode of education that youth cited as most helpful

was in the form of training, educational services and informational seminars provided by their country's government or various stakeholders.

Since Wote, Hoima, and Lushoto are all designated CCAFS CSVs, they are beneficiaries of multiple workshops, seminars, and training specific to agricultural adaptations as a result of climate change. In addition, these areas have agricultural extension officers, whose job is to "form a link between research and farmers" and "communicate with farmers supporting decision making by providing information on sustainable farming practices" (Green Matter 2017 p. 1). Farmer FGDs were unanimous in expressing the importance of extension officers, citing them as the primary way they receive farming information. Aside from the aforementioned basic education and daily weather updates, extension officers are the predominant exposure that young farmers have regarding agricultural practices and adaptations. While it is clear that the youth are pleased with the training, perceive them to be sufficient, and have positive relationships with extension officers, this narrow support system equates to a high dependency on extension officers for training, inputs, and other outside influences in order to be successful in agriculture. Youth would further benefit from additional educational services and training from other sources, as well as more direct opportunities for information sharing. For example, in Lushoto and Hoima, respondents cited in-person visits to demonstration plots to be the most helpful source of information. Agricultural practices and adaptations, combined with learning about climate change itself, should be integrated into a mandatory course curriculum for primary and secondary schools, to ensure that the majority of EA youth will be exposed to this information, regardless of where they live, the extent of their schooling, or their involvement in agriculture.

Community Collaboration

According to the FGDs, the communities of Wote, Hoima, and Lushoto are supportive and inclusive of youth opinions and involvement. The youth farmers explained how they are involved in community events; some even have leadership status, and others come to them for advice, due to their extensive knowledge, experience, and success in agriculture. Such characteristics are highly evidenced by the training the youth attend.

FGD participants expressed the various criteria for a decision maker in their community to be associated with experience, land ownership, wealth, age and education. Notably, gender was not regarded as a critical quality when it came to being listened to at community events and having decision making power within communities on agricultural decisions. In fact, FGD participants expressed that the majority of community events were comprised of women, and because they were the ones who knew the most and had the most experience in agricultural adaptations, they make the informed decisions.

Urban vs. Rural Experiences and Realities

The FGDs revealed an extensive youth involvement in decision making at the household and community level, but expressed a limited role at the policymaker and stakeholder level. This may be due to the fact that the relationship between youth and policymaker is minimal in the rural areas of Wote, Hoima, Lushoto, and much more likely in urban areas, common to policymakers and stakeholder organizations. This is corroborated by the interviews with policymakers and stakeholders, who reported that the majority of their interactions with youth is urban youth. This type of interaction is more so determined by proximity, rather than preference or exclusivity. In urban areas, such as Nairobi, Kampala, and Dar es Salaam, communication is quick, easy, multimodal, and ubiquitous. Youth have a much easier time accessing policymaker and stakeholder events and information and typically have the educational and financial credibility necessary to be involved in a variety of ways. In urban areas, youth are presented with more opportunities and have the resources necessary to pursue them. Therefore, urban youth are more involved in the decision-making process at the policymaker and stakeholder level compared to their rural counterparts.

Even though youth are involved with policymakers and stakeholders, this involvement is limited and indirect, in the sense that youth are invited and included as part of a much larger group to represent a youth voice, but are not directly involved in decision making. For example, youth may attend meetings and seminars and workshops, and interact with stakeholder organizations, but they wish to speak and work with policymakers for a youth voice on agricultural climate change adaptations. In Kenya,

there are already policies and groups in place to encourage direct youth involvement. Even though Uganda and Tanzania do not have this, the majority of EA policymakers and stakeholders interviewed (90%)[8] expressed a positive perception of youth, and an active interest in involving youth on a more direct level.

[8] See Table 3 for numerical breakdown of policymaker/stakeholder perceptions of youth.

Conclusion/Recommendations

Our findings indicate that the primary barrier for youth implementation of adaptation measures is the limited accessibility of agricultural inputs such as land, water, financial capital, and markets. The barrier is not knowledge-based, as young farmers are already actively adapting to changes in their environment largely due to the training and education they have received in regards to how to adapt to their changing environment. Rural youth involved in agriculture understand climate change on a personal, practical level and are able to match their experiences with the changing weather patterns or environmental conditions on a daily or seasonal basis. These are then met with specific changes youth farmers have had to implement in order to continue to produce adequate yields.

Policymakers incorrectly assume youth's ignorance to climate change as the reason for their difficulty in successful adaptation measures, and therefore do not address the root issues to youth engagement in agriculture. The reality is that in order to adequately adapt, young farmers require agricultural inputs to which they currently do not have sustainable or predictable access. Policymakers' lack of understanding about what youth farmers truly need is perpetuating a system in which young rural farmers have a high reliance on external factors such as NGO program participation, government subsidy availability, funding access, etc. that determines the success of their livelihood from one season to another.

Youth, due to their knowledge and understanding of climate change and learned adaptive techniques, do have direct decision-making power at the household and community level, in which they directly engage in discussions that result in a tangible planned outcome and course of action. The investments in youth-targeted training and agricultural educational initiatives are working, and they must continue at local levels. However, youth have very limited direct engagement at the national and regional levels, which is a gap that needs to be addressed as East Africa works to develop long-term sustainable agricultural practices to climate change in the context of development.

References

Adger WN, Benjaminsen TA, Brown K, Svarstad H. 2001. Advancing a Political Ecology of Global Environmental Discourses. *Development and Change* 32(4):681-715. http://dx.doi.org/10.1111/1467-7660.00222

Challinor A, Wheeler T, Garforth C, Craufurd P, Kassam A. 2007. Assessing the vulnerability of food crop systems in Africa to climate change. *Climatic Change* 83(3)381-399. http://dx.doi.org/10.1007/s10584-007-9249-0

Devas N, Grant U. 2003. Local government decision-making – citizen participation and local accountability: some evidence from Kenya and Uganda. *Public Administration and Development* 23(4):307-316. http://dx.doi.org/10.1002/pad.281

Dyer KW. 2013. Young people and agri-food: aspirations, opportunities, and challenges. Future Agricultures CAADP Policy Brief 09. Brighton, UK: Future Agricultures Consortium. Retrieved from http://www.future-agricultures.org/policy-engagement/policy-briefs/1748-young-people-and-agri-food-aspirations-opportunities-and-challenges/file.

Förch W, Sijmons K, Mutie I, Kiplimo J, Cramer L, Kristjanson P, Thornton P, Radeny M, Moussa A, Bhatta G. 2013. Core Sites in the CCAFS Regions: East Africa, West Africa and South Asia, Version 3. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Green Matter. n.d. Agricultural Extension Officer. Retrieved from http://awsassets.wwf.org.za/downloads/agricultural_ext_officer.pdf

Commonwealth Secretariat. 2016. Global Youth Development Index and Report. London, UK: Commonwealth Secretariat. Retrieved from http://cmydiprod.uksouth.cloudapp.azure.com/sites/default/files/2016-10/2016%20Global%20Youth%20Development%20Index%20and%20Report.pdf.

Goldstein M, Westman M, Torkelsson A. 2015. Costing the Gender Gap. Gender Innovation Lab Policy Brief no. 13. World Bank, Washington, DC. Retrieved from http://hdl.handle.net/10986/25452

Hartley S. 2014. Collective Learning in Youth-Focused Co-Operatives in Lesotho And Uganda. *Journal of International Development* 26(5):713-730. http://dx.doi.org/10.1002/jid.3000

Hope KR. 2009. Climate change and poverty in Africa. *International Journal of Sustainable Development & World Ecology* 16(6):451-461. http://dx.doi.org/10.1080/13504500903354424

Hope KR. 2012. Engaging the youth in Kenya: empowerment, education, and employment. *International Journal of Adolescence and Youth* 17(4):221-236. http://dx.doi.org/10.1080/02673843.2012.657657

Human Rights Watch. 2013. Uganda: Free Pass on High-Level Corruption: Large-Scale Graft Deprives Ugandans of Basic Rights. Retrieved June 28, 2017, from https://www.hrw.org/news/2013/10/21/uganda-free-pass-high-level-corruption

Leavy J, Smith S. 2010. Future farmers: youth aspirations, expectations, and life choices. Future Agricultures Discussion Paper No. 13. Brighton, UK: Future Agricultures Consortium. http://www.future-agricultures.org/publications/research-and-analysis/discussion-papers/1067-future-farmers-youth-aspirations-expectations-and-life-choices/file

Lobell D, Field C. 2007. Global scale climate-crop yield relationships and the impacts of recent warming. *Environmental Research Letters* 2(1):014002. http://dx.doi.org/10.1088/1748-9326/2/1/014002

Lodin JB, Paulson S, Mugenyi MS. 2012. New seeds, gender norms and labor dynamics in Hoima District, Uganda. *Journal of Eastern African Studies* 6(3):405-422.

Moore N, Alagarswamy G, Pijanowski B, Thornton P, Olson J, Lofgren B, Andersen J, Campbell D. 2009. Food production risks associated with land use change and climate change in East Africa. In IOP Conference Series: Earth and Environmental *Science* 6(34):342003. http://dx.doi.org/10.1088/1755-1307/6/34/342003

Mwakalila S. 2006. Socio-economic impacts of irrigated agriculture in Mbarali District of south–west Tanzania. *Physics and Chemistry of the Earth*, Parts A/B/C 31(15-16):876-884. https://doi.org/10.1016/j.pce.2006.08.021

Pandve HT, Deshmukh PR, Pandve RT, Patil NR. 2009. Role of youth in combating climate change. *Indian Journal of Occupational and Environmental Medicine* 13(2):105. https://doi.org/10.4103/0019-5278.55130

Schlenker W, Lobell D. 2010. Robust negative impacts of climate change on African agriculture. *Environmental Research Letters* 5(1):014010. https://doi.org/10.1088/1748-9326/5/1/014010

Swarts MB, Aliber M. 2013. The 'youth and agriculture' problem: implications for rangeland development. *African Journal of Range & Forage Science* 30(1-2):23-27. http://dx.doi.org/10.2989/10220119.2013.778902

te Lintelo D. 2011. Youth and policy processes. Future Agricultures Working Paper No. 25. Brighton, UK: Future Agricultures Consortium. http://www.future-agricultures.org/publications/research-and-analysis/working-papers/1447-youth-and-policy-processes/file

The Republic of Uganda. 2001. The National Youth Policy: A Vision for Youth in the 21st Century. Kampala, Uganda: Ministry of Gender, Labour and Social Development. http://www.youthpolicy.org/national/Uganda_2001_National_Youth_Policy.pdf

Thornton PK, Jones PG, Alagarswamy G, Andresen J, Herrero M. 2010. Adapting to climate change: agricultural system and household impacts in East Africa. Agricultural systems 103(2):73-82. https://doi.org/10.1016/j.agsy.2009.09.003

Transparency International. 2012. Uganda tops East Africa in corruption. Retrieved June 28, 2017, from https://www.transparency.org/news/pressrelease/uganda_tops_east_africa_in_corruption

USIU-Africa. 2015. About USIU-Africa GAME Center. Retrieved June 27, 2017, from http://www.usiu.ac.ke/agribusiness/

Uwezo Fund. 2017. Uwezo Fund. http://www.uwezo.go.ke/

Wellard-Dyer K. 2013. Young people and agri-food: aspirations, opportunities, and challenges. Future Agricultures Policy Brief 09. http://www.future-agricultures.org/policy-engagement/policy-briefs/1748-young-people-and-agri-food-aspirations-opportunities-and-challenges/file

Youthpolicy.org. 2014a. Kenya: Factsheets. http://www.youthpolicy.org/factsheets/country/kenya/

Youthpolicy.org. 2014b. Tanzania: Factsheets. http://www.youthpolicy.org/factsheets/country/tanzania/

Youthpolicy.org. 2014c. Uganda: Factsheets. http://www.youthpolicy.org/factsheets/country/uganda/

RESEARCH PROGRAM ON
Climate Change, Agriculture and Food Security

CGIAR

CCAFS

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic initiative of CGIAR and Future Earth, led by the International Center for Tropical Agriculture (CIAT). CCAFS is the world's most comprehensive global research program to examine and address the critical interactions between climate change, agriculture and food security.

For more information, visit www.ccafs.cgiar.org

Titles in this Working Paper series aim to disseminate interim climate change, agriculture and food security research and practices and stimulate feedback from the scientific community.

CCAFS is led by: CIAT

Strategic partner: futureearth research for global sustainability

Research supported by:

CGIAR Fund · Australian Government Australian Centre for International Agricultural Research · Irish Aid · Ministry of Foreign Affairs of the Netherlands · New Zealand Ministry of Foreign Affairs & Trade · Swiss Agency for Development and Cooperation SDC · UKaid · USAID From the American People · IFAD