



Strengthening Climate Resilience through Integration of Climate Change, Women and Youth Issues in Uganda's Agriculture Sector

Analysis of Agriculture Related Policies and Programmes



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It is highly anticipated that the findings contained in this report will provide key insights upon which policy makers and other stakeholders will build a gender sensitive climate smart agriculture while at the same time reducing the vulnerability of women, youth and refugees to the adverse impact of climate change in Uganda.

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List of Acronymns

ACCRA	Africa Climate Change Resilience Alliance
ACODE	Advocates Coalition for Environment and Development
ASSP	Agriculture Sector Strategic Plan
AU	African Union
CAADP	Comprehensive Africa Agricultural Development Programme
CGIAR	Consultative Group on International Agricultural Research
CREEC	Centre for Research in Energy and Energy Conservation
CSA	Climate Smart Agriculture
DANIDA	Danish International Development Agency
ENRP	Enhancing National Food Security through increased Rice Production Project
FAO	Food and Agriculture Organization
FFS	Farmer Field Schools
FOWODE	Forum for Women in Democracy
GBV	Gender Based Violence
GDP	Gross Domestic Product
GEF	Global Environment Facility
GGDS	Green Growth Development Strategy
GoU	Government of Uganda
IFPRI	International Food Policy Research Institute
IGAD	Inter Government Authority on Development
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MoFPED	Ministry of Finance, Planning and Economic Development
MoGLSD	Ministry of Gender, Labour and Social Development
MWE	Ministry of Water and Environment
NAADS	National Agricultural Advisory Services

NAEP	National Agriculture Extension Policy
NAP	National Adaptation Plan
NAPA	National Adaptation Programmes of Action
NCCP	National Climate Change Policy
NDC	Nationally Determined Contributions
NDP	National Development Plan
NPA	National Planning Authority
OPM	Office of the Prime Minister
OWC	Operation Wealth Creation
PFA	Prosperity for All
RPLRP	Regional Pastoral Livelihoods Resilience Project
SGBV	Sexual Gender Based Violence
SLM	Sustainable Land Management
UBOS	Uganda Bureau of Statistics
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UNMA	Uganda National Meteorological Authority
USAID	United States Agency for International Development
YLP	Youth Livelihood Programme

Executive Summary

Uganda's agriculture sector is highly vulnerable to climate change because it is largely rain-fed and dominated by smallholder farmers with inadequate adaptive capacity. Equally vulnerable are marginalized groups; more especially the women, youth, refugees and host communities that depend on subsistence farming for the livelihoods. There is therefore strong need to reduce vulnerabilities by incorporating climate change in agricultural policy and practice while at the same time building the resilience of women and youth. Also important is effective implementation of the climate smart agricultural policies and programmes to build resilient agricultural systems.

ACODE conducted a study that involved a desk review of Uganda's agricultural policies and programmes as well as key informant interviews and focus group discussions in the following districts: Arua, Kyegegwa and Kyenjojo. This was to assess the extent to which agricultural policy and practice have mainstreamed climate change and were sensitive to gender in addressing women and youth climate resilience.

This report provides insights into building a gender sensitive climate smart agriculture while reducing the vulnerability of women, youth and refugees to the adversity impacted by climate change. It shows that successful mainstreaming of climate change in the agricultural sector and implementation of gender sensitive climate resilient agricultural policies, programmes and practices require strong and reliable climate information services and early warning systems, enhanced technical and institutional capacities, enabling legal framework, and strong monitoring and reporting mechanisms. A strong commitment to innovative climate financing and increasing budget allocation for climate change to the sectors especially Local Governments (LGs) is also essential.

The study shows that Uganda's national development policy, the Vision 2040 and Second National Development Plan (NDP II), provide a firm foundation for climate change mainstreaming and implementation because they are highly climate change sensitive. The climate change policy framework adequately provides for mainstream climate in policies, plans, programmes and budgets at national and local levels. The Ministry of Agriculture, Animal Industry and Fisheries (MAAF) has also developed climate change smart policies and programmes, including the agriculture sector National Adaptation Plan (NAP) and the Climate Smart Agriculture (CSA) programme geared at building a climate change resilient agriculture sector. But still a number of sector policies and programmes are not adequately climate smart such as the National Agricultural policy, the Agricultural Extension policy, the Land policy, Coffee policy, and the Operation Wealth Creation Programme. In addition, the LGs have not yet adequately mainstreamed climate change in District Development Plans (DDPs). Climate change is also yet to be mainstreamed

in the sector and LG budgets. One of the key barriers to this process is the lack of a legal framework that compels sectors and LGs to mainstream and implement climate change.

More effective implementation of climate resilient policies and programmes is needed for communities and farmers are still vulnerable. The lack of reliable climate information services and early warning systems, gender segregated data to inform adaptation planning, climate smart agricultural extensions and advisory services hinder the adoption of gender sensitive climate resilient agricultural practices. Inadequate technical and institutional capacity specially to guide climate change implementation is also a major challenge. Other limitations include; the insufficient budgetary allocations to agriculture, environment and climate change sectors; failure to mainstream climate change in budgets (constrained by lack of climate change budget lines and indicators in the PBS) and lack of technical and institutional capacity to develop bankable projects which hinder MDAs and LGs from accessing non-government climate financing sources (donors, and international climate change financing institutions e.g. Green Climate Fund and Adaptation Fund). The sector is also hampered by the lack of plausible agricultural insurance schemes.

Climate proofing agricultural policies and programmes and making them gender and youth sensitive can help to address policy gaps. Putting in place a climate change law is necessary to compel sectors and LGs to mainstream and implement climate change. Enhancing technical and institutional capacity of the sector and LGs through raising climate change awareness, trainings of technical staff in climate change, climate proofing agricultural extension services, employment of climate change officers, and putting in place climate change committees could also enhance coordination and implementation of climate change.

Addressing climate financing constraints in the sectors and LGs is also an urgent necessity. This could be achieved by increasing the budget allocation for environment and climate change and Climate Change Budget Tagging (CCBT) i.e. including climate change budget lines/codes and climate change indicators in the Performance Based Budgeting System (PBS). However, the limited budget allocations and budget ceiling provided by the Ministry of Finance, Planning and Economic Development to sectors and LGs will not make it possible to achieve meaningful climate change mainstreaming and implementation. It is thus time for government to rethink its position on setting up a separate Climate Change Fund. The Fund could allow a flexible climate change financing model where the government, donors and other partners put financial resources into it. The funds would then be accessed by MDAs, LGs, academia and researchers, NGOs and private sectors on a competitive basis to implement feasible climate change projects. Other countries in the East African region (Ethiopia, Kenya and Rwanda) are already implementing Climate Finance Funds and Uganda could learn useful lessons

from them.

With Uganda hosting more than one million refugees that are already putting pressure on natural resources and ecosystems (land, water, wetlands, and forests), the effects of climate change could even worsen existing vulnerabilities – environmental degradation, water and wood fuel shortage, food insecurity, poverty and conflicts. It is crucial that the country modifies its refugee response frameworks with a view to integrating climate change. Detailed vulnerability assessments of all refugee settlements are necessary to inform inclusive, climate smart and environmentally sustainable refugee response. Climate change related risks and disasters on the rise could also drive migration and displacements in Uganda and neighboring countries. That could heighten the already existing conflicts between refugees and host communities over natural resources leading to human insecurity. Thus, a deeper study to deepen understanding of the nexus between climate change, migration, refugees and conflicts is essential as it will also inform future adaptation planning and disaster risk management.

1. INTRODUCTION

1.1 Contextual Background

Agriculture remains the most important sector in Uganda; making up 23.6% of the country's Gross Domestic Product (UBOS 2016), 85% of export earnings, 68% of total employment, providing almost all the country's food requirements (UBOS, 2014a), and all material resources for agro-based industries. However, climate variability has been a threat to agriculture in Uganda for decades and with climate change, the country's vulnerability is increasing. Uganda's development, and agriculture in particular, is most vulnerable to the impacts of climate change - extreme temperatures and rainfall, frequent droughts, prolonged dry spells, seasonal variations in rainfall patterns, flooding and landslides (USAID, 2013; GoU, 2014; Ministry of Finance, Planning and Economic Development – MoFPED, 2018) adversely affect agricultural production and food security and increasing incidences of pests and disease epidemics in livestock and crops.

The pivotal role played by the agriculture sector in Uganda's economy makes the Government of Uganda (GoU) put much emphasis on fostering agriculture development in both policy and practice. Uganda is a signatory to the Maputo Declaration on Agriculture and Food Security (African Union, 2013), which advocates for 'commitment to the allocation of at least 10% of the national budgetary resources to the agricultural sector'. This signifies the importance Uganda puts on agricultural development and enhancing food security. Uganda is also a signatory to the Comprehensive Africa Agriculture Development Program (CAADP) which advocates for agriculture-led growth and the pursuit of 'a 6% average annual growth rate for the agriculture sector.

Uganda's development agenda contained in the Uganda Vision 2040 and Second National Development Plan (NDP II) for the period 2015/16-2019/20 prioritize agricultural development as the vehicle for the country's socio-economic transformation, poverty eradication, and attainment of a middle-income country status. Uganda has put in place a comprehensive agricultural policy to address challenges facing the agricultural sector (Ministry of Agriculture, Animal Industry and Fisheries - MAAIF, 2013).

Women play a significant role in Uganda's agriculture providing over 70% of the agricultural labour force (MAAIF, 2016a) and therefore, empowering women is crucial to enhancing agricultural production and food security in the country. Investing in sustainable agriculture systems is recognized as a great potential for fostering sustainable development, yielding women empowerment and cohesive rural societies, and balanced urban-rural dynamics (Ministry of Agriculture, Animal Industry and Fisheries - MAAIF, 2018a) and enhancing gender equality and women empowerment (Nelson & Huyer, 2016).

Uganda's climate is changing and is constraining agricultural development and poverty reduction agendas. For example, between 1900 and 2009, Uganda's average annual temperature was reported to have increased by between 0.8°C - 1.5°C and climate change projections suggest that Uganda will be hotter with temperatures likely to increase by 1.5°C to 4°C in the next 50 to 80 years (Ministry of Water and Environment, 2015). The country's vulnerability to climate change is high due to its high dependence on rain-fed subsistence agriculture and natural resources, the high poverty levels and inadequate adaptation capacity (Trocaire 2012; USAID, 2013; Government of Uganda, 2014; Twinomuhangi et al., 2015; World Bank Group 2015; CIAT-BFS/USAID 2017). Aware that agriculture has potentially a big multiplier effect, it can affect efforts directed towards strengthening the resilience of local communities especially the women and youths.

Building climate resilient agricultural systems requires coherent policies and programmes as well as institutional support to implement the policies (FAO 2010; Cobb et al., 2015). Uganda has put in place an elaborate climate change policy that prioritizes climate smart agriculture. However, a climate resilient agriculture is far from being achieved and vulnerabilities are said to be increasing. Whereas the National Climate Change Policy (NCCP) prioritizes mainstreaming climate change in sectoral and local policies, plans, and programmes; it is not clear whether this has been done in the agriculture sector and if so, to what extent. The policy also requires that special measures be undertaken to build the resilience of the most vulnerable groups including: the women, youth, refugees and the elderly. The extent to which this has been achieved, and more especially in the agriculture sector, remains largely unknown or at best contentious. All in all, it is crucial that the agriculture sector related policies, plans and programmes are climate proofed to address the current and future climate change risks to the sector. Since women and youth form the biggest proportion of the populace and those engaged in and/or depending on agriculture, climate proofed policies, plans and programmes need also to address the high vulnerabilities of women and youth to the impacts of climate change.

The Advocates Coalition for Development and Environment (ACODE) conducted a study to establish the extent to which agricultural policies, plans, strategies, and programmes mainstream climate change; are youth and gender-sensitive; address peculiar climate resilience issues affecting women and youth; and the challenges, if any, that could be affecting effective mainstreaming of climate change, women and youth in the agriculture sector. The findings of the study will be used to support MAAIF's efforts to mainstream climate change and gender in its policies, strategies, and programmes and in making Uganda's agricultural policies, strategies and programmes more women and youth sensitive.

The study is part of ACODE's initiative on, *“Enhancing Resilience in Vulnerable Communities and Inclusion of Women and Youth in the Governance of Uganda's Natural*

Assets” that is supported by CARE International Uganda’s Programme on “*Strengthening Resilience and Promoting Inclusive Governance for Women and Youth in vulnerable Communities (STRENPO)*” that is funded by DANIDA through CARE Denmark.

1.2 Objectives of the study

The overall objective of the study was to analyze existing agricultural policies, plans, strategies and selected programmes and their implementation to establish the extent to which they:

- i. Have mainstreamed climate change;
- ii. Are youth and gender sensitive in addressing peculiar climate resilience issues affecting women and youth.

Specifically, the study sought to establish the challenges, if any, that could be affecting effective mainstreaming of climate change, women and youth in the agriculture sector with a view to proposing recommendations that can ensure effective mainstreaming of climate change on one hand, and making agricultural policies, plans, strategies and programmes more gender and youth sensitive in both policy and programme design and implementation.

1.3 Methodology and key concepts

1.3.1 Scope of the study

The study was commissioned by ACODE to meet one of the outputs of the initiative on the STENPO programme being implemented in Arua, Kyegegwa and Kyenjojo districts; focusing on increasing the resilience women and youth in vulnerable, natural resource dependent communities (including refugee settlements) to shocks and stresses from natural resources degradation, climate change, and conflict and displacement. As a result, the study approach and sample selection were tailored to meet the project interventions.

In line with the Terms of Reference (TORs), the study scope covers a review of existing agricultural policies, plans, strategies and selected programmes and their implementation to establish: (i) the extent to which climate change has been mainstreamed; (ii) whether or not climate resilience issues affecting women and youth have been addressed (iii) the challenges, if any, that could be affecting effective mainstreaming of climate change, women and youth in the agriculture sector and; iv) propose recommendations that can ensure effective mainstreaming of climate change on one hand, and making agricultural policies, plans, strategies and programmes more gender and youth sensitive in both policy & programme design and implementation.

1.3.2 Study Approach

The study was largely descriptive and qualitative and employed different techniques/methods including: secondary sources as well as interviews with 90 respondents (37 key informants and 53 Focus Group Discussions participants) selected as described in section 1.3.2.3. Data was also collected through transect walks and observation. The design was considered appropriate because of its comprehensiveness and suitability for analysing policy and practice as well as triangulation to improve the validity of the results.

1.3.2.1 Document review analysis

The first stage involved a Document Review Analysis (DRA) of agriculture-related policies, plans, strategies and programmes/projects to understand how they have mainstreamed climate change issues / are aligned to Uganda's climate change policy. In addition, it involved analysing the way the policies address/mainstream the peculiar climate change concerns affecting the women and youth. In the DRA, emphasis was placed on the meaning and implications of text within the document, rather than simply the presence of keywords. DRA was used to understand the extent to which agricultural related policy documents align with the concept of climate change development. The process involves subjective scoring and we ensured consistency by following explicit steps aimed at providing in-depth analysis. These included: (i) setting criteria for the selection of documents; (ii) collecting documents; (iii) articulating main areas of analysis; (iv) coding the documents; (v) verifying preliminary results, and (vi) analyzing the findings. The building blocks for the analysis were informed by Uganda's National Climate Change Policy, and specifically for this study, the main concerns addressed were: (i) addressing adaptation; (ii) mitigation with adaptation co-benefits; (iii) fostering development and poverty reduction; (iv) addressing the resilience of most vulnerable groups – the women, youth, and refugees.

The main policies, strategies, plans and programmes reviewed included:

- Uganda's overarching development policy framework: the Uganda Vision 2040 and the Second National Development Plan (NDPII) 2015/16 – 2019/20;
- Uganda's climate change policy framework: National Adaptation Programmes of Action (NAPA), National Climate Change Policy (NCCP), Nationally Determined Contributions (NDC), Draft Climate Change Law, and the Uganda Green Growth Development Strategy (GGDS) 2017/18/ - 2030/31.
- Uganda's agricultural policy framework: National Agricultural Policy 2013, Agriculture Sector Strategic Plan (ASSP) 2015/16 -2019/20, National Agricultural Research Act, National Agricultural Extension Policy 2013, National Strategy for Youth Employment in Agriculture, as well as agriculture sector specific climate change policies like the Climate Smart Agriculture (CSA) Programme; the National

Adaptation Plan (NAP) for Agriculture Sector and Guidelines for mainstreaming climate change in the agricultural sector.

- Main agricultural programmes including Operation Wealth Creation Programme, National Agricultural Advisory Services (NAADS), Fostering Food Security Programme, and the Uganda Green Incubation Programme, Youth Livelihood Programme, among others.

The review also focused on evidence-based information from study reports, journal articles and publications pertaining to climate change adaptation within the agricultural sector in vulnerable communities in Uganda.

1.3.2.2 Score card method

A quantitative assessment of the extent to which agricultural policies, plans and programmes mainstream climate change, are gender and youth sensitive addressing the peculiar women and youth climate change resilience concerns was conducted using a score card method whose methodology is illustrated in Table 1. In line with the objectives of the study, agricultural policies and programmes were scored on three main areas:

- Climate change mainstreaming:** The criteria/factors considered were whether agricultural policies and programmes mention the current and future impacts of climate change, incorporation of climate change in policy/programme goals and objectives, and in the interventions/strategies, outputs/outcomes, and in the monitoring and evaluation framework. Also considered was whether or not the policies can lead to triple wins i.e. adaptation, mitigation and development.
- Gender sensitivity, specifically addressing women climate change resilience:** The criteria/factors considered were whether the agricultural policies and programmes highlight gender and women empowerment challenges, as well as women specific climate change challenges, incorporation of gender/women resilience in the policy/programme goals and objectives, in the interventions/strategies, outputs/outcomes, and in the monitoring and evaluation frameworks.
- Youth climate change resilience:** The criteria/factors considered in the assessment were whether or not the policies and programmes highlight the youth empowerment and climate change vulnerabilities, incorporation of youth resilience in the policy/programme goals and objectives, in interventions/strategies, outputs/outcomes, and in the monitoring and evaluation frameworks.

The scoring description and justification are presented in Table 1.

Table 1: Score card for assessing agricultural policies and programmes mainstreaming/alignment to climate change, and women and youth climate resilience concerns

Area of assessment	Factor/Criteria	Description of alignment to climate change/justification	Scoring on a 5-point scale (0-4)
Mainstreaming climate change	Do the goals, objectives and guiding principles of a policy, plan, strategy or programme mainstream climate change?	Policy goals and objectives incorporate or do not incorporate climate change/ environmental resilience i.e. reducing climate change vulnerabilities, increasing climate change resilience, climate smart agriculture, adaptation, mitigation, green economy etc.	0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned
	Do the policies and programmes highlight the current and future climate change impacts/challenges?	A highly climate sensitive policy should mention the current and future climate change shocks and stresses/challenges that need to be addressed to increase resilience.	0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned
	Do the policies/ programmes have climate change specific interventions/ activities/outputs/ outcomes?	The policy should have specific interventions focusing on building climate change resilience	0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned
	Can the policy lead to achievement of the triple wins: adaptation, mitigation (with adaptation co-benefits) and increased development?	A highly climate sensitive policy strongly supports the achievement of triple wins: change resilience (adaptation), mitigation (low carbon emissions with adaptation co-benefits) and increased development (improved welfare/livelihoods and poverty reduction).	0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned
	Does the monitoring, reporting and evaluation framework incorporate climate change indicators and targets?	A highly aligned policy has climate change indicators to measure and report on progress/success in implementation of climate change interventions and increasing resilience	0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned

Gender sensitivity, and/or addressing women climate resilience	Do the policy/ programme objectives incorporate gender/ women issues?	<p>The policy goals and objectives mention gender equality and women empowerment in a changing climate.</p> <p>A highly gender mainstreamed policy should mention addressing gender inequalities and the climate change vulnerabilities of women</p>	<p>0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned</p>
	Does the policy/ programme highlight the specific climate challenges faced by women?	A highly aligned policy should specifically mention the effects of climate change on women engagement in agriculture and constraints to building their resilience	<p>0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned</p>
	Does the policy/ programme incorporate gender/ women specific interventions/ activities/ outputs/ outcomes?	A policy that incorporates specific interventions that increase women empowerment, access to farm inputs and advice, access to information, access resources (land and finance) to address climate change is highly gender sensitive.	<p>0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned</p>
	Does the monitoring, reporting and evaluation incorporate gender specific indicators and targets?	A highly aligned policy has gender specific indicators and targets that be used to collect gender segregated data for measuring progress/ success on women resilience to climate change	<p>0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned</p>
Youth climate change resilience	Do the goals / objectives of the policy/programme incorporate youth resilience?	<p>The policy goals and objectives mention youth resilience i.e. youth empowerment or youth vulnerability reduction</p> <p>A highly mainstreamed youth policy should aim at reducing the vulnerabilities or increasing the resilience of youth to the impacts of climate change</p>	<p>0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned</p>

	Does the policy highlight the climate change challenges faced the youth?	A highly aligned policy should specifically mention how climate adversely affects the youth i.e. livelihoods, employment, and engagement in agriculture as well as constraints to building their resilience	0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned
	Does the policy/ programme incorporate youth specific interventions/ activities/ outputs/ outcomes?	A highly aligned policy should incorporate specific interventions that increase youth resilience e.g. youth employment and empowerment, green access to climate smart agricultural inputs, access to training and information, access resources (land and finance) to address climate change concerns.	0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned
	Does the monitoring, reporting and evaluation incorporate youth specific indicators and targets?	A highly aligned policy has youth specific indicators and targets i.e. that be used to track progress/success in increasing youth resilience to climate change	0 = not aligned 1 = moderately aligned 2 = aligned 3 = highly aligned 4 = exceptionally highly aligned

1.3.2.3 Key informant interviews and group discussions

Key informant interviews were conducted at the national level and local levels in the study districts of Arua, Kyegegwa and Kyenjojo. Focus Group Discussions were also conducted in refugee settlements and host communities of Kyaka II and Rhino Camp refugee-founded settlements in Kyegegwa and Arua districts respectively. The interviews and focus group discussions were conducted to:

- validate the findings from the literature review;
- establish the status and challenges of mainstreaming climate change and women and youth climate resilience concerns in agricultural policy and practice;
- assess the status and challenges of implementing climate resilient agricultural programmes and practices at the local and community levels in the selected districts of Arua, Kyegegwa and Kyenjojo, and;
- document the coping strategies of refugees and host communities to climate risks and environmental shocks and stresses.

National level key informants were climate change and environmental focal points

purposely selected from MAAIF, Office of the Prime Minister (Department of Refugees), the Ministry of Water and Environment (Climate Change Department), Ministry of Gender, Labour and Social Development, Uganda National Meteorological Authority (UNMA), and selected NGOs.

Local level key informants were purposively selected in Arua, Kyegegwa and Kyenjojo districts where the STENPO project is being implemented and included District officials and political leaders. The included; District Environment/Natural Resource Officers, District Planners, District Production/Agricultural Officers, Gender Officers, Community Development Officers and Secretaries for Production and Environment (District Councils). In the refugee settlements and host communities, the key informants included settlement commandants, environment and livelihood officers, and programme officers from selected NGOs and staff from UNHCR and the OPM.

Four group discussions were conducted in Kyaka II and Rhino camp refugee settlements and interviews held with host communities to establish the climate change and environmental shocks or stresses affecting these vulnerable communities and their coping strategies.

In all, 90 respondents participated in the study including 37 key informants drawn from national and local level institutions while 53 respondents participated in four (4) FGDs conducted in Kyaka II Refugee Settlement (Kyegegwa district) and Rhino Camp Refugee settlements (Arua district). The FGD participants were selected from women and youth groups purposively selected as the most active members in the groups. 23 of the respondents who participated in FGDs were women (11 refugees and 12 from host communities), while 30 were youth (12 refugees and 18 from host communities).

1.3.2.4 Transect walks and observation

Transect walks and observation were conducted in Kyaka II and Rhino Camp refugee settlements and host communities with the aid of an observation checklist to get an impression of the status of the climate change risks and stresses (impacts) natural resource utilization, land/environment degradation and/or conservation, if any.

1.3.2.5 Data analysis

Quantitative data from interviews was summarized in Ms Excel, summarised and statistics generated. The score card data was also constructed in Ms Excel in which quantitative data on the performance of policies and programmes on various criteria was entered, weighted and the sum of weights obtained were used to rank the performance of the policies and programmes on mainstreaming climate change, and addressing women and youth resilience. The qualitative data (field notes) obtained from the key informant interviews and group discussions was transcribed and typed out in MS word, and entered into ATLAS.Ti qualitative data analysis software and coded. The codes that

represented similar information were grouped into themes based on the patterns and associations found in the data. A content analysis was then performed and the results presented thematically on the basis of the study objectives.

1.3.3 Key concepts used

Adaptation

Adaptation to climate change is the adjustment in natural or human systems in response to actual or expected change in climate. Adaptation comprises initiatives and measures to reduce vulnerability of natural or human systems to actual or expected climate change impacts, including climate variability and extremes (IPCC, 2007a)

Climate change

A change in global or regional climate patterns, attributed to increased concentrations of greenhouse gases resulting from anthropogenic activity (especially atmospheric carbon dioxide produced by the use of fossil fuels) that is more apparent from the mid to late 20th Century onwards. Climate change is about abnormal variations to the climate, and the effects of these variations on other parts of the earth.

Climate risk

Climate risk combines the magnitude of the climate change impact with the probability of its occurrence, and captures uncertainty in climate change, exposure, sensitivity and adaptation (IPCC, 2007b)

Coping strategies

Coping strategies are a set of actions that are used ex-post as reactions to the occurrence of a risk event (in this case climate risk). They are therefore used to survive the impacts of a disaster. Coping strategies are generally short term which may breakdown under extreme stresses (CGIAR, 2009).

The distinction between coping and adaptation is not very clear as coping strategies can lead to adaptation and hence understanding local coping strategies is important in adaptation planning.

Vulnerability

Vulnerability is the degree to which a system is susceptible to, or unable to cope with the adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate change and variations to which a system or society is exposed, its sensitivity and adaptive capacity (IPCC, 2007a).

Resilience

Resilience is the ability of a social or ecological system – groups, communities or ecosystem – to cope with external stresses and disturbances as a result of social, political and environmental change. A climate resilient system will absorb climate change related disturbances while retaining the basic structure and ways of functioning, the capacity for self-re-organization and the capacity to adapt to stress and change (IPCC, 2007a).

Climate Smart Agriculture

Climate Smart Agriculture (CSA) is a form of farming that sustainably increases productivity, resilience (adaptation) to climate change, reduces or removes greenhouse gas emissions (mitigation), and enhances food security and development (FAO, 2010). The concept also includes improvements along the value chain, appropriate policies and institutions as well as financing and investments.

2 OVERVIEW OF AGRICULTURAL CLIMATE CHANGE VULNERABILITIES

2.1 Key facts on Uganda's agriculture sector

Agriculture is Uganda's main economic sector providing employment, food security, livelihoods improvement and overall economic development. Although the sector's contribution to Uganda's GDP has been steadily declining since the 1980s (from 53.7% in 1982 to 23.7% in 2015) due to growth in the industrial and service sectors, it remains the key source of exports contributing more than 80% of the country's total exports (World Bank, 2016; CIAT - BFS/USAID, 2017). The responsibility of fostering agricultural development in Uganda falls under MAAIF which is mandated 'to promote and support sustainable and market oriented agricultural production, food security and household incomes in the country' and a mission of 'transforming subsistence farming into commercial agriculture in the country'. Uganda's Agriculture Sector Strategic Plan (ASSP) 2015/16 – 2019/20 emphasizes the fundamental importance of the agriculture sector in: contributing to wealth creation, poverty reduction, increasing employment opportunities along the agricultural value chains in a sustainable manner, and the transformation of the country to a middle-income status (MAAIF, 2016).

The agricultural sector comprises of three sub-sectors namely: crop, animal and fisheries resources. These sub-sectors are predominantly small-scale, subsistent in nature and farmers are mainly engaged in mixed agriculture i.e. grow perennial and annual crops as well as graze animals throughout most of the districts (CIAT; BFS/USAID, 2017). The main crops are cereals (maize, sorghum, millet, rice) on almost 32% of the area cropped (UBOS, 2012a), root crops (25%), bananas (17%) as well as pulses, oil seeds, coffee, vegetables and fruits. Export crops include coffee, tea, tobacco, cotton flowers and cocoa. Livestock is also a key component of the primary sector with over 26 million heads in 2014 (FAOSTAT, 2016). USAID (2017) considers seven main agro-ecologic zones which are: (i) the Banana-Coffee System with stable rainfall ranging between 1000–1500 mm and suitable for growing farming banana, robusta coffee and root crops, (ii) the Banana-Millet-Cotton System with less stable rainfall that is good for staple foods i.e. millet, sorghum, maize, cotton and tobacco, (iii) the Montane System which reaches 1500–1750 m.a.s.l. and is appropriate for bananas, staple food like potatoes and cassava, arabica coffee, (iv) the Teso System has bimodal rainfall with a longer dry season that is right for millet, maize, cotton, livestock, (v) the Northern System with bimodal rainfall with about 800 mm annually (suitable for drought-tolerant crops [millet, cassava] sesame, sorghum, tobacco and cotton). In the North and North- East System rainfall is unimodal and below 800 mm, and it is appropriate for semi-nomadic pastoral system (cotton, tobacco, sesame, finger millet, sorghum, cassava, sunflower), (vi) the West Nile system with bimodal rainfall with about 800 mm

annually (cassava fishing, sorghum, peas, tobacco, livestock), (vii) the Pastoral system has rainfall below 1,000 mm and is characterized by short grasslands with nomadic extensive pastoralism (pastoral livestock). However, these systems are dynamic due to climate-related hazards, population pressure rated at 3.2%, as well as external political and economic factors.

Uganda faces significant constraints to the achievement of increased agricultural production, sustainable agriculture, food security and poverty reduction. The sector is characterized by low yields partly due to poor agriculture technology development. Another challenge to agriculture is land degradation, with 30% of Uganda's land area highly degraded (Njeru et al. 2016). The country's high population growth rate (over 3% percent per annum), accelerates land fragmentation, soil nutrient depletion and unsustainable production practices. Uganda's crop productivity growth is reported to be on a downward trend and has averaged only around 1% per year over the last decade, compared to around 6% per year in better-performing countries in the region (Twinomuhangi et al. 2015) attributed to farming being dominated by small holder farmers with small land holdings (averaging two hectares) using the hand hoes as the major production tool (IFPRI, 2012; Njeru et al. 2016). In addition, agricultural systems are largely rain-fed, with irrigated agriculture comprising only 0.1% of total cultivated land (CIAT; BFS/USAID (2017), while fertilizer use is among the world's lowest averaging 1kg of nutrients per hectare (Hundsbaek et al. 2012). Moreover, food crop production contributes about 55% of the agricultural GDP while cash crops contribute 17% and livestock 15% (MAAIF, 2010).

Women are central to agricultural production in Uganda. However, whereas the country has also made significant progress in relation to women's engagement in the agricultural sector in the five domains of empowerment: agricultural production, resources, income, leadership and time (IFPRI, 2012); Ugandan women remain disadvantaged with regards to land ownership and labour market participation, constituting only 16.3% of the total agricultural landholders (UBOS, 2010). Moreover, rural Uganda, where more than 80% of the country's population lives and agriculture dominates, accounts for 94.4% of the poor (Amone 2014; MoFPED, 2014; MAAF & MWE, 2015).

Historically, Uganda was relatively sparsely populated and land for agriculture was therefore abundant. Consequently, the country's agriculture has been characterized by traditional farming practices that involve extensive use of land and limited use of other inputs. Agricultural growth has in the past been driven by expansion of land under cultivation and not through improving the productivity of land (i.e. efficient use of land). These agricultural systems are not sustainable in light of the rapid population growth over recent decades that have accelerated depletion of land and other natural resources. Another challenge is the dominance of agricultural land in the productive base of Uganda's economy on the one hand, while the supply of land is inherently

limited (Twinomuhangi et al., 2015). The rapidly growing population and the attendant demand it imposes on arable land, makes land become increasingly a scarce resource in Uganda and to keep pace with the fast-growing population, the proportion of land under agriculture has been increasing. For example, between 1990 and 2000 land under agriculture increased by 12.4% and by 4.7% between 2000 and 2005 (UBOS, 2014a). By 2013, 72% of Uganda's total land area was used for crop production or pasture for livestock, compared to 60% in 1990. Over the last decade, growth in agricultural land has averaged around 1% per year, mainly driven by cropland (Twinomuhangi et al., 2015) while the forest area significantly reduced during this period from 49,334sq.km in 1990 to 26,197sq.km in 2010. The agricultural workforce expanded by 3.5% per year on average between 2009/10 and 2012/13 (UBOS, 2014b). If the current agricultural land growth rate (1% per annum) continues, more than 90% of Uganda's land would be used for agriculture by 2040 and this is clearly unsustainable (Twinomuhangi et al, 2015) and inconsistent with the Vision 2040 objective to expanding forest cover from 15% to 24% of the country's land area. Thus, Uganda will require significant improvements in agriculture and land use management if it is to achieve sustainable agricultural development while ensuring environmental sustainability.

Other major constraints to agricultural development are; soil erosion, pest and diseases that cause losses, market and value addition challenges, weak institutional frameworks and a lack of capacity to implement the sector development policies and plans. Of recent, climate change is an emerging challenge to agriculture and the lack of capacity to address climate risks will worsen the low productivity of the sector in Uganda. Given the heavy dependence on agriculture, the effects of climate change could clearly put Uganda's population at a greater risk of poverty and hunger and undermine the achievement of global Sustainable Development Goals (SDGs 1 & 2).

2.2 Climate change and agriculture in Uganda

2.2.1 Key characteristics of Uganda's climate

Uganda experiences relatively humid conditions and moderate temperatures throughout the year, with mean daily temperatures of 28 °C (UNDP, 2013). The long-term mean temperature is around 21°C and the monthly temperatures range from 15°C in July to 30°C in February. The highest temperatures are observed in the northern parts of the country, especially in the north-east, while lower temperatures occur in the southern parts. The annual rainfall totals vary from 500 – 2,800 mm (Government of Uganda, 2007). This climate is bimodal in the south to central parts of Uganda, exhibiting two rainy seasons (March–June and October–January), with the exception of the northern-eastern region, which experiences one long rainy season (FAO, 2015).

Globally, changes in temperature, rainfall amounts and seasonal patterns are already being experienced and these are creating risks for economies and societies that are

largely dependent on agriculture. The IPCC contends that the frequency and intensity of extreme climatic events such as heat waves, erratic heavy rainfall, and the long-term chronic effects of higher temperatures are on the increase (IPCC, 2012). Between 1900 and 2009, Uganda experienced an increase in average annual temperature of between 0.8°C - 1.5°C, with typical rates of warming around 0.2°C per decade. The period 1960 - 2008 was progressively warmer. The observed rainfall for 1900–2009 rainfall shows that that for the period 2000–2009, Uganda’s rainfall was on average about 8% lower than rainfall between 1920 and 1969. Although the June–September rainfall appears to have been declining for a longer period, the March–June decline has only occurred recently. Three long epochs of below-normal rainfall occurred between 1940 and 1960, around the 1970s and again around the 1980s and 1990s. Above-normal rainfall periods occurred during the early 1960s and late 1970s and 1990s.

Uganda has been repeatedly affected by extreme weather events such as droughts, dry spells, intense rainfall and floods. Droughts are becoming more frequent and more severe (IGAD, 2010). Between 1991 and 2000, Uganda experienced seven severe droughts. The western, northern, and north-eastern regions have been experiencing more frequent and longer-lasting droughts than seen historically. Heavy rains have caused landslides in the Mt. Elgon and Mt. Rwenzori region of Uganda. For example, in 2010 landslides in Bududa district (Mt. Elgon region) buried three villages including people, crops and livestock (killing more than 100 people), while in 2011, Bulambuli district was also strongly affected by landslides, which destroyed homes and crops (GoU, 2014). In 2014, the flooding of River Nyamwamba in the Mt. Rwenzori region led to serious soil erosion and destruction of infrastructure both on the hill slopes and down the valleys. In 2007, the Teso region experienced its heaviest rainfall in 35 years (OCHA, 2010) which caused extensive flooding. Uganda’s cattle corridor, which is located in the dry-land region, is prone to drought while the northern region is especially vulnerable to both floods and droughts (Kasimbazi, 2013).

2.2.2 Climate change projections for Uganda

Global Climate Models (GCMs) have been used to simulate Uganda’s future climate. Climate projection studies conducted for Uganda (DEWPoint, 2012; USAID, 2013; MWE, 2015) indicate that Uganda’s temperature will increase by +2 °C in the next 50 years and +2.5 °C in the next 80 years under the Representative Concentration Pathway (RCP) 4.5 scenarios; by +2.5 °C in the next 50 years and by +4.5 °C in the next 80 years under RCP 8.5 scenarios.

Projected annual rainfall totals will differ little from what is presently experienced, with projected changes within a range of less than plus or minus 10% from present rainfall (Thornton et al., 2009; Vrieling, De Leeuw, & Said, 2013). Rainfall totals are likely to drop significantly over the Lake Victoria region to about -20% from the present. What is significant on a seasonal time scale is the projected increase in seasonal rainfall for the

DJF season (up to 100% from present), which is indicative of a longer wet season that extends from SON towards DJF.

The decrease in rainfall in most parts of Uganda will result into significantly drier conditions for the rest of the year. In some places a longer wet season that extends from SON towards DJF will be experienced but this will also combine with significant temperature increases, especially during the MAM and JJA seasons. A significant drop of total rainfall over Lake Victoria (-20% from present), combined with about 1°C temperature increase, will impact the lake water level. The increased warming, with high average air temperatures, will most likely amplify water stress and increase the impact of water shortages. Warming temperatures are likely to adversely affect agriculture production, which is an important economic activity for Uganda. Overall, the changes in climate will require a number of adaptation strategies.

2.2.3 Implications of climate change for agriculture

There is a very strong link between climate and agriculture more especially for Uganda that depends heavily on rain-fed agriculture, with limited irrigation. A number of studies have documented the effects of climate change on Uganda's agriculture (UNDP, 2013; USAID, 2013; FAO, 2015; Ministry of Water and Environment, 2015; World Bank, 2013; World Bank Group, 2015).

According to the World Bank (2013) climate change can potentially impact agricultural production by:

- i. reducing the area suitable for agriculture,
- ii. altering the length of the growing season,
- iii. reducing the yield potential,
- iv. increasing the frequency and severity of extreme events (in particular droughts and floods), and
- v. increasing the incidence of plant diseases.

USAID (2013) observes that shifts in rainy seasons, i.e. (September-November) and (March-May), and short or prolonged dry seasons in some regions distort growing seasons confusing farmers on deciding on the timing for agricultural activities. This affects timing of field preparation and planting; crop growth, and intensification of crop diseases and pests; resulting into lower yields. The shift in rainfall patterns also leads to reduction in amounts of rain water harvested; affecting both hillside and valley irrigation projects. A value chain analysis shows that many crops are vulnerable to rising temperatures, increasing dry season and unrealizable rainfall with arabica coffee being particularly vulnerable, while cassava is the least vulnerable because it is more drought

and disease resilient (Jassogne, Lderach & Van Asten, 2013; USAID, 2013). The most vulnerable crops are: arabica coffee, robusta coffee, rice, maize, banana (matooke), beans, sorghum, sweet potatoes, and cassava USAID (2013). Uganda's NAPA notes that that a 2°C temperature rise might significantly reduce the area suitable for coffee growing (GoU, 2007).

The Climate and Development Knowledge Network (CDKN) supported a study on the economic impact of climate change in Uganda reveals that the largest impact of climate change on agriculture is on food crops, followed closely by the export crops such as coffee, tea and cotton (MWE, 2015). The loss of food crops is estimated at about USD 1.5 billion per year by 2050 considering eleven crops: cassava, groundnuts, maize, millet, pigeon peas, potatoes, rice, sorghum, soybean, sugar cane. The study further reveals that agricultural exports will be severely affected by the effects of climate change, with the arabica coffee growing area significantly reduced by 50-75% by 2050 due to yield reductions and loss of areas where coffee can be grown. This is a major impact on the economy, which is currently deriving 18% of its export earnings from coffee. Estimates of impacts on tea growing areas also indicate significant losses of up to 50% (fall in production) by 2050. An IFPRI modelling shows potential losses of cotton production due to yield impacts in the range of 60-77% by 2050.

While the estimated impacts on livestock production are quite small (1 or 2%), the key impacts on livestock may come from other climate change factors, in particular droughts, floods and diseases. Climate change affects livestock production through its effects on water and pasture availability, incidence of livestock pests and diseases and the distribution of livestock in the country. Increasing temperatures and warming is expected to alter the feed intake, mortality, growth, reproduction, maintenance and production of animals - all of which have negative impact on livestock productivity (Kipkoech et al., 2015). The effects of climate change on water and pasture availability climate change is causing increased competition between pastoralists and sedentary farmers, with a higher potential for resource conflicts. Faced with higher risks of crop failure linked to increased drought frequency, desertification and land degradation, a widespread response by farmers across the cattle corridor is the diversification of income source to reduce reliance on a single activity. As such, sedentary crop farmers are increasingly developing livestock activities, raising competition for grazing lands with pastoralists and destabilizing the traditional balance based on exchanges between the two groups. As a result, straying cattle are the main source of violent conflicts between farmers and herders within the region.

Adaptation to climate change in the agricultural sector in Uganda is still limited and the choices for adaptation depend on the available options in specific agro-ecological zones. To ensure that the agriculture sector copes or adapts to climate change, practices or technologies have to be climate smart. Njeru et al. (2016) CSA "integrates the three

dimensions of sustainable development (economic, social and environmental) by jointly addressing food security and climate challenges.” A range of Climate Smart Agriculture (CSA) technologies are being promoted and implemented across farmer typologies and agro-ecological zones in Uganda (Njeru et al. 2016; Mwongera et al., 2017). Notable practices include conservation agriculture, integrated soil fertility management and coffee-banana intercropping. The predominant users of CSA practices are small-scale farmers whose primary goal is to increase crop productivity. Nevertheless, adoption of many CSA practices remains generally low because of policy gaps. Other constraints to CSA adoption include limited extension services, inadequate knowledge, inadequate technology, labour and capital, inaccessible input markets and declining farm size.

2.3 Vulnerability and adaptation of agricultural systems in Arua, Kyegegwa and Kyenjojo districts

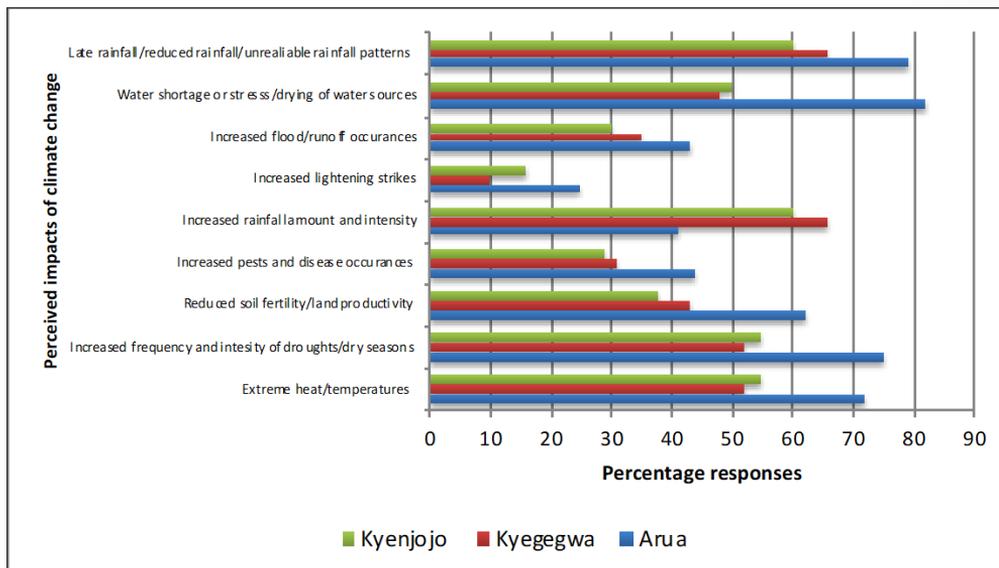
2.3.1 Agriculture in Arua, Kyegegwa and Kyenjojo districts

Agriculture is the main economic activity in the three districts. For example, in Arua district, 96% of the households depend on subsistence farming, while 70% of the work force in agriculture in the district are women who do not control the proceeds of whatever is produced or sold in the market (Aua District Local Government, 2015). The major food crops include cassava, beans, groundnuts, simsim, millet and maize. The main cash crop is tobacco while cotton and coffee are also grown. In Kyegegwa and Kyenjojo districts, 79% and 76% of the households are depended on subsistence farming respectively. In the two districts, the main cash crops are maize, beans, bananas, cassava, sweet potatoes, Irish potatoes and groundnuts. The main cash crops are coffee and tea.

2.3.2 Climate change and environmental shocks and stresses

Key informant interviews and groups discussions conducted reveal that the main impacts of climate change in the three study districts are reduction in rainfall and/or late rainfall, variations in rainfall seasons, extreme temperatures, droughts, water shortage/insecurity, floods and water insecurity illustrated in the Figure 1.

Figure 1: Perceived impact of climate change in Arua, Kyegegwa and Kyenjojo districts



In Arua district, increased drought occurrences, extreme temperatures, water shortages/water stress and unreliable/late rainfall patterns were reported as having major impacts on climate change. Changes in rainfall patterns were particularly noted most especially the increasing dry spells during the months of March to June. In Kyegegwa and Kyenjojo districts, unreliable rainfall patterns and increased rainfall intensity were equally perceived as the main climate change impacts followed by droughts, extreme/rising temperatures and water shortages. Reduced soil fertility/land productivity, crop pest and diseases, flooding and lightning strikes were also perceived as climate change impacts in all districts.

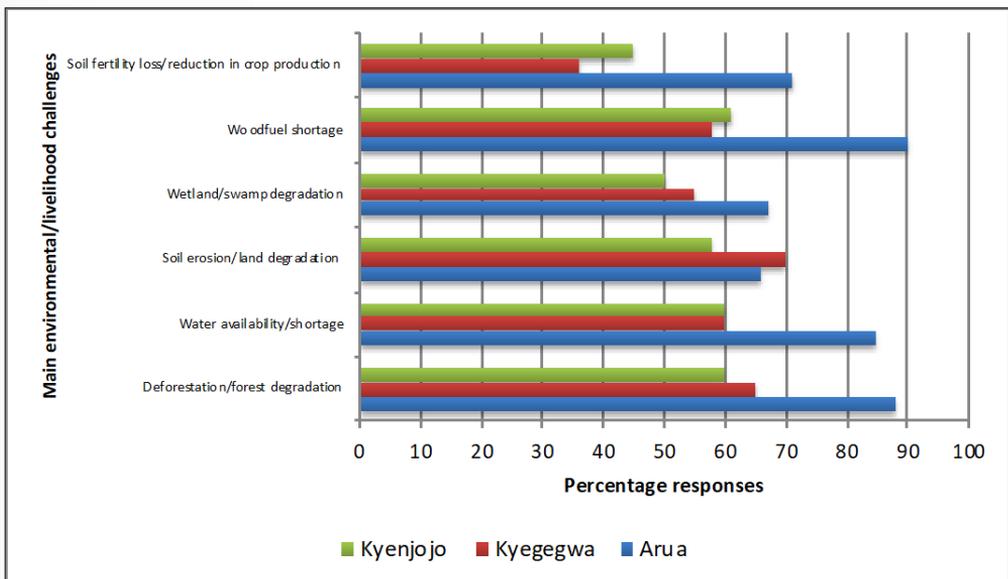
The impact of climate change and extreme weather events were reported to be making agriculture more unproductive, laborious, and unattractive to the youth. Climate change impact was also perceived to be causing rising food insecurity (especially in Arua district) and reduced household incomes, and increasing the vulnerability of women as they depend more on subsistence farming.

The main environmental/livelihood challenges in the districts were identified as deforestation, water scarcity and wood fuel shortage. The other challenges are; wetland degradation, soil erosion, land degradation and reduced soil fertility that affects crop production (see Figure 2). Comparatively, Arua district faces more environmental challenges than Kyegegwa and Kyenjojo districts. The main concerns includes; forest degradation/deforestation, water shortage and wood fuel shortage. In Arua and Kyegegwa districts, wood fuel shortage, deforestation, wetland degradation, and water

shortages were also attributed to the rising population and refugees who create pressure on available environmental resources. Similar challenges were also mentioned by the refugees and host communities in Kyaka II and Rhino Camp Refugee settlements found in Kyegegwa and Arua districts respectively.

All the respondents interviewed indicated that the impact of climate change is worsening the environmental and livelihood challenges. Deforestation and forest degradation were said to be driven by the high population, especially refugees who create additional demand for land for farming, as well as wood fuel and construction poles. Land-use conversions, from forest to agriculture and settlements, are a major environmental challenge in Arua district.

Figure 2: Main environmental and livelihood challenges in Arua, Kyegegwa and Kyenjojo districts



Wood fuel shortage was said to be resulting from the reduced forest/tree cover due to deforestation and bush burning. The reduced forest cover affects different groups in different ways. The youth reported loss of forest products that reduces non-farm sources of income and employment. A lot of youth engage in honey businesses and charcoal burning and thus reduced forest cover leads to loss of employment and incomes for them. The women and refugees, are impacted through reduced sources of energy/ firewood and other ecosystem services especially food/fruits and medicinal herbs.

The challenge of wood fuel scarcity (energy insecurity) was said to be caused by deforestation driven by the high refugee influx that increases the demand for wood fuel and construction poles. The main source of fuel for cooking in refugee settlements and

host communities is firewood. The rising scarcity of firewood also presents a host of other challenges. People (speciality women and children) walk long distances looking for firewood which reduces the time for productive activities, like farming. It also exposes women and girls to sexual gender-based violence (SGBV) e.g. rape, sexual assault when women and girls collect firewood from the bushes. Gender based violence (GBV) also results as some men beat up their wives because of delays in serving food resulting from wood fuel scarcity. Moreover, wood fuel scarcity translates health challenges resulting into eating half cooked food or reduced meals.

Regarding water shortage/water availability, the respondents reported that it is mainly a result of increased occurrence of droughts and prolonged dry seasons that have caused water sources to dry up (rivers, springs, wells or boreholes). The problem is worsened by the increased demand for water resulting from increased population and a refugee influx as well as flooding, land degradation and encroachment of wetlands that reduce water availability and compromise water quality. Sharing of water sources between people and animals was also mentioned and it results into water pollution and water borne diseases.

The challenge of water security and water quality increases vulnerabilities of communities especially the women, youth and refugees. Women and girls have to move long distances to collect water making them less productive in agriculture and also exposed to SGBV. The youth, more notably the girls, miss school while collecting water for domestic use and watering crops and animals. The lack of water or use of contaminated water increases the spread of waterborne diseases which results into lost time and resources in treatment. Shortage of water increases ill-health of women and children. Women and children need more water for drinking and hygiene.

The challenges of wetland/ecosystem degradation were attributed to the rising population (natives and refugees) and reduced land productivity which increases the need for agricultural land resulting into conversion of wetlands into farmlands. The challenge is more severe with the influx of refugees in Arua and Kyegegwa districts. In Kyaka II refugee settlement (Kyegegwa), refugees have encroached on wetlands/swamps in Bukele, Kaburogota, Kakoni, Byakaakora, Bwiriza and Sweswe. In Rhino camp refugee settlement (Arua), refugees have encroached on wetlands in Vura, Pajiru and Terego sub counties along the banks of River Enyua. In addition, there is a reported increase in rice growing in the reclaimed swamps as an alternative livelihood option. The challenges associated with wetland degradation is the loss of ecosystem services especially clean water (especially during droughts and dry spells), raw materials for art and craft, food (fish) as well as the protection from natural disasters (floods and droughts). This erodes the resilience of women, youth and refugees when climate risks and disasters strike.

The challenge of reduced soil fertility, land degradation and reduced land productivity was attributed to increasing population (natives and refugees) and the resulting shortage of land for communities to engage in agriculture and planting trees. Communities around refugee settlements complained that a lot of land has been allocated to refugees and they are left with little land for farming. The Impact of climate change, especially droughts and intensive rainfall were also reported to reduce land productivity. However, the traditional farming practices, although not reported, that do not include land improvement (e.g. soil erosion control, conservation agriculture etc.) and use of agricultural inputs (manure, fertilizers and pesticides etc.) and post-harvest losses are also causes of reduced soil/land productivity.

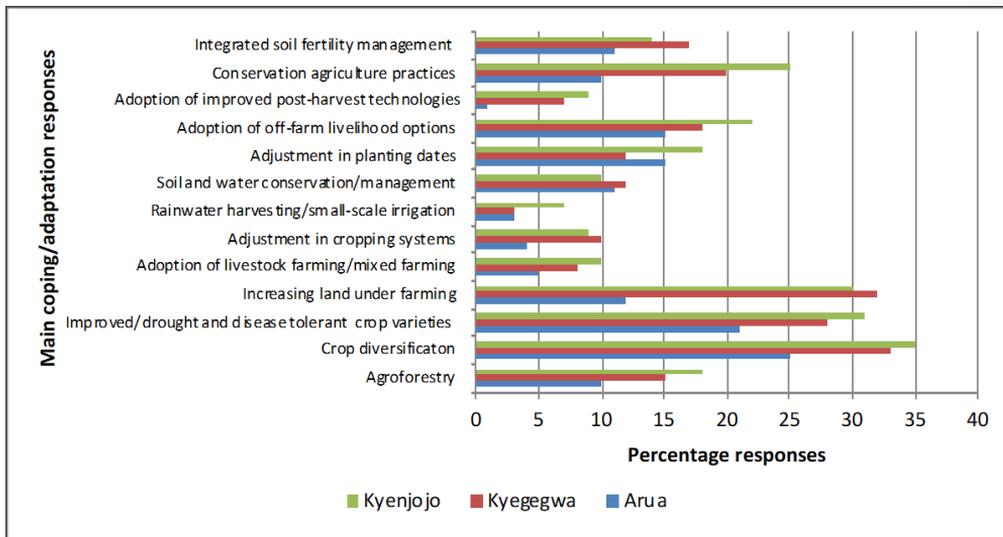
The challenges associated with reduced soil fertility/land production were said to be unattractiveness of agriculture to the youth which is increasing youth unemployment, as well as reduced agricultural production which increases household food insecurity and incomes. Women are more affected because they are responsible for food in the homes, and are more dependant farm incomes as compared to men who have other sources of income. Food insecurity is also a driver of GBV in homes and the women suffer most.

2.3.3 Coping/adaptation responses to the impacts of climate change

Figure 3 presents the coping responses adopted by communities and farming households to adapt to the impact of climate change across the three districts, more especially in the refugee settlements and host communities. The main coping responses were: crop diversification, increasing farming land, adoption of improved crop varieties that are tolerant to droughts and pests and diseases, adoption of conservation agricultural practices, adjusting farming calendars, integrated soil fertility management and adoption of non-farm livelihood options. Other coping responses included; adoption of livestock farming/mixed farming, adjusting cropping system, adoption of rainwater harvesting and irrigation and adoption of post-harvest technologies.

However, Arua district communities were found to be the least performing in coping with the impact of climate change compared to Kyegegwa and Kyenjojo districts.

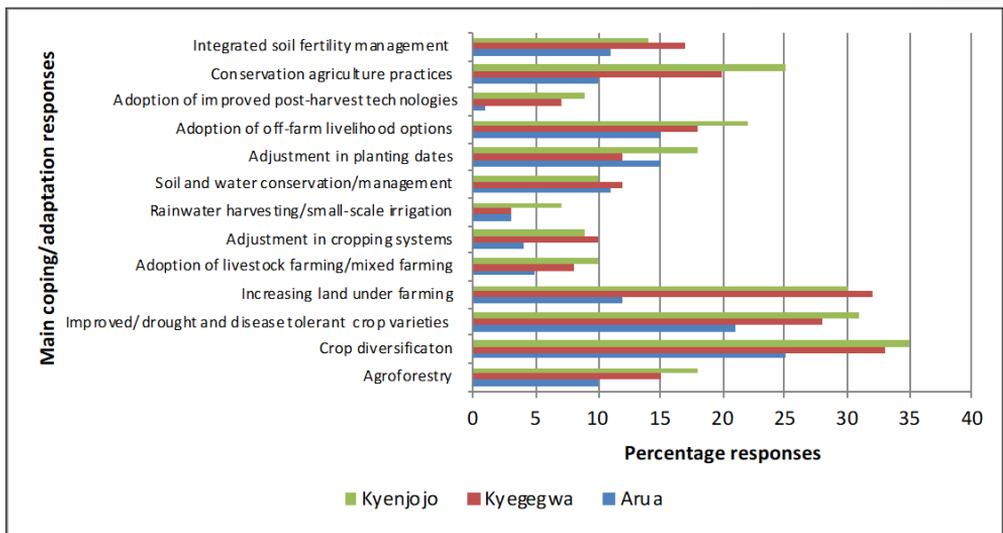
Figure 3: Main coping responses to climate change and environmental shocks and stresses in Arua, Kyegegwa and Kyenjojo districts



2.3.4 Barriers to adoption of climate smart farming practices

Adoption and scaling up of adaptation practices at the local and community levels in Arua, Kyegegwa and Kyenjojo districts, and the Kyaka II and Rhono camp refugee settlements and communities were reported to be slow. Through key informant interviews and focus group discussions, the perceived barriers to adaptation to climate change among farming and refugee communities were identified as shown in Figure 4.

Figure 4: Perceived barriers to adaptation in Arua, Kyegegwa and Kyenjojo districts



The main barriers to adaptation identified include:

- The limited awareness and knowledge about climate change and the appropriate adaptation technologies/practices to adopt;
- Inadequate climate information services and early warning systems to help farmers plan their farming activities
- The small land holdings and fragmented landholdings that hinder adoption of adaptation practices that may require medium and large sized land, for example agro-forestry, irrigation, fodder production etc.
- The high rural poverty levels that constrain from adopting modern farming practices such as buying agricultural inputs, good quality seeds, fertilizers, irrigation etc.

At times, the agricultural inputs available on the market are of low quality (counterfeits). The prevalence of open grazing systems in some areas hinders the uptake of adaptation technologies like intercropping, composting and biogas. The open grazing system makes manure management a very time- and labour-intensive activity.

There is also limited coverage of agricultural extension and advisory services to farmers on the appropriate climate change adaptation practices.

2.4 Climate change, migration and conflicts

While the underlying causes of migration and conflicts are varied and complex (environmental, political and socio-economic), climate change impact could escalate conflicts between nations and within countries and communities largely because climate change has an effect on the environment and natural resource on which many communities depend for livelihoods (Rodes et al. 2014). Conflict, extreme weather events and political instability are among the root causes of migration (FAO, 2016). Climate change could cause droughts, floods and migration that could trigger conflicts in Africa (Kuperman, 2011). Many migrants are forced to move because of socio-economic challenges such as factors, poverty, food insecurity, unemployment lack of social protection, natural resource depletion and the adverse impacts of environmental degradation and climate change.

Conflicts over water, pastures, and farming land often arise when the supply is not assured. For example, cross-border conflict and pastoralists' access to key resources (especially water and pasture) is a major security challenge in the East Africa region (Liwenga et al. 2014). The region has the world's largest grouping of pastoralists from Kenya and Sudan who usually cross into Uganda during dry spells desperately looking for pastures and water to sustain their livelihood. The security of the border pastoralist

communities is also threatened by armed conflicts in the region (e.g South Sudan and DRC) resulting cross-border armed conflict over resources.

Within Uganda, pastoralists come into conflicts with crop farmers during times of droughts when water and pasture shortages are very severe. A case in point is the conflict between Karimajong and Teso communities in eastern and north eastern Uganda. In the recent past, cattle-rustling was common in the region as communities sought to restock herds reduced by drought and water shortage. Conflicts are also said to be on the rise in the other districts of the central cattle corridor (Luwero, Mubende, Nakaseke and Nakasongolo) between pastoralists, agro-pastoralist and crop farmers over land and water.

Land degradation and the consequent shortage of farming land can also drive encroachment on ecosystems that result in resource conflicts. Quite often, Ugandan communities have encroached on wetlands, forest reserves and protected areas. Human-wildlife conflicts between the wildlife and forest authorities on the one hand and communities are common involving evictions of communities from national parks and forest reserves such as the Mt. Elgon National Park. Conflicts are also rising over eviction of communities from wetlands. Such unresolved conflicts can certainly increase vulnerability to climate change.

Uganda is a host to about 1.4 million refugees, one of the world's highest, originating from neighbouring countries: Burundi, DR Congo, Eritrea, Ethiopia Rwanda, Sudan (UNHCR, 2018a). Both the refugees and host communities' livelihoods are dependent on the natural environment which exerts a lot of pressure on the natural resources: water, forest (wood fuel and construction materials) and land for farming, and yet the environment cannot adequately replenish the resources which lead to conflicts over natural resources between refugees and host communities. With the projected change in climate change, that is associated with droughts, water shortage, biodiversity loss and reduced agricultural production; the conflicts could escalate.

Building climate change resilience could be one of the avenues for reducing displacement, migration and the conflicts associated with migration. Agricultural development can contribute to rural development which can in turn address the root causes of migration and build the resilience of both displaced and host communities, not only laying the ground for long-term recovery but also reducing the resource conflicts that are associated with migration. However, attributing conflicts to climate change in Uganda is not well understood and would need a study to document the nexus between climate change, conflicts and human security.

3 MAINSTREAMING CLIMATE CHANGE IN AGRICULTURAL POLICIES AND PROGRAMMES

3.1 Introduction

One of the objectives of the study was to examine the extent to which climate change is mainstreamed in Uganda's agricultural policies, plans and programmes. The focus was to identify policies, plans, strategies and government programmes aimed at building resilience of the agricultural sector in general and the local communities in particular, and analyzing the extent to which they have mainstreamed climate change both in design and practice. In this section, the analysis of how the agricultural policies, plans and programmes have mainstreamed the climate change concerns and the policy gaps is presented.

3.2 National development policy framework

In 2007, Uganda approved the Comprehensive National Development Planning Framework (CNDPF) which provides for the development of a 30-year vision, the Uganda Vision 2040, to be implemented through: six five-year National Development Plans (NDP), and Sector Development Plans (Africa Business Group, 2015). The Uganda Vision 2040 (Government of Uganda, 2010a) articulates the country's long and medium-term development agenda. The Vision 2040 aims at 'transforming Uganda from a predominantly peasant and low-income economy to a competitive upper middle-income economy through promoting growth, employment and socio-economic transformation'. Agriculture is recognized in the Vision 2040 as a major contributor to GDP, as key source of employment and a driver to achievement of food security and poverty reduction in the 30-year period. The Vision 2040 also aspires for the achievement of a green economy and clean environment, in the context of sustainable development and poverty eradication. The National Development Plan (NDP) is the second important Uganda national development policy document. Currently, Uganda's medium-term development framework is guided by the Second National Development Plan (NDPII) 2015/2016 – 2019/2020 (Government of Uganda, 2015a) whose major goal is attainment of middle-income country status by 2020 by strengthening the country's competitiveness for sustainable wealth creation, employment and inclusive growth.

Our analysis shows the Uganda Vision 2040 and NDP II strongly incorporate climate change clearly articulating that climate change is a constraint to Uganda's development agenda, and seek to foster the achievement of climate resilient development and a green economy¹. The Vision 2040 mentions specific strategies for the attainment of climate resilient agriculture. It includes investment in irrigation farming, sustainable land

¹The Uganda Vision 2040 identifies climate change as one of the development challenges (section 1.4) and addressing climate change is identified as a driver to socio-economic transformation (section 5.9)

management, agricultural technology improvement through research for improved seeds and breeds and agricultural value chain improvement. The NDP II recognizes that climate change is a development constraint, prioritizes climate change mainstreaming, and specific interventions to promote Climate Smart Agriculture (CSA) including the promotion of ecologically sound agricultural technologies and practices such as; sustainable land management practices; increasing access to water for agricultural production; agricultural diversification; developing climate early warning systems; climate smart agricultural extension systems and agricultural value chain improvements².

3.3 National climate change policy framework

Uganda is active on both the international and national levels in policy formulation and implementation. On the international scene, Uganda is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol and Paris Agreement. Thus, Uganda has obligations to put in place an enabling policy environment to address climate change. Responding to commitments under Article 4 and 12 of the UNFCCC, Uganda developed and submitted the Initial National Communication (INC) to UNFCCC in 2002 and the Second National Communications in 2014, comprising a national GHG inventory system, vulnerability and adaptation to climate change, and recommendation for adapting and mitigating climate change.

In conformity to the commitments to UNFCCC, Uganda developed and submitted its National Adaptation Programmes of Action (NAPA) to UNFCCC in 2007 (GoU, 2007). NAPAs were intended to build the capacity of developing nations to identify short-term priority climate change adaptation, so as to reduce their vulnerability to climate change impacts (<http://www.napa-pana.org>). The NAPA, presents a list of nine priority projects including: community tree growing, land management, meteorological services, community water and sanitation, water for production, drought adaptation, pest and disease control, indigenous knowledge in natural resource management, climate change and development planning; all at a cost of approximately USD 40 million. The NAPA projects were implemented in four areas namely; addressing sanitation and deforestation (Apac district), addressing soil erosion and deforestation (Bundibugyo district), addressing food insecurity and drought (Nakasongola district), and addressing soil degradation and pests and diseases (Palisa district).

At the national level, the National Climate Change Policy 2015, the National Determined Contribution (NDC), the draft Climate Change Bill (Act) 2017 and the Green Growth Development Strategy (GGDS) are the overarching climate change policies. However,

²Uganda's Second National Development Plan (NDPII) 2015/16-2019/20 mentions that climate change is challenge to attainment of Vision 2040, the challenge that has to be addressed (Section 2.3.5), in section 3.3.10 the NDPII prioritizes mainstreaming climate change adaptation and mitigation in sector and local development policies and plans. In section 6.2, climate change is included in the agriculture sector development objectives and strategies.

not much has been done at the local level in terms of climate change policy and practice.

The National Climate Change Policy 2015 (NCCP), with a cost implementation strategy, seeks to ensure a harmonized and coordinated approach towards a climate-resilient and low-carbon development path for sustainable development in Uganda'. The overarching objective of the policy is 'to ensure that all stakeholders address climate change impact through appropriate measures while promoting sustainable development and a green economy' (GoU, 2015b). The Policy also provides direction for the key sectors including agriculture that are and/or likely to be affected by climate change to facilitate action for achievement of climate compatible development. The NCCP recognizes that climate change is fundamentally a multi-sectoral issue and that all sectors (including agriculture) and all categories of stakeholders must be actively involved during the implementation of the policy, and mandates all sectors and local governments to mainstream climate change concerns in their policies, plans, strategies, programmes and budgets.

Agriculture is one of the priority sectors in NCCP and the policy priorities for adaptation in the agriculture sector emphasize: (i) promotion of climate change adaptation strategies that enhance resilient, productive and sustainable agricultural systems; and, (ii) promotion of value addition and improving food storage and management systems to ensure food security at all times, as a factor of resilience.

The specific strategies for addressing policy priorities for adaptation in agriculture include:

- i. Promoting and encouraging highly adaptive and productive crop varieties in drought-prone, flood-prone and rain-fed crop farming systems;
- ii. Promoting and encouraging highly adaptive and productive livestock breeds;
- iii. Promoting and encouraging conservation agriculture and ecologically compatible cropping systems, to increase resilience to climate change;
- iv. Promoting sustainable management of rangelands and pastures, through integrated rangeland management, to avoid land degradation and deforestation;
- v. Promoting irrigated agriculture by encouraging irrigation systems that use water sustainably;
- vi. Promoting and encouraging agricultural diversification, and improved post-harvest handling, storage and value addition, in order to mitigate rising climate related losses and to improve food security and household incomes;
- vii. Supporting community-based adaptation strategies through stretched extension services and improved systems for conveying timely climate information to rural populations to enhance the resilience of agricultural systems to the impact of climate change; and
- viii. Developing innovative insurance schemes (low-premium micro-insurance

policies) and low-interest credit facilities to insure farmers against crop failure due to droughts, pests, floods and other weather-related events.

Nationally Determined Contributions (NDCs): In the run up to COP 21 in December 2015 and the Paris Agreement, Uganda submitted its Intended Nationally Determined Contribution (INDC) to UNFCCC (Government of Uganda, 2015c) and it was later ratified and transformed into the Nationally Determined Contribution (NDC). The NDC is the country's contribution to the implementation of the Paris Agreement on Climate Change i.e. Uganda's contribution towards curbing global temperature rise to below 2°C by the end of the 21st century. Uganda's priority in the NDC is adaptation, although mitigation interventions that have adaptation and development co-benefits are also prioritized.

In Agriculture, Scaling up Sustainable Land Management (SLM) and Climate Smart Agriculture (CSA) to increase resilience at the grassroots level are the main priority interventions while the other climate resilient priority interventions are: expanding climate information and early warning systems; agricultural extension services; diversification of crops and livestock; value addition, post-harvest handling and storage and access to markets. Others include; micro-finances; rangeland management; small scale irrigation and water for production infrastructure; climate resilient crops and animal breeds; and off grid renewable energy to support value addition and irrigation.

In order to provide a legal and regulatory framework to climate change in Uganda and operationalize the implementation of the NCCP, Uganda is putting in place a Climate Change Act (Law). The purpose of the proposed Bill is, among others: to give force of law to the UNFCCC, Kyoto Protocol and Paris Agreement; and provide an enabling environment for mainstreaming climate change in different sectors, like agriculture, in line with the policy priorities under NCCP and its cost implementation strategy.

To operationalize mainstreaming of climate change in sector, as provided for in the NCCP, the Ministry of Water and Environment in collaboration with the National Planning Authority (NPA) has put in place Guidelines for integration of climate in sector plans and budgets (Ministry of Water and Environment, 2014). The guidelines provide approaches to mainstream climate change in sector plans and budget, including how to: (i) carry out impact and vulnerability assessments; (ii) identify opportunities and entry points for integration of climate change mitigation and adaptation measures; (iii) propose options for integrating climate change adaptation and mitigation into the policy formulation process, financing, implementation and evaluation at national, local and community levels; and, (iv) assist to improve resilience.

Uganda Green Growth Development Strategy (2017/18 – 2030-31), the Uganda Vision 2040, NDP, NCCP and the NDC seek to 'foster green growth and the achievement of a green economy in Uganda.' Green growth has several principles whose pursuit is to generate outcomes that reconcile the environment, economic and social aspects

of development. The key principles of green growth that are key to Uganda include: (i) sustained economic growth that ensures poverty reduction and wealth creation; (ii) resource use efficiency that eliminate wastage and frees resources for other uses; (iii) climate change response through adaptation and mitigation; (iv) decent green and gainful jobs generated in green sectors such as waste management, renewable energy and planned green cities; (v) social inclusiveness and equity characterized by holistic growth and development in sectors that employ the majority, the most vulnerable and the minorities that are at the risk of being left behind; (vi) environmental sustainability through pursuit of national economic growth and development within planetary limits (Government of Uganda, 2017).

To pursue green growth and development, Uganda has put in place the Green Growth Development Strategy (GGDS) 2017 /18 – 2030/31 that pursues ‘an inclusive low emissions economic growth process that emphasizes effective and efficient use of the country’s natural, human, and physical capital while ensuring that natural assets continue to provide for present and future generations.’ Climate change is one of the main pillars of Uganda’s GGDS seeking to ensure that social and economic transition is achieved through low carbon development and climate resilient pathways that safeguards the integrity of the environment and natural resources (GoU, 2017). Agriculture and natural capital development are identified as some of the high impact sectors in which interventions for achieving green growth are foreseen. Enhancing availability and access to water for agricultural production, soil fertility management, agricultural value chain improvement, forest and wetland ecosystem restoration and management, and water resource management are some of the climate smart related interventions prioritized in the GGDS.

3.4 Agriculture policy framework

The overarching agricultural policy in Uganda is the National Agricultural Policy 2013 whose vision is “to create a competitive, profitable and sustainable agricultural sector” and mission of “transforming subsistence farming to sustainable commercial agriculture.” The overall objective of the policy is to achieve food and nutrition security and improve household incomes through coordinated interventions that focus on enhancing sustainable agricultural productivity and value addition; providing employment opportunities, and promoting domestic and international trade.

Our analysis shows that the National Agricultural Policy was developed in 2013, before the NCCP came into force in 2015. The policy guiding principles, policy goal and objectives do not include climate change and does not refer to future climate change impact on agriculture³. In section 4.4, the policy recognizes that climate change impact

³Whereas Uganda’s farming systems are largely rain-fed, the National Agriculture Policy’s guiding principles (Section 3.1) and policy goals and objectives (Section 3.2) do not refer to climate change.

adversely affects agricultural productivity and food security and priorities developing capacity at all levels for climate change planning and implementation. Although the policy advocates for irrigation, it does not highlight the impact of climate change on future water availability for irrigation.

Thus, our analysis shows that the National Agriculture Policy moderately incorporates climate change and may thus not adequately guide CSA in Uganda. First, the policy does not address the much needed agro-ecological zoning (it mentions agricultural production zones but does not specify that they are climatically/ecologically suitable) that would guide farmers to grow specific crops, based on the suitability of the agro-ecological zones they live in. In addition, the policy does not mention future climate change impact. A climate smart policy needs to be specific on the current and future climate change concerns it seeks to address and since planning is geared at addressing future needs and challenges, the agricultural policy in its current form may not adequately guide efforts to addressing maladaptation that may arise in the future.

The Agriculture Sector Strategic Plan (2015/16 - 2019/20) is highly aligned to the NDP II and operationalizes the National Agricultural Policy (MAAIF, 2016b). The ASSP defines the priorities and interventions to be implemented over the five-year period to enhance the contribution of agriculture to national wealth creation and increased employment along the agricultural value chains in a sustainable manner (MAAIF, 2016b). The plan focuses on four priority areas: (i) increasing production and productivity of agricultural commodities and enterprises; (ii) increasing access to critical farm inputs; (iii) improving access to markets and value addition; (iv) strengthening agricultural services institutions and enabling environment.

Our analysis further shows that the sector plan adequately mainstreams climate change adaptation and incorporates almost all the agriculture related climate change concerns prioritized in the NCCP. The Plan prioritizes mainstreaming climate change adaptation and mitigation in all technologies and practices across the 10 Agricultural Ecological Zones (AEZ). Specifically, the sector plan provides for: increasing agricultural productivity through climate smart agricultural practices; increasing the resilience of agricultural landscapes and communities; strengthening the enabling environment for efficient and effective scaling up of climate smart agriculture; increase partnerships and resource mobilization initiatives to support implementation of climate smart agriculture; provide technical support to farmers and other stakeholders designing and or implementing climate related interventions at all levels in the agriculture sector. The plan also fosters transformation of agricultural activities and promotes sustainable land management in order to reduce emissions in the agriculture sector.

Uganda's National Agriculture Extension Policy (2016) is geared at reforming the extension services with a goal "to strengthen a sustainable farmer-centred agricultural

extension system for increased productivity, household incomes and exports". Whereas the policy recognizes climate change as a cross-cutting issue and foresees the need for integrating climate change and environmental management into extension services, there is no mention of specific strategies for its attainment. In addition, the policy recognizes the role of local governments and non-state actors in developing, packaging, and disseminating climate change adaptation and mitigation. Therefore, the NEAP is framed as a development policy and has very limited alignment to climate change adaptation.

Coffee remains the most important commercial agricultural commodity and the major foreign exchange earner and has been contributing an annual average of 20% of Uganda's total export revenue for the last ten years (Ojambo, 2014; White & Kitimbo, 2018). The National Coffee Policy (2013) was developed to guide and regulate activities of various stakeholders in the coffee industry; so as to improve production, roasting, processing and marketing of coffee. The policy seeks to, among others, increase coffee production and productivity at farm level in a sustainable way that addresses the social, ecological and economic dimensions and to support and strengthen coffee farmer organizations to participate effectively in all the stages of the coffee value chain. Although the coffee policy recognizes that climate change has implications on changing production patterns and increased incidence of pests and diseases, it mostly focuses on interventions for overall commercial and environmental sustainability. However, the Policy does not explicitly address adaptation to climate change and the need for promoting a climate smart coffee sector. Therefore, the Coffee Policy needs to be reviewed with the aim of mainstreaming climate change and specifically considering global best practices of coffee farming, such as supporting and promoting the use of multipurpose shade trees in the context of climate change and ensure that the species selected do not harbor pests. There is also need to build climate resilient coffee value chains.

Although our analysis did not find a specific National Agricultural Research Policy, Uganda has the National Agriculture Research Act 2005 that regulates agricultural research in Uganda. It is aimed at: transforming agricultural production into a modern science-based market-oriented agriculture capable of greater efficiency, profitability and of sustaining growth in the agricultural sector while contributing to poverty eradication; promoting agricultural and related industry for the purposes of contributing to the improvement of the quality of life and livelihoods of the people, having regard to the protection of the environment; and supporting the development and implementation of national policy with relevant information and knowledge. However, the Act was developed before climate change was apparent, and as such it does not mention climate change and cannot guide climate change adaptation.

Recognizing that land degradation is a major impediment to sustainable growth in agriculture, natural resources productivity, and national economic development, the

Ugandan government put in place the Uganda Strategic Investment Framework for Sustainable Land Management (SLM) 2010-2020 to strengthen sectoral cooperation in order to halt, reverse and prevent land degradation/desertification and mitigate the effects of climate change and variability in Uganda. The main sectors involved in the SLM Investment Framework include: agriculture, environment and natural resources, energy, lands, housing and urban development, wildlife and tourism, and trade. The Investment Framework avoids duplication across stakeholders and sectors.

Climate change features very prominently in the SLM objectives and activities of investment framework, and the main focus areas are to: i) raise crop and animal productivity; ii) reduce deforestation; iii) secure ecosystem services; and (iv) improve rural livelihoods. Agriculture related SLM practices such as erosion control through terracing, mulching and contour ploughing, agroforestry, conservation agriculture, and integrated nutrient management are prioritized and these increase the climate change resilience of Uganda's farming systems. Moreover, catchment management, which is an integral part of ecosystem-based adaptation, is also a priority intervention.

Land is Uganda's prime and critical asset in development and it is thus a central issue in the country's policy and development context. The way it is used and managed will play a key role in the achievement of Uganda's development agenda, and the agriculture in particular because it remains a sector of strategic importance for Uganda's socio-economic transformation. The GoU developed the Uganda National Land Policy 2013 with the goal of "to ensure an efficient, equitable and optimal utilization and management of Uganda's land resources for poverty reduction, wealth creation and overall socio-economic development". Among other things, the policy seeks to re-orient the land sector in national development, by articulating its centrality vis-à-vis other sectors in economic development.

The policy seeks to promote sustainable agricultural systems by zoning to establish appropriate agro-ecological zones, pastoral resource areas and access, maintaining an equitable balance between the use of land for pasture, agriculture, energy, industry and for wildlife protection (Section 2.3). The Land Policy also seeks to address the disparities in ownership, access to and control of land by vulnerable groups (including women); displacement, land grabbing and landlessness resulting from high population growth and the increasing demand on land for investment, particularly the communal lands that are neither demarcated nor titled. The policy also provides for incentives to enhance land utilization for development and discourages the practice of holding large tracts of land for speculative purposes, while serious developers or landless people are without access to land. Other issues addressed by the land policy include underutilization of land due to poor planning and land fragmentation, environmental degradation and climate change, poor management of the ecological systems due to their trans-boundary nature and unsustainable exploitation arising out of the conflicting

land uses and inadequate enforcement of natural resources management standards and guidelines. Climate change is mainstreamed in the land policy⁴. The policy recognizes that the impact of climate change (droughts, desertification and floods) hamper the realization of Uganda's development goals. The policy seeks to utilize land in a manner that enhances climate change adaptation and mitigation and fosters the mainstreaming of climate change and sustainable management of environment and natural resources in policy and practice.

3.5 Agriculture specific climate change policies and their alignment to gender (women) and youth issues

The agriculture sector was the first sector to develop a National Adaptation Plan (NAP). With support from FAO through the Global Climate Change Adaptation Project, MAAIF developed a National Adaptation Plan (NAP Ag) for the Agricultural Sector that was launched in November 2018. The NAP Ag. seeks to "reduce vulnerability and enhance adaptive capacity of the agricultural sector to the impacts of climate change in order to achieve sustainable agricultural development" (MAAIF, 2018a). The NAP Ag. comprehensively addresses agricultural sector adaptation concerns in the NCCP and prioritises to: conduct studies on climate resilient crop varieties and cultivars (early maturing and drought tolerant) in the different agro-ecological zones; promote and scale up conservation agriculture practices such as agro-forestry and sustainable land management; conduct studies on the irrigation potential and identify sites in various river floodplains and underground water sources for micro-irrigation systems; promote diversification of livelihoods through supporting of alternative off-farm and non-weather dependent enterprises and employment; strengthen platforms, through which small scale farmers can access agricultural information and extension services; promote and encourage highly adaptive and productive livestock breeds. Although the sector NAP focuses on adaptation, it recognizes that some adaptation actions have a mitigation aspect and that mitigation co-benefits are crucial to climate smart agriculture.

In 2015, a CSA Program was developed jointly by MAAIF and MWE in order to build the resilience of agricultural farming systems for enhanced food and nutrition security, wealth creation and sustainable economic growth in line with the Vision 2040. The CSA programme is climate change specific with six result areas i.e. improving agricultural productivity and incomes, building climate resilience and related mitigation co-benefits, value chain integration, research for development and innovations, improving and sustaining agricultural advisory services, and improving institutional collaboration. Specifically, the CSA fosters improved (climate smart) livestock production through adoption of improved technologies improved quality (grazing and fodder) feed resources; appropriate irrigation technologies; Crop and livestock weather-indexed insurance; reducing post-harvest losses along staple foods, livestock and fish value chains;

⁴Section 6.10 of the policy is dedicated to addressing climate change.

adoption of CSA and sustainable land management practices by at least one million households by 2025; REDD+ and increased adoption of farm forestry. The programme also seeks to put in place and implementing a comprehensive Early Warning System and Contingency Plan and to mobilize and build capacity of smallholder farmers for collective and cooperative effort to engage in more efficient handling, storage, agro-processing and marketing.

The agriculture sector has taken another proactive step to develop sectoral climate change mainstreaming guidelines. The guidelines for mainstreaming climate change adaptation and mitigation in the agricultural sector policies and plans (MAAF, 2018b) were developed and launched in November 2018. The guidelines aim to: “ensure that interventions developed and implemented within the agricultural sector address climate change issues through activities of mitigation and adaptation and provide practical, step-by-step guidance for all agricultural sector stakeholders including MAAIF, its agencies and local governments, on mainstreaming climate change adaptation and mitigation in their planning and decision-making processes”.

3.6 Local development policy framework

Uganda’s governance structure is anchored in the decentralization policy and the Local Governments Act 1997. However, the decentralization policy, now under review, does not incorporate climate change. The main development policies at the district are the District Development Plan (DDPs). The goals, objectives and planned interventions in the Arua, Kyegegwa and Kyenjojo DDPs were found to be properly aligned to the Uganda Vision 2040 and the NDP II. The climate change and agricultural related issues in the DDPs are: sustainable environmental and natural resources management (especially the restoration of degraded forests and wetlands), improved/high value crops and livestock breeds, access to output markets and financial services, agricultural extension and advisory services and livelihood diversification; prioritized in all the three DDPs. Although the NCCP policy mandates local governments to mainstream climate change in local government plans, our analysis found that the DDPs of the three districts had not incorporated the climate change concerns prioritized in the NCCP and its cost implementation strategy. Only the Arua DDP identifies climate change as a development challenge and all the three DDPs had no climate change interventions and budget lines. In addition, the three districts had no institutional coordination mechanisms for mainstreaming, implementing and reporting climate change interventions.

The Arua DDP for the period 2015/16-2019/20 recognizes climate change as a constraint to agricultural production and poverty reduction and a driver to environmental degradation. However, apart from one project “Construction of Production wells for irrigation with solar pump” funded by PRDP (Arua District Local Government, 2015), the DDP does not have climate change specific interventions and budget allocations.

The Kyegegwa DDP for the period 2015/16 – 2019/20 mentions climate change once as one of factors constraining agricultural production (Kyegegwa District Local Government, 2015). The DDP does not however, mention the major climate challenges the district faces nor does it have specific climate change interventions or budget lines. The Kyenjojo DDP for the period 2015/16-2019/20, only mentions climate change as an environmental challenge resulting from wetland degradation and pollution and recognizes the need for sensitization to raise public awareness on climate change and adaptation (Kyenjojo District Local Government, 2015). Beyond this, the DDP does not mention the current and future climate challenges that the district is faced with and no climate change specific interventions and budget lines are provided in the plan.

3.7 Selected agriculture programmes/projects

A number of agricultural related programmes and projects have been implemented by the GoU through the MAAIF and government MDAs and other partners, aimed to promoting agricultural development and food security, sustainable agricultural systems as well as increasing the resilience of agriculture to the impact of climate change. Regarding climate smart agriculture, the programmes and projects have been promoting technologies and practices including conservation agriculture, agroforestry, soil and water conservation (mulching, terracing, ridging, strip and contour cultivation, cover crops etc.), water harvesting and management for crops and livestock, irrigation, intercropping, livestock management, improved fodder production, biogas and watershed/water catchment management, with varying levels of success. In this section we discuss the main programmes and projects, their alignment to climate change and levels of successes in implementation.

3.7.1 Comprehensive Africa Agricultural Development Programme (CAADP)

The Comprehensive Africa Agricultural Development Programme (CAADP) was adopted in July 2003 at the 2nd African Union (AU) Assembly of Heads of State and Government held in Maputo, Mozambique . After the Assembly, Heads of State and Government signed the Maputo Declaration on agriculture and food security whose commitments were to be implemented under CAADP. CAADP focuses on four key pillars to achieve measurable outcomes, namely: (i) extending the area under sustainable land management and reliable water control systems; (ii) improving rural infrastructure and trade related capacities for market access; (iii) increasing food supply, reducing hunger, improving responses to food emergency crises; and, (iv) improving agriculture research, technology dissemination and adoption. All in all, the Maputo Declaration on CAADP requires governments to increase agriculture growth rates to 6% per annum to GDP as well as to allocate 10% of their annual public budgets to the agricultural sector .

A decade later, AU Heads of State and Government met again at the African Union

summit in Malabo, Equatorial Guinea in June 2014 where they asserted their commitment to the Maputo Declaration and also made new commitments to overcome impediments that were beyond the agriculture sector. Thereafter, they adopted a new declaration called Malabo Declaration. The Malabo Declaration on Agriculture in Africa is intended to “accelerate agricultural growth and transformation for shared prosperity and improved livelihoods through harnessing opportunities for inclusive growth and sustainable development’ as well as foster the adoption of the Comprehensive Africa Agriculture Development Programme (CAADP)” by 2025. The CAADP-Malabo Declaration has seven commitments/thematic areas which are: (I) Re-committing to the Principles and Values of the CAADP Process; (II) Enhancing investment finance in agriculture; (III) Ending Hunger in Africa by 2025; (IV) Reducing poverty by half, by 2025, through inclusive agricultural growth and transformation; (V) Boosting intra-African trade in agricultural commodities and services; (VI) Enhancing resilience of livelihoods and production systems to climate variability and other related risks; and (VII) Strengthening mutual accountability to actions and results.

Uganda is committed to delivering the Malabo Declaration under CAADP. The CAADP framework seeks to strengthen the quality of agriculture sector development plans under the National Development Plan (NDP). The Agricultural Sector Strategic Plan (ASSP) 2015/16 – 2019/20 is Uganda’s principle instrument for implementing the CAADP (MAAIF, 2016b). However, the GoU has continuously allocated less than 5% of the national budget to agriculture which is below CAADP target of 6% (Rhoads et al., 2015). Although Uganda is generally on track to achieving the Malabo Commitments, it is lagging on commitments: II (i.e. increasing public expenditure and both domestic and foreign private sector investment in agriculture, agribusiness and agricultural industries); III (i.e. access to agricultural inputs & technologies and strengthening social protection); and V (i.e. investment in resilience building). Moreover, the CAADP and ASSP recognize that climate change is pointed out as the most prevalent impediment to the growth of the agriculture sector coupled by limited research information to overcome some of the arising issues.

The main government projects in the agriculture sector linked to achieving the CAADP-Malabo Declaration in the context of achieving results in the thematic areas the country is lagging in are: Enhancing National Food Security through increased Rice Production Project (ENRP), Agriculture Cluster Development Project (ACDP) and the Regional Pastoral Livelihoods Resilience Project (RPLRP) These projects emphasize increase in agricultural productivity, food security and improving climate change adaptive or resilience of the agriculture sector.

3.7.2 National Agricultural Advisory Services (NAADS)

Uganda’s Agricultural Extension Policy has since 2001 been implemented by the National Agricultural Advisory Services (NAADS) programme, a 25-year donor funded

extension services and input subsidy delivery programme is implemented, by MAAIF, in all the districts across the country. According to Benin et al. (2011), NAADS has been able to improve rural service delivery in farming communities, strengthened the institutional and human resource skills of farmers to potentially demand and manage the delivery of agricultural advisory services, increase the adoption of new enterprises and technologies by participating farmers, and increased crop and livestock productivity and commercialization of agriculture. However, a review of the NAADS programme in 2010 suggested a weak relationship between research institutions and extension agents in access to quality technologies and providing research-based advice to farmers in the country (World Bank, 2010). It was observed that recent extension programs under NAADS have reached only a limited number of farming communities (22%) and tended to benefit only better off farmers. By not focusing on increasing access to critical agricultural inputs, agribusiness and value chain improvements, improving household food security and incomes under the NAADS, climate-proofing the programme's activities is relevant. This would contribute towards climate change adaptation and mitigation carried out in the agriculture sector. Moreover, the programme does not have specific interventions to address the climate change issues affecting farmers.

3.7.3 Prosperity for All Programme (PFA)

The Prosperity for All (PFA) programme initiated in 2008 had the aim of reducing poverty by empowering households, especially rural families, in increasing their incomes to UGX 20 million per annum (AfranaaKwapong & Nkonya, 2015). The PFA was funded by the Government of Uganda through the Ministry of Finance, Planning and Economic Development in partnership with the International Fund for Agricultural Development (IFAD). Implementation of the PFA was based on the components under the Rural Financial Services Programme (RFSP) which fostered sustainable mechanisms for delivering financial services to rural people at a community level. Rural people were required to form small groups, such as SACCOs, to access PFA's financial benefits (Makoba & Wakoko-Studstill, 2015).

Since the majority of the beneficiaries were agriculturalists, the PFA in contributed enormously to the agriculture sector particularly productivity. Recognizing that, farmers require lot of financial assistance to increase agricultural productivity in terms of soft loans for mechanization or buying farming equipment, and adding value to their produce, PFA increased farmers' access to rural financial services like low credit or easy saving services. Over 700 SACCOs were established and supported by Government under this programme and banks, such as Centenary Bank, were successful in extending credit to smallholder farmers. On the other hand, PFA was challenged by many cases of fraud and corruption; highly influenced by politics; the become difficult to supervise and limited sensitization of PFA beneficiaries that led to the collapse of some SACCOs. Other challenges included; limited clarity of the PFA guidelines and the existence of

funding gaps for some of its activities (AfranaaKwapong & Nkonya, 2015; Makoba & Wakoko-Studstill, 2015).

3.7.4 Operation Wealth Creation (OWC)

The Operation Wealth Creation (OWC) was launched in June 2013 and operationalized in 2014 with an aim of transforming the socio-economic livelihoods of households engaged in agriculture. The goal is to raise household incomes and increase wealth creation by assisting subsistence farmers transform into commercial farmers (Robert & Mesharch, 2018). The specific objectives of OWC are to: (i) mobilize the masses to engage in commercial agricultural activities in order to boost household incomes; (ii) distribute production inputs equitably and timely to boost production and productivity at household level; (iii) facilitate rural technological upgrading to allow smallholder farmers to transform themselves into small-scale industrialists; (iv) stimulate local and community enterprise development across the country; (v) facilitate infrastructural development particularly in rural areas; and (vi) empower the 68% of the population outside the money economy .

OWC is operationalized under NAADS, and designed to be implemented in 4 phases. Phase 1, which ended in July 2017, focused on mobilizing and sensitizing farmers to adapt new farming methods through mindset change interventions. During this phase, agricultural inputs, like equipment, improved seed and animal varieties, were also distributed in about 112 districts across the country. Phase 2 ensured that OWC built on the achievements of phase 1 and fostered policy changes aligned to the identified gaps. Building on phases 1 and 2, phase 3 seeks to attract investors to increase opportunities for the OWC beneficiaries as well as establish skilling institutions for local farmers. Phase 4 is the exit strategy to achieve and build on the objectives and achievements of OWC respectively. Although the programme was not designed and implemented to address climate change, OWC has distributed drought tolerant and high value crop varieties thus promoting climate smart agricultural activities. Other achievements of OWC are: contribution to improved agricultural extension service delivery, participation in policy formulation like the Agriculture Sector Strategic Plan, built crop value chains in collaboration with NAADS, and increased debate on ways of improving agricultural production in the country. The main challenges of the OWC are (i) supply of small quantities of inputs due to budget constraints; (ii) poor quality inputs; (iii) participation is more or less by the elite farmers; (iv) stringent entry requirements; (v) late delivery of supplies, when rainy seasons have ended; (vi) poor flow of information between the programme proponents and beneficiaries (Robert & Mesharch, 2018).

3.7.5 Fostering Food Security Programme

The Fostering Food Security Programme is carried out under the Fostering Food Sustainability and Resilience for Food Security in Karamoja Sub Region project and jointly implemented by UNDP, FAO and MAAIF with funding from the Global Environmental

Facility (GEF) Trust Fund. The Fostering Food Sustainability and Resilience for Food Security project is being undertaken in the Karamoja sub-region (Kaabong, Kotido, Moroto and Nakapiripit districts) focusing on land degradation, biodiversity and climate change. The overall development objective is to improve food security by addressing the environmental drivers of food insecurity and their root causes in the Karamoja sub-region of Uganda in order to contribute to enhancing long-term environmental sustainability and resilience of food production systems in the Karamoja Sub-Region. The resilience aspects of the project are geared at addressing the shocks and stresses brought about by climate variability and change, environmental factors, conflicts, and food insecurity among others. Thus, the project is highly aligned to addressing climate change vulnerabilities in the Karamoja region.

The project's outcome seek to channel investments into the food production systems and value chains using a Farmer Field School (FFS) approach adapted to the realities of the agro-pastoral societies of Karamoja; increase production through climate resilient production techniques, diversify production to increase income and reduce vulnerability to food insecurity. The programme promotes ecosystem-based adaptation by seeking to rehabilitate ecosystem services through restoration, agro-forestry, natural regeneration and sound pasture management. To this end, the programme is highly climate change sensitive.

3.7.6 Uganda Green Incubation Programme

The Uganda Green Incubation Programme is one of the government's major attempts on implementing the principle of inclusive green growth and equity. The programme is still at the pilot phase and results are yet to be realized. The programme is spearheaded by the MoGLSD with financial support from the UNDP and is aimed at creating green decent employment, enhancing productivity, reducing poverty and ensuring environmental sustainability. Under this programme, Uganda is attempting to domesticate the Songhai model and the pilot area has already been launched at Kampiringisa, Mpigi district (NPA, 2017). The model has been identified as one of the safe spaces the youth can exploit to learn about agriculture and value addition.

The Songhai model is primarily a regenerative agricultural approach which uses agro-ecological practices to boost soil fertility, and increase yields while protecting the environment. The model emphasises; production of more with less, zero waste, creation of green jobs, inclusive economy and self-reliance. All its processes are purely organic and integrate crop production, animal husbandry and aquaculture. Its primary stage focuses on production of raw materials such as crops and livestock while at the secondary stage, the model promotes processing and value addition of the raw materials. The model also incorporates marketing of its products and is inclusive of training programmes for the youth, women and community members interested in the model. In Uganda, the Songhai Model involves an integrated system of development

that seeks to reduce poverty, youth and women unemployment and food insecurity by strengthening the technical and organizational capacities of communities to produce efficiently and sustainably.

3.7.7 Regional Pastoral Livelihoods Resilience Project (RPLRP)

The Regional Pastoral Livelihoods Resilience Project (RPLRP) is a five-year activity implemented by the GoU through MAAIF and funded by the International Development Association (IDA) of the World Bank at a tune of USD 40 million. The project aims at enhancing livelihood resilience of pastoral and agropastoral communities in cross-border drought-prone areas of selected countries and to improve the capacity of selected governments to respond promptly and effectively to an eligible crisis or emergency.

Implementation of the project commenced in 2015 and its components are; (i) natural resource management focusing on drought-prone communities having secured access to natural resources and acquiring the capacity to sustainably manage these resources; (ii) pastoral risk management focusing on enhanced drought preparedness, prevention and management; (iii) market access and trade i.e. enabling pastoral and agro-pastoral communities access market opportunities and improve their trade; (iv) livelihood improvement i.e. enhancing livestock productivity (including animal health, food and feed production, as well as animal breed improvements) and livelihoods diversification; and (v) project management and institutional support for enhanced resilience. The project is being implemented in 12 districts of north-eastern Uganda i.e. Kaabong, Amudat, Kween, Moroto, Nakapiripirit, Kotodo, Abin, Napak, Katakwi, Kumi and Amuria dostricts that are drought-prone arid lands and have been under-resourced, leaving their population more vulnerable to external stressors.

The project is highly aligned to climate change adaptation because it seeks to mitigate the impact of drought at local, national and regional levels, specifically geared as increase resilience of pastoral communities to address medium-term and long-term climate related vulnerabilities like droughts, resource conflict and food insecurity. Support for building climate change resilience is focusing on increasing water access and water resource management; pastoral and agro-pastoral sustainable land management; promoting and disseminating drought tolerant crop and feed crop technologies, identification and strengthening alternative livelihoods, strengthening early warning systems, and operationalizing disaster risk management and contingency planning.

3.7.8 Enhancing National Food Security through increased Rice Production Project (ENRP)

This project is being implemented by MAAIF with support from the Islamic Development Bank (IDB) aims to increase production and productivity of mainly smallholder rice farmers. Interventions include: (i) bringing into productive use 5,500 ha of land under protective irrigation; (ii) doubling the productivity of small-scale producers from a

national average of 1.5 tons/ha to 3 tons/ha; and, (iii) facilitating the development of agro-processing and marketing for rice output from small scale producers. Specifically, the project seeks to address key inputs and output bottlenecks; management of water for production, and developing producer organizations (POs) with a focus on; creating group cohesiveness and developing business/marketing skills, creating market linkages with buyers and linking them with service providers (for extension, inputs, finance, output etc.). By incorporating irrigation and water for production, the project is moderately aligned to climate change although it does not specifically state so. Rice production in Uganda is largely water dependent, and by not incorporating the current and future climate change impacts (and of course water availability), the project could lead to maladaptation; another policy gap that needs to be addressed.

3.7.9 Enabling Environment for Sustainable Land Management (SLM) to Overcome Land Degradation in the Uganda Cattle Corridor

This project was implemented by the GoU and UNDP between 2010-2015 with financial support from the Global Environment Facility (GEF). The project was climate change environment specific. The main objective was 'to provide land users and managers with the enabling policy, institutional and capacity environment for effective adoption of SLM within the complexity of the cattle corridor production system'. The project was, among others, successful in integrating CSA and environmental management practices in six districts of Uganda – Nakasongola, Nakaseke, Lyantonde, Sembabule, Kamuli and Kaliro. Through the project, five policies relating to institutional and regulatory arrangements for sustainable charcoal have been reviewed and a policy brief on the framework for charcoal prepared and presented to energy sector policy makers to guide revision of existing policies. In addition, fifteen charcoal producer associations have established constitutions stipulating rules and regulations for managing charcoal production and marketing processes and they are actively enforcing them amongst themselves as part of efforts to control cutting down of trees.

3.7.10 Enhancing Adaptation to Climate-Smart Agriculture Practices in the Farming Systems of Uganda

This COMESA-UNDP project was implemented by UNDP in partnership with MAAIF, NARO and MWE to enhance the adoption of climate smart agriculture CSA adoption in five districts: Namutumba, Bugiri, Budaka, Busia and Buyende. The project's main objectives are to increase productivity through the sustainable management of soil and water resources and build capacity of farmers and extension officers at local government level in an effort to develop a climate change resilient society and generally increase the number of farmers using climate-smart agriculture practices. The project has supported farmers to engage agroforestry, established climate-smart gardens in at least 30 schools and training teachers and students to manage these gardens, as well as developing a monitoring and evaluation system for CSA technologies. This is a highly climate specific

project that scales up CSA practices whose implementation was highly successful.

3.7.11 Agricultural Technology and Agribusiness Advisory Service (ATAAS)

The World Bank funded ATAAS aims at increasing agricultural productivity and the household incomes of participating smallholder farmers through support to National Agricultural Research Organization (NARO) and National Agricultural Advisory Services (NAADS) to transform and improve the performance of agricultural technology development and advisory service systems in Uganda. The project is highly climate aligned as it focuses on enhancing the sustainability and resilience of agricultural production systems to land degradation and climate risks, as well as expanding the area under improved land and water management practices. The SLM component was mainly implemented in Nakasongola and Lira districts.

3.7.12 Strengthening Climate Information and Early Warning Systems for Climate Resilient Development and Adaptation to Climate Change in Uganda

The project aims to ensure the establishment of information infrastructure on weather, climate and disaster management. The project is implemented by the Uganda National Meteorology Authority and the Department of Water Resources Management in the Ministry of Water and Environment, in partnership with the Ministry of Agriculture, Animal Industry and Fisheries, Office of the Prime Minister and other relevant partners at national and district level.

3.7.13 Agricultural Adaptation to Climate Change in the Central Cattle Corridor Project

The project is being implemented in Uganda in the framework of the Global Climate Change Alliance (GCCA) with main funding partners – the European Union and the Government of Belgium. The project is being implemented by FAO in partnership with MWE and MAAIF. The project, now in its second phase, is aimed to strengthen the resilience of the rural population and the agricultural production systems in the central part of the cattle corridor, and to build the capacities of communities, commercial farmers and the Government of Uganda to cope with climate change. The project seeks to ensure ownership and alignment by supporting the implementation of the National Adaptation Programme of Action (NAPA), and now NAPs, particularly its components of water for production, drought adaptation, tree planting and climate-compatible development planning. Among other things, the project is increasing climate change awareness and knowledge in selected departments and districts, and ensuring that good adaptation practices are integrated into policies and plans.

3.8 Score card performance on mainstreaming climate change in agricultural policies and programmes

A score card performance, whose methodology is already described in section 1.3.3.2, was used to assess the extent to which agricultural related policies, plans and programmes have mainstreamed climate change and the results are presented in Table 2. A total of 14 policies/plans/strategies were assessed using the score card, 12 of which are from the agricultural sector. The other two policies are from MoGLSD i.e. the National youth Policy and the Gender Policy, and these were also considered because this study also focused on gender/women and youth climate resilience. As illustrated in Table 2, four policies/plans were found to be extremely highly aligned (mainstreaming) to climate change/mainstreaming i.e. Agriculture sector NAP, Uganda GGDS, Uganda CSA Programme, and Agriculture Sector Mainstreaming guidelines. This would be expected because these policies/plans were designed specifically to address climate change. Two were found to be highly aligned and two aligned. The highly aligned policies were the Strategic Investment for SLM and National Strategy for Youth Employment in Agriculture, while the two that were found to be aligned were the National Agricultural Policy and the Agricultural Sector Strategic Plan (2015/16-2019/20). Two other policies were found to be somewhat/moderately aligned i.e. the land policy and coffee policy. Finally, three policies were found not be not aligned to climate change i.e. National Youth Policy, National Gender Policy and National Agricultural Research Act.

As for programmes and projects, three programmes were found be extremely highly aligned, six highly aligned, one aligned and four are not aligned to climate change (see table 3). The three programmes/projects extremely mainstreaming are: the Agricultural Adaptation to Climate Change in the Central Cattle Corridor Project; the Uganda Green Incubation Programme; and, the Enhancing Adaptation to Climate-Smart Agriculture Practices in the Farming Systems of Uganda. The bottom four programmes/projects that were found not be mainstreaming climate change are: OWC, PFA, YLP and the Enhancing National Food Security through increased Rice Production Project.

Table 2: Score card performance of agricultural policy alignment to/mainstreaming climate change

	Policy or program/Factor	Policy goals and objectives	Current and future climate change risks	Policy/ programme interventions	Triple wins (adaptation, mitigation and development)	M&E	Overall Score 20 (Max score 20 points)	Alignment Rank	Description of alignment**
1	National Adaptation Plan (NAP) for the Agricultural Sector	4	4	4	4	3	19	1	Extremely high aligned
2	Uganda Green Growth Development Strategy	4	3	4	4	4	19	1	Extremely high aligned
3	Uganda Climate Smart Agriculture Program	4	3	4	3	3	17	3	Extremely high aligned
4	Agriculture sector climate change mainstreaming guidelines	4	3	3	3	4	17	3	Extremely high aligned
5	Uganda Strategic Investment Framework for Sustainable Land Management (SLM) 2010-2020	3	2	3	4	3	15	5	Highly aligned
6	National Strategy for Youth Employment in Agriculture	0	2	4	4	3	13	6	Highly aligned
7	Agriculture Sector Strategic Plan 2015/16-2019/20	0	4	3	3	2	12	7	Aligned
8	National Agriculture Policy for Uganda 2013	0	4	4	4	0	12	7	Aligned
9	National Agriculture Extension Policy 2016	0	1	2	2	1	6	9	Moderately aligned
10	National Coffee Policy	0	3	2	1	0	6	10	Moderately aligned
11	National Land Policy	0	1	3	1	0	5	11	Moderately aligned
12	Uganda National Youth Policy 2016	0	0	1	1	0	2	12	Not aligned
13	National Agriculture Research Act	0	0	0	0	0	0	13	Not aligned
14	National Gender Policy 2007	0	0	0	0	0	0	14	Not aligned

**0-4 = not aligned; 5-9 = somewhat/moderately aligned; 9-12 = aligned; 13-16 highly aligned; 17-20 extremely highly aligned.

Table 3: Score card performance of agriculture programmes/projects' alignment to/mainstreaming climate change

	Policy or program/Factor	Policy goals and objectives	Current and future climate change risks	Policy/ programme interventions and outcomes	Triple wins (adaptation, mitigation and development)	M&E	Overall Score 20 (Max score 20 points)	Alignment Rank	Description of alignment**
1	Agricultural Adaptation to Climate Change in the Central Cattle Corridor Project	4	4	4	4	4	20	1	Extremely highly aligned
2	Uganda Green Incubation Programme	3	3	3	4	4	17	2	Extremely highly aligned
3	Enhancing Adaptation to Climate-Smart Agriculture Practices in the Farming Systems of Uganda:	4	3	4	3	3	17	2	Extremely highly aligned
4	Fostering Sustainability and Resilience for Food Security in Karamoja Sub Region project	3	3	4	3	3	16	4	Highly aligned
5	Regional Pastoral Livelihoods Resilience Project (RPLRP)	3	3	3	4	3	16	4	Highly aligned
6	Enabling Environment for Sustainable Land Management (SLM) to Overcome Land Degradation in the Uganda Cattle Corridor	3	3	3	3	3	15	6	Highly aligned
7	Agricultural Technology and Agribusiness Advisory Service (ATAAS)	2	2	4	4	3	15	6	Highly aligned
8	Comprehensive Africa Agricultural Development Programme (CAADP)	3	3	3	3	2	14	8	Highly aligned
9	Strengthening Climate Information and Early Warning Systems for Climate Resilient Development and Adaptation to Climate Change in Uganda:	4	4	4	2	4	14	8	Highly aligned
10	National Agricultural Advisory Services (NAADS)	0	0	3	3	1	7	10	Aligned
11	Operation Wealth Creation (OWC)	0	0	2	2	0	4	11	Not aligned
12	Prosperity for All Programme	0	0	2	2	0	4	12	Not aligned
13	Enhancing National Food Security through increased Rice Production Project	0	0	2	1	0	3	13	Not aligned
14	Youth Livelihood Programme (YLP)	0	0	0	0	0	0	14	Not aligned

**0-4 = not aligned; 5-9 = somewhat/moderately aligned; 9-12 = aligned; 13-16 highly aligned; 17-20 extremely highly aligned.

4 MAINSTREAMING WOMEN AND YOUTH ISSUES IN AGRICULTURAL POLICIES AND PROGRAMMES

4.1 Introduction

This study also sought to establish the extent to which Uganda's agricultural policies address the peculiar climate resilience issues affecting women and the youth. In this section highlights the connection between gender, agriculture and climate change. Specifically, refers to the climate vulnerabilities of women and youth in agriculture sector in Uganda. It also analyses the way agricultural policies and programmes incorporate the climate change adaptation needs of women and youth and the policy gaps therein.

4.2 Women vulnerabilities and engagement in climate smart agriculture

From a gender perspective, climate change severely affects women more than men because women have lesser entitlements, are poorer and face more constraints not only in their social lives but also in undertaking agriculture. Gender considerations therefore, need to be taken into consideration when designing and implementing climate smart agricultural policies, plans and programmes. Dybenko (2009), notes that awareness of gender issues is crucial when shaping responses to climate change and environmental policy. Chaudhury et al., (2012) observes that the ability of men and women to adapt to climate change differs and there is a gender dimension in the choice of adaptation strategy (Nabikolo et al., 2012). For example, women have heavy household tasks as compared to men; travel long distances to farms and market centres, and the end result is that they are constrained by time. These household burdens may also translate into other constraints such as reduced access or awareness to climate information and knowledge (Nabikolo et al., 2012) which may in turn influence the way they respond to climate change. Women face limitations in adopting adaptation technologies because of the gender gap that they face in access to productive resources such as land, working animals, credit, and extension services (FAO, 2011). In addition, climate change adaptation activities require adequate crop land (Juana et al., 2013) and women who are majorly in crop cultivation are pushed to the limits when it comes to responding to changing climatic conditions.

From the Ugandan perspective, climate change adaptation actions require the involvement of women, because the ratio of men to women is 95:100. In rural communities, women and girls are responsible for collecting fuel wood, a physically draining task spending approximately 2.5 times more time per day on fuel than do men (UNDP, 2015). As a result, women have less time to fulfill their domestic responsibilities, earn money,

engage in politics or other public activities, learn to read or acquire other skills, or simply rest. Girls are sometimes kept home from school to help gather fuel, perpetuating the cycle of disempowerment. Moreover, when environmental degradation forces them to search farther afield for resources, women and girls become more vulnerable to injuries from carrying heavy loads for long distances, and also face increased risk of sexual harassment and assault. This implies that domestic burdens of women as having a direct and negative impact on their productivity. For example, Ali et al., (2015) attribute women's lower agricultural productivity to what they term as a "dependency gap," and conclude that the overall work burdens of women, when domestic tasks are considered, have a direct, and negative, effect on women's economic opportunity and productivity.

Climate change also has significant impact on water sources hence affecting the availability of water used for domestic and productive tasks. The consequences of the increased frequency in floods and droughts are far reaching to those responsible for water management at the household level. Women and girls bear the burden of fetching water for their families and spend time daily hauling water from distant sources. Besides the water from distant sources is rarely enough to meet the needs of the household and is often contaminated, such that women and girls also pay the heaviest price for poor sanitation. For instance, in the Karamoja sub-region, their personal security and physical integrity at risk as they come into contact with the male folk that is seeking water for livestock, thus exposure to rape, defilement and other forms of gender-based violence.

In Uganda, women still face gender-based discrimination on ownership of land and access to natural resources, credit, thus leading to economic marginalization of women (Gomez, 2012; Mukasa et al., 2012). Women have an inadequate resource base compared to men. This cumulatively puts women in a disadvantaged position in coping with the adverse impacts of the changing climate having implications on productivity. According to Byamugisha (2013), without a title to the farm land, women are unable to raise the money needed to improve their small harvests or to raise living standard.

Climate change adds a new complexity to the areas of human mobility and settlement by exacerbating environmental degradation. While migration is a survival response to climate change, frequent human resettlement further exacerbates the loss of biodiversity and ecosystems. This is the case given that migration entails vast changes in land-use, and the physical modification of rivers or water withdrawal from rivers. For instance, in farming communities the men go further away to look for pastures. There are also cases of cross border migration especially the districts neighboring other countries, where men cross in search for work and women remain home to fend for the children.

Key informant interviews and focus group discussions conducted in Arua, Kyegegwa and Kyenjojo districts revealed that the harsh conditions brought about by climate change hazards make communities work harder to find the means to sustain their

families. In particular, most of the gender roles change with seasons or when extreme weather events such as droughts, dry seasons, floods and rainfall/hailstorms occur. The findings reveal that:

- As communities cope with climate change, women's workload increases - their burdens of looking for water, wood fuel, and food increases during the long dry seasons.
- More women were said to engage in male-dominated activities such as charcoal burning and selling, casual labour, building, brick making and businesses or petty trade.
- Scarcity of water and firewood during the dry seasons tends to interrupt children's school attendance, as the children have to collect firewood and water before going to school. This means that they sometimes either miss school completely or go to school late.
- Some climate smart technologies require new or modified tools that require money for acquisition which females may lack.

The perceived low social status of women and girls translates into increased vulnerability and reduces resilience. Women and girls' limited access to resources, decision-making power and enjoyment of individual and community rights affect their ability to respond effectively to shock/stress. Most women may not adopt climate change interventions because of their reduced access to sources of climate information and the appropriate adaptation technologies. Women also have lower decision-making power with regard to asset utilization (especially land), have lesser mobility as compared to men, and are unfavourably included in public programmes.

Some of the documented ways (Dankelman, 2010; Lambrou & Nelson, 2010; FAO, 2013) in which rural agrarian women cope with climate change include: putting more time, effort and energy into work and migration to find food and work. This situation provides a strong basis for designing climate change adaptation activities and policies that build resilience for women, men, girls and boys (Opondo et al., 2016).

4.3 Gender policies and climate smart agriculture

Uganda's Gender Policy 2007 is the overarching gender policy framework for redressing gender imbalances in Uganda. The policy deals with gender disparity in access to and control over economically significant resources and benefits among other things. Many other policies and laws in Uganda are also gender sensitive. Although Uganda's land law does not discriminate between men and women, it does not address the highly unequal allocation of land between men and women. According to Rugadya (2010) Uganda's gender policy is unable to lay strategy for securing women's rights through

economic avenues and regardless of the policy provision of equal rights to land, women are excluded from owning land. They only retain secondary rights in all land tenure systems.

UBOS and ICF International Inc. (2011) reveal that 61.3% of women in Uganda do not own any land and much as they have the legal right to own and inherit land, in practice their access to land continues to be limited by cultural norms, particularly in rural areas (Bomuhangi et al., 2011) and yet improving women's access to land and security of tenure has direct impact on farm productivity (FAO, 2011). Therefore, for women in Uganda, secure land rights are a foundational building block for agricultural productivity. Hagos (2012); Deininger and Jin (2006) observe that secure property rights may influence agricultural productivity through three routes: (i) long term land investment and adoption of new technologies; (ii) encourage efficient resource use; and (iii) land may be used as collateral to access credit. Access to financial services provides opportunities for improving agricultural output and food security among other things (FAO, 2011). With that position on land and capital resources, climate change adaptation among women is jeopardized because adaptations such as crops diversification and adjustment in farming practices require more investment in land and capital (Yegbemey et al., 2013).

However, our analysis (see Table 2 in Section 3.5) shows that Uganda's gender policy does not incorporate climate change, and this is a huge policy gap. Out of the 14 policies assessed, the gender policy is ranked least in mainstreaming climate change. This is mainly because the gender policy was developed in 2007 before climate change became a serious concern in Uganda (the NCCP came into existence in 2015). Therefore, the gender policy needs to be climate proofed to incorporate the prioritized concerns in the NCCP and NDC. However, implementation of gender (and women) responsive policies and practices, that can also build climate change resilience, is constrained by limited gender awareness among communities, bureaucratic resistance to gender mainstreaming among decision makers, and weak institutional support. There is also limited number of women in technical and leadership positions, absence of gender focal persons required by law, and inadequate knowledge and skills on gender equity issues by policy makers, political leaders and technical staff on the part of local governments (Banana, 2013) and yet the local governments form a chain through which policies are implemented. However, Lakwo (2009) notes that in the local governments, it is not numbers that deter effective representation of women but ineffectiveness of women leaders to champion women needs.

4.4 Mainstreaming gender in the climate change policy

Uganda's NAPA was developed with consideration of gender issues. The NAPA recognizes that climate change affects men and women differently due the different societal roles they play. The implementation of project activities under NAPA such as the

construction of water harvesting roofs in Rakai district (Bambaiha, 2009) and making of energy saving cooking stoves - to reduce energy challenges - in Bundibugyo district were in part aimed at reducing women vulnerability to climate change impacts (Isabirye and Barihaihi, 2013). Women have the responsibility of collecting water and firewood which involves walking long distances in periods of scarcity which exposes the GBSV (Isabirye and Barihaihi, 2013).

The NCCP is highly gender sensitive, recognising that women are among the most vulnerable to climate change impacts driven mainly by existing gender inequality e.g. women have had limited access to and control over resources, especially land and yet they play a crucial role in agriculture and natural resource management. The NCCP prioritizes mainstreaming of gender issues¹ in climate change adaptation and mitigation in order to reduce the vulnerability of women and children. The policy also prioritises the development of relevant gender sensitive indicators in the monitoring and reporting system; inclusion of gender and climate change in education curriculum and training programmes; information sharing and research to better understand the vulnerabilities of particular groups and populations; concerted action to improve women's status; and protecting the right of women to make their own decisions about childbearing. Uganda's NDC prioritises gender mainstreaming². In particular, the NDC recognizes that women are especially vulnerable in terms of food insecurity, water shortage and fuel wood scarcity.

Our analysis also shows that the guidelines for mainstreaming climate change in sector development plans are gender sensitive. The guidelines propose gender sensitivity as one of the criteria for assessing progress/success in climate change mainstreaming of climate change. The Draft Climate Change Bill underscores the differential impact of climate change on men and women, and addresses women climate change challenges. Uganda's GGDS targets inclusive growth and enhancing the empowerment of marginalized groups like women. For example, the strategy targets the achievement of decent jobs in agriculture, 75% of which are for women.

4.5 Mainstreaming of gender and women resilience in agricultural policies and programmes

MAAIF does not have a gender strategy to guide addressing gender issues in policy and practice. This is a big policy gap that constrains the Ministry's efforts to achieve gender equality and women empowerment. Although the Ministry has a gender focal point, it is understaffed and this together with lack of a gender strategy hampers the coordination and implementation of gender sensitive interventions.

¹Gender mainstreaming is one of six common priorities in National Climate Change Policy (Section 4.1

²Uganda's National Determined Contribution recognizes gender mainstreaming in development policies and plan (Section 5) as one of the means of implementation.

We find that the National Agricultural Policy is largely gender-sensitive³. The policy's guiding principles emphasize on provision of extension services to all farmer categories as individuals or in groups, while ensuring gender equity and putting attention to specific needs of vulnerable or marginalized groups, including women. FOWODE (2012) agrees that MAAIF has made efforts to promote gender focused activities, incorporation of gender in policy statements, promotion of labour-saving technologies and fostering formation of women farmer groups. However, these efforts have been limited to some degree for example gender sensitive activities are not usually allocated budgets and the technologies are on a small scale benefiting a few farmers (FOWODE, 2012). In addition, the Agriculture Sector Development Plan 2015/16-2019/20 is highly gender sensitive. Specifically, the sector plan provides for increased climate smart agriculture practices that consider gender equality and empower women.

The SLM investment framework also adequately incorporates gender issues. The strategy notes that land fragmentation has serious implications on land ownership, regarding women's investment in land management practices. It advocates for mainstreaming gender issues in SLM and provides for gender segregated indicators in Monitoring and Evaluation. The National Land Policy is highly gender sensitive prioritizing the promotion of gender equality and protection of the rights of women. For example, policy statement 63 of the policy provides that 'the government shall by legislation protect the right to inheritance and ownership of land for women and children'. It provides for the protection of the land rights of groups and communities marginalized by history or on the basis of gender and other forms of vulnerability to achieve balanced growth and social equity. It also seeks to: redress gender inequity and inequality to inheritance and ownership of land in statutory law and mainstream gender into development planning to improve the status of women.

The NAP also promotes gendered climate smart agriculture interventions to reduce the vulnerability of women, other vulnerable groups through actions such as: mainstream gender in animal breeding interventions; facilitating and supporting the acquisition of improved breeding stocks by men and women farmers; developing and applying a tool for gender-sensitive climate smart agriculture. The Uganda's CSA programme highly incorporates gender equity. It seeks to increase agricultural productivity through CSA practices and approaches that consider gender. For example, it seeks to increase income from food and cash crop production by men and women by 20% and 30% respectively by 2025; increase the proportion of women and youth participating in CSA initiatives by 50% and 20% respectively by 2025; integrate gender in value chain businesses; establish, operationalize and regularly update a robust CSA/SLM knowledge platform with disaggregated data on men and women.

³The guiding principles of the national agriculture policy (section 3.1) include ensuring gender equity in agricultural growth as well as engaging women and youth in agricultural and community development (section 4.1.2).

The agriculture sector guidelines for mainstreaming climate change recognize that climate change has a gender dimension affecting men and women differently; the poorest, the majority of the most vulnerable being women. The guidelines observe that involving women and men in all climate change decision-making processes is a significant factor in addressing the climate change challenge. However, the guidelines do not indicate how women would get involved in the various steps of the mainstreaming process. However, MAAIF does not have a gender strategy to guide gender mainstreaming.

In addition, the three DDPs (of Arua, Kyegegwa and Kyenjojo districts) are highly gender sensitive. For example, the theme of the Arua DDP is:

“Enhancing the district’s production capacities and productivity for sustainable value addition, wealth creation, employment and inclusive growth”, while the vision for the Kyegegwa DDP is “an enhanced livelihood security for all women, men and children of Kyegegwa District”.

Gender is mainstreamed in the DDPs and the women and youth challenges and priorities are well documented. However, as mentioned in section 3.5 all the three DDPs are largely climate change blind and need to be climate proofed. In the same vein they do not incorporate the climate change concerns that affect women, and to this end, the need to be reviewed to incorporate women climate change resilience concerns.

The NAADS programme is gender sensitive seeking to realize the full potential of women and men. However, the climate change resilience issues affecting women are not mentioned or addressed, which is a major gap. Although women are the biggest cohort of society engaged in agriculture, SACCOs and other financial services established under the PFA programme never exclusively targeted (Makoba & Wakoko-Studstill, 2015).

Although the OWC programme is gender sensitive, and both poor women and men are beneficiaries, women face significant challenges that hinder them from effectively benefiting from the programme such as low levels of education, high levels of poverty, lack of ownership of most assets such as land and cultural bias (FOWODE, 2013). These challenges could be addressed through an affirmative action that encourages women’s participation in the market oriented farming.

The Fostering Food Security (FFS) programme also pays special attention to gender-based strategies, specifically prioritising climate resilient interventions targeting women, who are among the most vulnerable in order to ensure equality of participation and remove underlying vulnerabilities. These include women engagement in income generating activities, women access to financial assistance through village saving and loan associations. The project’s interventions address climate change and food insecurity by prioritizing female headed households. The interventions include: (i) raising

awareness of communities and particularly women, on their rights of access, use and control of land resources; (ii) encouraging the uptake of drought resilient crops and product processing and marketing for value addition; (iii) promoting the use of rotations, cover crops, organic matter and precision use of inorganic fertilizers to restore soil; (iii) improving access to quality seed of local varieties, farm tools and equipment (pedal pumps, hoses, watering cans, grain silos) to increase yields, in order to improve food availability, access and affordability (iv) providing training through baseline programming and the establishment of FFS in order to sensitize women, who are responsible for food production at the household level, and improving dietary diversity and healthy eating habits, (v) identifying and supporting existing and/or facilitate the formation of VSLAs, women farmers associations and groups to access start-up capital to undertake various income generating activities; (vi) implementing rainwater harvesting techniques for enhanced productivity and resilience to drought in fields, as well as sand dams for crops, livestock and household use; and, (vii) any other interventions to reduce women's workload and create more time for child caring practices. To this end, the programme is highly aligned to addressing women climate change concerns.

Both the Green Incubation Programme (GIP) and the Regional Pastoral Resilience project (RPRP) were found to be gender sensitive. The former seeks to empower female youth through skilling in green agricultural enterprise. On the other hand, the latter fosters the rights of the vulnerable population by addressing gender inequalities and women empowerment. While the Enhancing National Food Security through increased Rice Production project mentions gender equality, it is not specific on addressing women and youth climate change issues in rice production.

4.6 Score card performance of mainstreaming gender and women resilience in agricultural policies and programmes

A score card performance (whose methodology is described in section 1.3.3.2) was used to assess the extent to which agriculture related policies and programmes are gender sensitive and specifically address women resilience issues. The assessment covered 16 policies and 14 programmes (see Tables 4 and 5). As summarized in Table 4, only one policy (the GGDS) was found to be extremely highly aligned (gender sensitive and addressing women resilience), six policies were found to be highly aligned, seven policies were aligned. On the other hand two policies (the National Coffee Policy and the National Agriculture Research Act) were found not to be gender sensitive or address women resilience.

Out of the 14 programmes assessed (see Table 5), only one programme is extremely highly aligned/gender sensitive and addressing women climate resilience) i.e. Agricultural Adaptation to Climate Change in the Central Cattle Corridor Project. Nine are highly aligned and four are somewhat or moderately aligned. Only one policy; the Enhancing

National Food Security through increased Rice Production Project was found not be aligned that is, not gender sensitive and/or addresses women climate resilience issues.

Table 4: Score card performance of agricultural policy on gender sensitivity and women resilience

Policies	Policy goals and objectives	Women empowerment / livelihood challenges	Women specific climate resilience challenges	Women resilience specific interventions and outcomes	M&E	Overall Score (Max score 20 points)	Alignment Rank	Alignment description**
1	Uganda Green Growth Development Strategy	4	4	3	3	17	1	Extremely high lyaligned
2	National Strategy for Youth Employment in Agriculture	3	3	3	3	15	2	Highly aligned
3	Agriculture sector climate change mainstreaming guidelines	3	4	3	3	15	2	Highly aligned
4	Uganda Climate Smart Agriculture Program	3	3	3	2	14	4	Highly aligned
5	National Adaptation Plan (NAP) for the Agricultural Sector	3	3	3	2	13	5	Highly aligned
6	National Climate Change Policy	3	3	3	3	13	5	Highly aligned
7	Guidelines for integrating climate change in sector plans and budgets	3	3	3	4	13	5	Highly aligned
8	National Land Policy	4	4	0	2	12	8	Aligned
9	Agriculture Sector Strategic Plan 2015/16-2019/20	3	3	3	3	12	8	Aligned
10	Uganda Strategic Investment Framework for Sustainable Land Management (SLM) 2010-2020	2	2	3	2	11	10	Aligned
11	Draft Climate Change Bill (Act)	3	2	3	1	11	10	Aligned
12	National Agriculture Policy For Uganda 2013	0	3	3	2	11	10	Aligned
13	Nationally Determined Contribution (NDC)	0	3	3	1	9	13	Aligned
14	National Agriculture Extension Policy 2016	0	3	2	2	9	14	Aligned
15	National Coffee Policy	0	1	1	1	4	15	Not aligned
16	National Agriculture Research Act	0	2	0	0	2	16	Not aligned

**0-4 = not aligned; 5-9 = somewhat/moderately aligned; 9-12 = aligned; 13-16 highly aligned; 17-20 extremely highly aligned.

Table 5: Score card performance of agricultural programmes and projects on gender sensitivity and women resilience

	Policies	Policy goals and objectives	Women empowerment / livelihood challenges	Women specific climate resilience challenges	Women resilience specific interventions and outcomes	M&E	Overall Score (Max score 20 points)	Alignment Rank	Alignment description**
1	Agricultural Adaptation to Climate Change in the Central Cattle Corridor Project	3	3	4	4	3	17	1	Extremely highly aligned
2	Fostering Sustainability and Resilience for Food Security in Karamoja Sub Region project	2	3	3	3	3	14	2	Highly aligned
3	Regional Pastoral Livelihoods Resilience Project (RPLRP)	3	3	3	3	2	14	2	Highly aligned
4	Enhancing Adaptation to Climate-Smart Agriculture Practices in the Farming Systems of Uganda:	2	3	3	3	3	14	2	Highly aligned
5	Strengthening Climate Information and Early Warning Systems for Climate Resilient Development and Adaptation to Climate Change in Uganda:	2	3	3	3	3	14	2	Highly aligned
6	Uganda Green Incubation Programme	3	2	3	3	2	13	6	Highly aligned
7	Youth Livelihood Programme (YLP)	2	3	3	3	2	13	6	Highly aligned
8	Enabling Environment for Sustainable Land Management (SLM) to Overcome Land Degradation in the Uganda Cattle Corridor	2	2	3	3	3	13	6	Highly aligned
9	Agricultural Technology and Agribusiness Advisory Service (ATAAS)	2	2	3	3	3	13	6	Highly aligned
10	Operation Wealth Creation (OWC)	2	2	1	1	2	8	10	Moderately aligned
11	Comprehensive Africa Agricultural Development Programme (CAADP)	0	2	2	2	2	8	10	Moderately aligned
12	National Agricultural Advisory Services (NAADs)	0	3	1	1	2	7	12	Moderately aligned
13	Prosperity for All Programme	0	2	1	1	2	6	13	Moderately aligned
14	Enhancing National Food Security through increased Rice Production Project	0	1	0	0	2	3	14	Not aligned

**0-4 = not aligned; 5-9 = somewhat/moderately aligned; 9-12 = aligned; 13-16 highly aligned; 17-20 extremely highly aligned.

5 ADDRESSING YOUTH AND REFUGEE ISSUES IN AGRICULTURAL POLICIES AND PROGRAMMES

5.1 Introduction

This study also sought to establish the extent to which Uganda's agricultural policies incorporate issues of the youth and climate resilience and the climate risks affecting refugee settlements. In addition, it also explored the climate vulnerabilities and resilience concerns affecting women. This section analyses the way agriculture related policies and programmes incorporate the youth climate change resilience. It also highlights Uganda's refugee policy and the climate change issues affecting refugees and how they are being addressed.

5.2 Youth engagement in agriculture and climate change resilience Uganda

5.2.1 Key factors on youth in agriculture

The world's youth population is growing significantly. For example, the global population is expected to increase to 9 billion by 2050, with young people (aged 15–24) accounting for about 14% (Young Leaders Think Tank, 2015). However, employment and entrepreneurial opportunities for youth, especially in developing countries, like Uganda, remain limited.

Uganda has one of the world's highest annual population growth rates (above 3 per cent annum) and a young population. About 78% of the country's population is below 30 years of age (UBOS, 2016). The youth, categorized as the people aged 18-30 years, constitute approximately 23% of the population or about 9.2 million of the population (MAAIF, 2017), 64% of which are unemployed and most of them female (UBOS, 2012c). Moreover, three quarters of the working youth are said to be in vulnerable employment i.e. they are not in decision making positions, cannot negotiate own wages and most do not hold own bank accounts.

Whereas the large youth population presents immense opportunities for national development, youth unemployment is now recognized as one of the major socio-economic policy challenges facing Uganda's economic growth and development (MAAIF, 2017). Despite the rising youth unemployment in Uganda however, youth engagement in agriculture is also declining (FAO, 2017), and yet the services and industrial sectors have not created enough jobs for the increasing youthful labour force.

Most of Uganda's youth reside in rural areas where agriculture is the major economic

activity and 63% of the youth are in agriculture (GoU, 2015a). However, agriculture seems not to be attractive to the youth and is regarded as secondary in terms of employment and income generation, with only 30% considering it as the primary income generating activity and 10% considering it as their preferred future job (Young Leaders Think Tank, 2015). The unattractiveness of farming to the youth is in part attributed to the low productivity and returns from farming as well as vulnerability of crop farming to risks (including climate risks), among others. Youth are also constrained by: (i) insufficient access to knowledge, information and education that hinder them from developing agricultural entrepreneurial ventures; limited access to land by youth mainly due to inheritance laws and customs that often make the transfer of land to young women problematic, yet youth lack funds to acquire land; and inadequate access to financial services as most financial service providers are reluctant to provide their services (including credit, savings and insurance) to rural youth due to lack of collateral and financial literacy. Others include; difficulties in accessing green jobs due to lack of skills to engage in the green economy; and limited access to markets due to the growing influence of globalization and rigorous standards of the agricultural supply value chain. For the young rural women, access to markets is constrained by cultural norms which limit their freedom of movement while the young people's voices are not heard during the policy processes hence their complex and multifaceted needs are not met (FAO & IFAD, 2014).

Such a situation has negative implications on food security, unemployment, and underemployment and may undermine government's efforts to drive economic growth through agriculture and the achievement of the country's development agenda. Since agriculture remains the mainstay of Uganda's economy (at least in the short- and medium-term), it is potentially a viable solution to tackling Uganda's rising youth unemployment. Thus, attracting and maintaining the youth in agriculture is a necessity and achieving this requires critical understanding of the challenges faced by the youth at the production node of the agricultural value chain and the prospects of youth engagement in agriculture.

Youth employment is very high on the global development agenda and SDG 8 focuses on full and productive employment and decent work for all and sets dedicated targets on youth. The Malabo Declaration on accelerated agricultural growth and transformation for shared prosperity and improved livelihoods in Africa, endorsed at the African Union Summit in 2014, identifies specific youth-related targets under its "Commitment to halving poverty by the year 2025, through inclusive agricultural growth and transformation." The specific targets identified are: (i) create job opportunities for at least 30% of the youth in the agricultural value chains; (ii) support and facilitate preferential entry and participation for women and youth in gainful and attractive agribusiness opportunities.

Youth employment is one of the main priorities for the GoU and is well articulated in government development policy documents including the Vision 2040 and NDPII. The

current government policy and strategic framework promotes youth employment. It is cognizant of the role that agriculture plays, and can potentially play to increase youth employment and contribution to national development. In particular, youth engagement in agriculture and employment promotion remain priorities in Uganda's agriculture policy framework.

5.2.2 Youth climate change vulnerabilities

Uganda's youth are highly vulnerable to the impacts of climate change. Some of the documented effects of climate change on youth include:

- The youth are marginalized from current decision making to deal with the future impacts of climate change.
- Many youths in Uganda are from the poorest and marginalized families and engaged in nature related sectors mainly subsistence agriculture by cultivating marginal areas which exposes them to climate change impacts more especially droughts, extreme temperatures, unpredictable rainfall patterns, rainfall storms, floods, landslides, and water insecurity.
- Most of the youth are poor and unemployed which limits their coping mechanisms when climate risks strike;
- The majority of the youth who are employed are poor; seasonal and casual workers are engaged in subsistence agriculture and the informal sector which are low paying. They thus have limited income opportunities and cannot easily cope or diversify their sources of livelihoods. This hinders them from coping with climate change and environmental shocks and disasters.
- Youth also lack social protection systems to help them cope with climate shocks and disasters.
- The youth from the poorest families cultivating the most marginal areas are most likely to be forced to seek employment in the informal sector and therefore, in which young people are already over-represented, and therefore become vulnerable to low-paid, low-quality jobs, more so if they have migrated in search of employment.
- One of the principal adaptations to climate change among the youth is migration in search of employment. However, unskilled migrants are often the first to lose jobs in times of crisis. Migrant youth are also vulnerable to impaired social capital and psycho-social development due to the breakdown of family and social support, increasing their vulnerability to future shocks.
- Youth are also more likely to seek alternative support networks during crisis, such as criminal gangs in which sexual gender-based violence is common.

At the same time, the youth constitute the majority of the population and have an increasingly strong social and environmental awareness, which has the power to transform societies towards a climate resilient future.

During key informant interviews and group discussions with youth in Kyaka II and Rhino camp refugee settlements, we explored how young people understand climate change, the impacts it has on their livelihoods, and whether they have participated in any adaptation or mitigation strategies to address the impacts. The youth understood climate change to mean different things, for example:

- i. Droughts and floods, resulting in displacement and migration;
- ii. Changing weather patterns (variation in rainfall patterns) affecting farming,
- iii. Dry conditions that reduce water availability causing water shortage for domestic use and for farming (cropping and livestock).
- iv. Land degradation (bush burning, soil erosion and soil infertility) that reduces agricultural productivity;
- v. The absence of trees, causing heavy wind storms and land degradation.

The youth were aware of the effects of climate change on their livelihoods in the short term and were concerned about its potential long-term consequences on their lives. Most youth in these areas are involved in rain - fed subsistence agriculture and rely on the weather for their activities and are thus very vulnerable to the effects of extreme weather conditions.

A female youth respondent in Kyaka II FG) had this to say:

“The rains come later than expected, and sometimes it does not rain at all or it does not rain as it should; we experience more drought.”

Another female youth in Rhino camp noted:

“Sometimes we are affected by floods which halt all farming activities, which reduces produce from the farm.”

Most youth respondents in Rhino camp (Arua district) viewed the main impact of climate change as lower agricultural production and reducing food availability, and diminished incomes. This has triggered several consequences. Because many households rely on subsistence agriculture, low yields following extreme weather events cause hunger among young people during the dry season. This impact is not particular to youth, but is a major concern, particularly for youth and children.

5.2.3 Mainstreaming youth in the climate change policy

Uganda's NAPA recognizes that climate change affects different segments of the society differently, considering the vulnerabilities of youth, especially the female population. The implementation of project activities under NAPA such as the construction of water harvesting roofs and making of energy saving cooking stoves –to reduce energy challenges - in Bundibugyo district were in part aimed at reducing female youth vulnerability to climate change impact. Girls have the responsibility of collecting water and firewood which involves walking long distances in periods of scarcity. They are the most affected since culture has it that boys do not collect firewood, so the girls bear the burden of walking long distances to collect firewood which affects their education, and exposes them to other dangers like defilement, cuts and wounds (Isabirye and Barihaihi, 2013).

The NCCP recognises that youth and children are among the most vulnerable to climate change impact and they have limited access to and control over resources, especially land and yet they play a crucial role in agriculture and natural resource management. The NCCP prioritizes mainstreaming of youth concerns in climate change adaptation and mitigation in order to reduce their vulnerability. It also prioritises the inclusion of climate change in the education curriculum and training programmes which can build climate change awareness and knowledge among youth and children. Although the NDC provides for the protection of all vulnerable groups, it does not specially mention the youth. Our analysis also shows that the guidelines for mainstreaming climate change sector development plans does not adequately cater for youth resilience. The Draft Climate Change Bill/Act also does not mention youth issues.

5.2.4 Mainstreaming climate change in Uganda's youth policies and programmes

Uganda has a comprehensive youth policy that is geared at creating decent employment for youth and youth empowerment. The Uganda National Youth Policy 2016 aims at 'harnessing the full potential of the youth for improved productivity and equitable socio-economic and political development' (Ministry of Gender Labour and Social Development, 2016). The policy focuses on: (i) sustainable livelihoods, employment promotion and enterprise development; (ii) skills training and entrepreneurship development; (iii) youth participation and governance; (iv) access to resources and services; (v) management coordination and partnerships. The youth policy also recognizes that the youth are mainly engaged in agriculture, and fosters agribusiness to increase decent youth employment and youth empowerment. However, the policy does not adequately incorporate climate change issues that affect youth engagement in agriculture. Our analysis (see Table 2 in section 3.5) further shows that Uganda's youth policy does not incorporate climate change and is ranked 12th out of the 14 policies that were assessed. Given that the policy was developed in 2016, after the approval of the NCCP, this presents a huge

challenge/policy gap.

MAAIF has put in place the National Strategy for Youth Employment in Agriculture (MAAIF, 2017) developed in alignment with existing agriculture and climate change policy frameworks. The strategy seeks to achieve increased and sustainable youth employment in the agriculture sector at various levels of the value chain through, among others: creating an enabling environment for youth employment in agriculture, supporting youth oriented agricultural extension, supporting youth entrepreneurship, and adaption and mitigation of agribusiness risks and uncertainties (including climate change).

Our assessment (See Table 2, section 3.5) shows that the strategy highly aligned to climate change. It foresees youth engagement in the achievement of a low-carbon and climate resilient future and prioritizes enhancing youth's adaptation and resilience to climate related agri-business risks and uncertainties to be achieved through promoting/supporting: (i) the uptake of best practices, innovations and technologies relevant to addressing agribusiness risks and uncertainties; (ii) effective and efficient dissemination of weather and climate information and early warning systems for climate smart agriculture and better agri-business planning; (iii) agricultural insurance to cushion agricultural loss; and, (iv) design and implementation of a robust rapid response and disaster preparedness system.

The Youth Livelihood Programme (YLP) is the GoU's main funded youth programme in the country that has implications for youth engagement in agriculture. The programme, launched in 2014 and being implemented by the MoGLSD, is aimed to empower youth to harness their socio-economic potential and increase self-employment opportunities. Launched in January 2014 with an estimated budget of UGX 265 billion, the YLP was implemented in 27 districts in the first phase (FY2013/14) before being rolled out to the rest of the country during phase II (FY 2014-15) which ended on June 30, 2018. Currently, the YLP is in its third phase (FY 2018-19) with the last phase expected to be in FY 2019-20. The Programme's design is based on the Community Demand-driven Development (CDD) model which places poor communal groups at the centre of decision making and control of resources. Relatedly, poor groups (usually small cohorts of underprivileged individuals) work in partnership in order to meet demand-response support provided by organizations or service providers such as central government agencies, elected local governments, the private sector, NGOs etc. The CDD supports: strengthening and financing accountable and inclusive community groups or CBOs; facilitating community access to information through the media; forging functional links between CBOs and formal institutions; and creating an enabling environment for appropriate decentralized policy and institutional reforms (Dongier et al. 2003). Accordingly, the YLP-CDD model promotes active and intensive participation of the youth in all structures of government i.e. at national and local government levels. Under the YLP, youth groups, comprising 10-15 individuals, receive support in form of 'Revolving Funds' for vocational skills

projects and other income generating enterprises.

The MoGLSD in partnership with MAAIF under the Directorate of Extension Services and NAADS has promoted the YLP through its National Strategy for Youth Employment in Agriculture. To-date, the YLP has been rolled out in all Local Government (LGs), developed Programme Implementation Guidelines for stakeholders; developed the capacity of all the LGs and Youth Councils to undertake its implementation; financed 11,503 youth projects; enabled 144,242 youth (45% female) to engage in self-employment and income generating activities; set up functional technical support units; sensitized key stakeholders; trained youth management committees; provided a revolving fund recovery system; and prepared programme guidelines and Information Education and Communication (IEC) materials¹.

However, our analysis (see Table 3, section 3.5) shows that the YLP does not incorporate climate change concerns its design and practice. Out of the programmes assessed, the YLP programme, ranks least in mainstreaming climate change. Given that the YLP is government's main youth programme and that most of its interventions are targeted to agriculture, a huge policy gap exists that needs to be addressed if the youth resilience to climate risks is to be built. There is a high likelihood that a good number of interventions under the programmes could fail when climate disasters hit. Indeed, some youth are already facing challenges of re-paying their YLP loans because their enterprises have failed to take off; some of them due to poor crop/animal yields.

5.2.5 Addressing youth resilience in agricultural policies and programmes

Our analysis shows that while some agriculture related policies and programmes address youth climate resilience, others do not. The Uganda GGDS targets inclusive growth and specifically prioritises enhancing the empowerment of marginalized groups like women and the youth. The strategy targets the creation of green jobs for youth in Uganda. It seeks to increase agricultural productivity through CSA practices and approaches that integrate the needs of the youth in value chain businesses; establish, operationalize and regularly update a robust CSA/SLM Knowledge Platform with disaggregated data on youth. The Uganda Green Incubation Programme is another programme that highly incorporates youth resilience. It focuses, among others, at creating green decent employment for the youth, domesticating the Songhai model. The programme focuses on the provision of training services for youth, reducing youth unemployment in a climate smart and environmentally sustainable manner.

The Fostering Food Security programme pays special attention to the youth by prioritising climate resilient interventions that can empower the youth and reduce their

¹see, <http://budget.go.ug/budget/sites/default/files/National%20Budget%20docs/PIP%20FY%20201819-FY202021.pdf>

vulnerabilities through: (i) training of youth groups and associations and the expansion of savings and credit groups to raise capital for business activities and; (ii) promoting youth livelihoods by encouraging the formation of producer groups to develop resilient value chains for increased income, such as sustainable charcoal production, establish piggeries and small stock rearing facilities. In addition, the programme priorities creating and strengthening multi-stakeholder platforms (that incorporate women and youth) at the local (district) level with CBOs, NGOs and private sector and government, working through extension services and focused on value chain development and fostering sustainable land management (SLM) and integrated natural resource management (INRM) while at the same time building climate change resilience. To this end, the programme is highly aligned to the youth climate change concerns.

The regional pastoral project is youth sensitive as it fosters the rights of the vulnerable population, to address youth employment and empowerment. On the other hand, the Enhancing National Food Security through increased Rice Production project it is not specific on addressing youth climate change issues in rice production.

A number of policies and programmes do not adequately address youth resilience to climate change. For example, Uganda's land policy does not mention the youth and is thus not youth sensitive. Uganda's NAP Ag. does not specifically mention interventions to reduce the vulnerability of the youth. The agriculture sector guidelines for mainstreaming climate change are equally not youth sensitive. They do not mention the challenges of youth in addressing climate change in agriculture and how they would get involved in the process of mainstreaming. Whereas, the NAADS programme is youth sensitive seeking to realize the full potential of women and men and youth, the climate resilience issues affecting youth are not mentioned or addressed. Similarly, the PFA programme was neither targeted to address climate change issues nor incorporating youth issues. On the other hand, while the OWC programme is youth sensitive, youth climate resilience issues are not captured.

At the local level, the DDPs of the three districts (Arua, Kyegegwa and Kyenjojo) are neither climate change nor youth sensitive. This policy gap should be addressed by reviewing the DDPs to incorporate climate change interventions in youth programmes.

5.2.6 Score card performance on mainstreaming youth climate resilience in agricultural policies and programmes

Like in the case for mainstreaming climate change in agricultural policies and programmes, a score card performance (whose methodology is described in section 1.3.3.2) was used to assess the extent to which agriculture related policies and programmes are youth sensitive and address youth resilience issues. The assessment covered 16 policies and 13 programmes (see, Tables 6 and 7).

As summarized in Table 5, no policy was found to be extremely highly aligned and only two policies were found to be highly aligned to mainstreaming youth resilience to climate change namely the GGDS and the NCCP. Four policies were found to be aligned and another four somewhat/moderately aligned to youth resilience. Six policies were found not to be aligned to mainstreaming youth resilience to climate change namely the National Land Policy, Gender Policy, Coffee Policy, Agricultural Extension Policy, and the Agricultural Research Act. In all, most policies were found not to be adequately addressing youth climate resilience.

Out of the 13 programmes assessed (see, Table 6), two programmes were found to be extremely highly aligned/youth sensitive and addressing youth climate resilience i.e. the Uganda Green Incubation Programme and the Agricultural Adaptation to Climate Change in the Central Cattle Corridor Project. Five programmes are highly aligned, one is aligned and three are somewhat or moderately aligned to youth resilience. Two programmes - the PFA programme and the Enhancing National Food Security through increased Rice Production project - were found not to be aligned to mainstreaming youth resilience to climate change.

Table 6: Score card performance of agricultural policies on youth climate change resilience

Policies	Policy goals and objectives	General youth livelihood and empowerment	Youth climate change resilience challenges	Youth specific climate change interventions and outcomes	M&E	Overall Score (Max score 20 points)	Alignment Rank	Alignment description**
1	Uganda Green Growth Development Strategy	3	3	3	3	14	1	Highly aligned
2	National Climate Change Policy	3	3	3	3	14	1	Highly aligned
3	National Adaptation Plan (NAP) for the Agricultural Sector	1	3	3	2	12	3	Aligned
4	Uganda Strategic Investment Framework for Sustainable Land Management (SLM) 2010-2020	1	2	3	3	11	4	Aligned
5	Agriculture Sector Strategic Plan 2015/16-2019/20	0	3	2	2	10	5	Aligned
6	Uganda Climate Smart Agriculture Program	2	2	2	2	10	5	Aligned
7	National Agriculture Policy For Uganda 2013	0	2	2	2	8	7	Moderately aligned
8	Agriculture sector climate change mainstreaming guidelines	1	1	2	1	6	8	Moderately aligned
9	Nationally Determined Contribution (NDC)	0	2	2	2	6	8	Moderately aligned
10	Guidelines for integrating climate change in sector plans and budgets	0	2	2	1	6	8	Moderately aligned
11	National Land Policy	0	1	2	0	4	11	Not aligned
12	National Gender Policy 2007	2	0	0	0	4	11	Not aligned
13	Draft Climate Change Bill (Act)	0	2	2	0	4	11	Not aligned
14	National Coffee Policy	0	1	1	1	4	11	Not aligned
15	National Agriculture Extension Policy 2016	0	0	0	0	2	15	Not aligned
16	National Agriculture Research Act	0	0	0	0	0	16	Not aligned

**0-4 = not aligned; 5-9 = somewhat/moderately aligned; 9-12 = aligned; 13-16 highly aligned; 17-20 extremely highly aligned.

Table 7: Score card performance of agricultural programmes and projects on youth climate change resilience

Policies	Policy goals and objectives	General youth livelihood and empowerment challenges	Youth climate change resilience challenges	Youth specific climate resilience interventions and outcomes	M&E	Overall Score (Max score 20 points)	Alignment Rank	Alignment description**
1	Uganda Green Incubation Programme	3	3	4	3	17	1	Extremely highly aligned
2	Agricultural Adaptation to Climate Change in the Central Cattle Corridor Project	3	3	4	3	17	2	Extremely highly aligned
3	Agricultural Technology and Agribusiness Advisory Service (ATAAS)	3	3	3	3	14	3	Highly aligned
4	Fostering Sustainability and Resilience for Food Security in Karamoja Sub Region project	2	3	3	3	13	4	Highly aligned
5	Enabling Environment for Sustainable Land Management (SLM) to Overcome Land Degradation in the Uganda Cattle Corridor	2	3	3	3	13	4	Highly aligned
6	Enhancing Adaptation to Climate-Smart Agriculture Practices in the Farming Systems of Uganda:	3	3	3	2	13	4	Highly aligned
7	Strengthening Climate Information and Early Warning Systems for Climate Resilient Development and Adaptation to Climate Change in Uganda:	2	3	3	3	13	4	Highly aligned
8	Regional Pastoral Livelihoods Resilience Project (RPLRP)	2	3	3	2	12	8	Aligned
9	Comprehensive Africa Agricultural Development Programme (CAADP)	2	2	2	1	7	9	Moderately aligned
10	Operation Wealth Creation (OWC)	2	1	1	1	5	10	Moderately aligned
11	National Agricultural Advisory Services (NAADs)	2	1	1	1	5	10	Moderately aligned
12	Prosperity for All Programme	2	1	0	0	3	12	Not aligned
13	Enhancing National Food Security through increased Rice Production Project	1	0	0	0	1	13	Not aligned

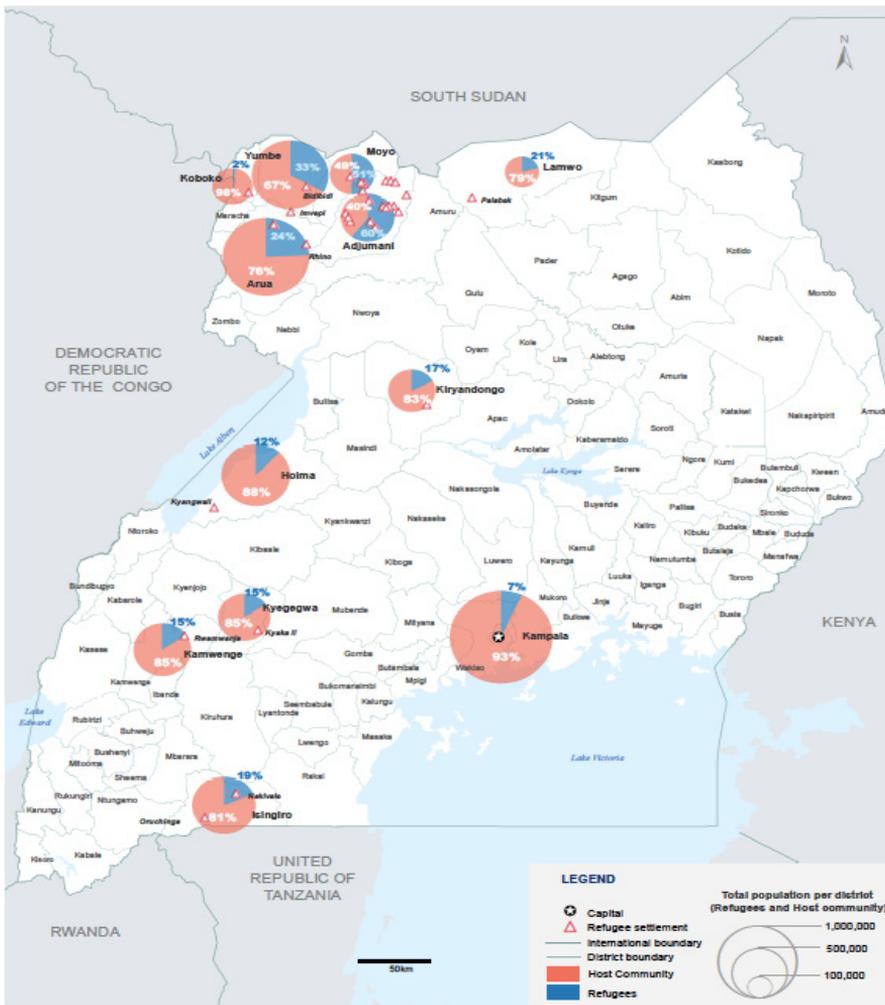
**0-4 = not aligned; 5-9 = somewhat/moderately aligned; 9-12 = aligned; 13-16 highly aligned; 17-20 extremely highly aligned.

5.3 Climate change and environmental concerns in refugee settlements and host communities

5.3.1 Key facts on refugee settlements in Uganda

Section 2.4 introduced the nexus between climate change, migration and refugees. It was indicated that Uganda hosts one of the world’s highest numbers of refugees, estimated at 1.4 million mainly originating from neighboring countries: Burundi, DR Congo, Eritrea, Ethiopia, Rwanda, and Sudan (UNHCR, 2018a; UNHCR, 2018b; UNHCR & REACH, 2018). The refugees reside in 30 settlements in 12 districts (including the study districts - Arua and Kyegegwa), and in Kampala city alongside their Ugandan host communities (See Figure 5).

Figure 5: Uganda: refugee and host community ratios by district as at June 2018 (source: UNHCR website)



Uganda's refugee response is led by the Office of the Prime Minister (OPM) - Department of Refugees and the UNHCR which jointly oversee inter-agency coordination. At the district level, the OPM's refugee desk officer oversees refugees in the district and works with the district local government to coordinate the response. At the field level, each refugee settlement is managed by the OPM through a camp commandant and other OPM leadership, while the OPM and UNHCR jointly coordinate humanitarian actors working in each location.

5.3.2 Environmental shocks and climate change in refugee settlements and host communities

Refugee impacted communities (refugee camps and host communities) are highly vulnerable to climate and environmental shocks compared to non-refugee impacted areas. This is mainly because refugees are poorer as compared to nationals and thus have limited resilience but also due to the increased demands of refugees on already-stressed resources. A study by the OPM reveals that in the last decade, there has been a significant increase in the land covered by refugee settlements in Uganda (Centre for Research in Energy and Energy Conservation – CREEC, 2018). The study reports wide spread ecosystem degradation in refugee settlements i.e. that tree plantations, wetland cover, woodlands and grasslands were reducing in size. In addition, open waters had declined. For example, between 2006 and 2018, grasslands, woodlands and wetlands reduced by 18%, 11.8% and 10.3% in Nakivale and Oruchinga refugee settlements. Other studies (GoU et al. 2017a; GoU et al. 2017a; GoU, 2018; OPM, 2018; UNHCR & REACH, 2018) posit that population pressure, brought about by the presence of refugees, is putting an extreme strain on the environment in refugee camps and host communities more especially forests and wetlands. This is mainly because most of the refugees and host communities rely on rain-fed subsistence farming and the natural environment as a source of livelihood. As the population increases, more land is cleared to create space for agriculture (CREEC, 2008).

In the study sites i.e. Kyaka II and Rhino Camp refugee settlements, key informants and group discussions confirmed that they were experiencing the impacts of main climate change and environmental shocks (see Figures 1 and 2 in section 2.3) that include:

- Increased occurrence of droughts, dry spells and extreme temperatures.
- Variation in rainfall seasons, unreliable rainfall patterns, rainstorms and floods
- The high rates of deforestation and forest degradation due to the rising demand for wood fuel, construction materials and conversion of forest to farming land.
- Wetland degradation due to conversion wetlands into forest land, brick making and sand mining.

- Soil erosion and loss of soil fertility that results in reduced agricultural production.
- Water shortage caused by drying up of water sources and increased pressure on water resources by refugees and host communities.
- Inappropriate wastewater treatment systems and extensive water extraction on groundwater.
- Wood fuel shortage is on the rise due to the rising populations and reduced tree cover.
- Conflicts between refugees and host communities: The reduced land fertility and tree cover, wood fuel shortage, water shortages and other environmental stresses have created tensions between the refugees and host communities and have the potential to further undermine peaceful coexistence and human security.

Energy insecurity, especially wood fuel scarcity, is one of the main environment and climate change challenges faced in the two refugee settlements. Almost all refugees and host communities mainly rely on wood fuel (fire wood and to a less extent charcoal) for cooking and heating, and poles for construction of shelter. The huge dependency of refugees on wood and charcoal-based fuels for cooking and heating, affects not only the environment (land degradation) but also the refugees' health. The low use of improved cooking stoves was reported in both refugee settlements.

“The coming of refugees led to scarcity of firewood since we have to compete for it with the refugee communities”, FGD with host community in Rhino Camp, Arua District.

The task of gathering fuel wood falls mainly on refugee women and children who walk by foot alone or in small groups for long distances in search of firewood. Wood fuel scarcity predisposes them to sexual gender-based violence (SGBV) in the form of rape, attempted rape, defilement, assault and snake bites. However, there have been effort to increase the number of households using improved cook stoves in refugee settlements. However, these interventions do not cover host communities.

These findings speak to the lack of strong environmentally-focused humanitarian and development interventions seeking to address sustainability of energy and light sources, among other issues. Some of the refugee coping mechanisms and barriers to adoption of climate smart farming practices are already presented in section 2.3.

5.3.3 Uganda's refugee policy and alignment to climate change resilience

The GoU has adopted a comprehensive refugee response approach in which refugees are included in the NDPII through the Settlement Transformative Agenda (STA) which

outlines government priorities (GoU, 2017a). Uganda's refugee policy is guided by the Refugees Act 2006 (GoU, 2006) and the 2010 Refugees Regulation. The Refugees Act is a progressive legislation regarded as a model for refugee hosting countries in Africa and the world (Akello, 2009) that affords refugees the right to work, freedom of movement, and the ability to live in settlements rather than refugee camps. Our analysis, however, shows that both the Refugee Act and Refugee Regulations do not incorporate climate change resilience issues.

Due to the protracted nature of refugees and displacement in Uganda, the government outlined a policy of self-reliance for refugees in 1998. The development programmes and initiatives are designed with the self-reliance aspect in mind. In addition to the refugee rights, the government also decided to grant every refugee household a plot of land for agricultural purposes in order to increase "food self-sufficiency" among refugee communities and to integrate refugees into the host communities (World Bank Group, 2016). This livelihood-based settlement policy has provided refugees with opportunities to produce their own food and generate incomes (UNHCR, 2018b). The group discussions with refugees and host communities in Kyaka II refugee settlement (Kyegegwa district) revealed that refugees are largely food self-sufficient and even have excess produce for sale in the market to earn their own income. Nonetheless, innovative approaches need to be developed to make refugees and host communities achieve better livelihoods, more especially improved agricultural inputs including storage silos, seed, small livestock, and non-agricultural income-generating opportunities to buffer them against food insecurity and increase peaceful co-existence.

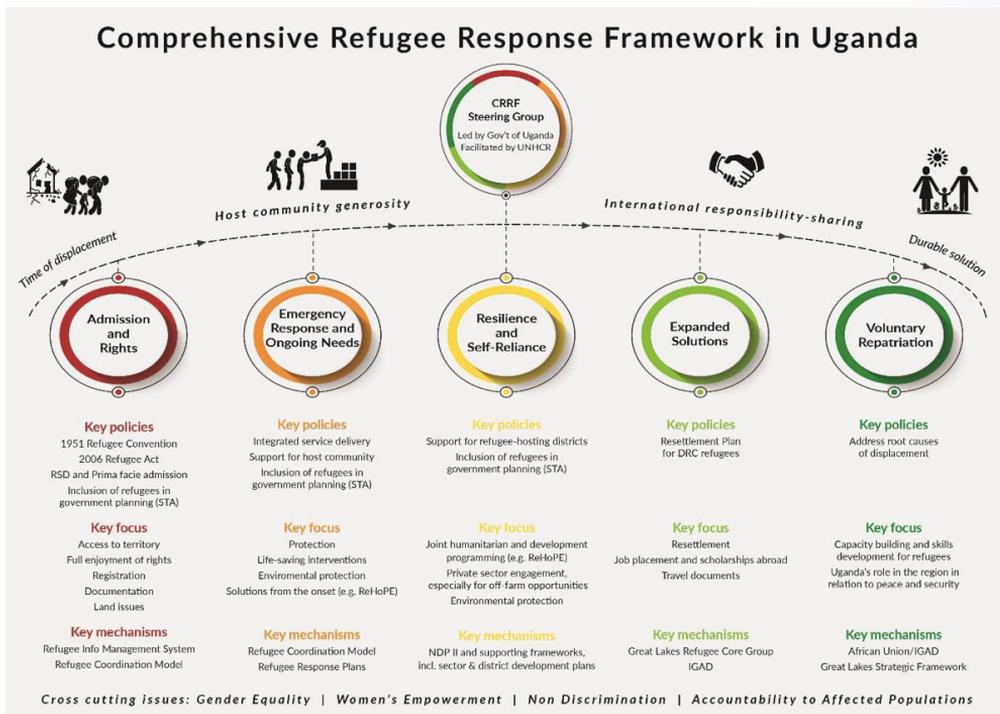
With support from the UNHCR, the World Bank and other development partners, Uganda has developed a multi-stakeholder Refugee and Host Community Empowerment (ReHoPE) Strategy geared at strengthening resilience and self-reliance of refugees and host communities (GoU et al. 2017b). The strategy is geared at implementing the Comprehensive Refugee Response Framework (CRRF), a global initiative to support host countries in protecting, supporting, and improving self-reliance of refugees. In line with the initiatives to support both refugees and host community members, 70% of the humanitarian aid goes directly to refugees and 30% to supporting host community members through district local governments (UNHCR & REACH, 2018). Despite this support, the refugees and host communities remain susceptible to underlying poverty and vulnerabilities that are being exacerbated by, among others, climate change and environmental shocks and stresses.

5.3.4 The Comprehensive Refugee Response Framework (CRRF) in Uganda

The New York Declaration, signed by all 193 United Nations Member states in September 2016, lays out a vision for a more predictable and comprehensive response to refugee crises known as the Comprehensive Refugee Response Framework (CRRF)

aimed at: (i) easing pressure upon host countries; (ii) enhancing refugee self-reliance; (iii) expanding access to third-country solutions; and (iv) supporting conditions in countries of origin to support return in safety and dignity. Uganda has domesticated the CRRF and the country objectives are: i) support government policy and protect asylum space; ii) assist resilience and self-reliance of refugees; iii) expand solutions, including third party options; and, iv) support Uganda’s role in the region and invest in human capital and transferable skills (Government of Uganda, 2018). As shown in Figure 6, Uganda’s CRRF has five mutually reinforcing pillars that are aligned to the global CRRF covering support provided to refugees, host communities, the government and the countries of origin. Despite Uganda’s progressive refugee policy, many refugees and host community members face challenges accessing basic services.

Figure 6: Five pillars of Uganda’s Comprehensive Refugee Response Framework (CRRF) engagement



Although the Uganda’s CRRF recognizes that environment, energy and climate change exist in refugee settlements and that they heighten the already existing vulnerabilities of refugees and host communities, our analysis shows that the CRRF it does not specifically highlight the climate change shocks that affect refugees and host communities.

In addition, although Arua and Kyegegwa are refugee hosting districts, an analysis of the DDPs of the three districts reveals they do not incorporate refugees’ issues and this

is another policy gap.

5.4 Opportunities for collaboration on refugees' climate resilience

Uganda is endowed with a number of institutions that offer the potential for collaboration and strengthening environmental sustainability, climate change resilience and livelihood improvement of refugees and host communities. Apart from OPM, UNHCR and District LGs, some key institutions (NGOs and development partners) operating in the study district and refugee settlements has been identified through literature review, key informant interviews and focus group discussions. Table 7, we provide the key institutions identified and summarize their roles and responsibilities in supporting agriculture, livelihood and improvement, and environment and climate change in the context of refugees, women and youth in Arua, Kyegegwa and Kyenjojo districts. However, it should be noted that some of these institutions operate beyond the three districts and refugee settlements.

Table 8: Analysis of stakeholders and their contribution to environment, livelihoods and climate change

Name	Type of institution	Roles/Responsibility	Coverage
OPM	Central Government	Government Coordinating refugee response framework	National
District Local Governments	Local Governments	Policy, planning and implementation of agriculture, environment, livelihood and climate change	Arua, Kyegegwa and Kyenjojo
Agency for Technical Cooperation and Development (ACTED)	NGO	NGOs/CBOs Environmental management – tree planting, waste management; improved agricultural practices.	Kyegegwa
Care International	NGO	Water, Sanitation and Hygiene (WASH), livelihood improvement, sustainable environment and natural resource management, humanitarian aid	Arua, Kyegegwa and Kyenjojo
GEFORD	NGO	Capacity building for disaster management and tree planting	Arua
Danish Refugee Council (DRC)	NGO	Humanitarian assistance, livelihood improvement, climate smart agriculture, environmental management	Arua, Kyegegwa,
Finish Refugee Council	NGO	Supporting refugee saving groups, humanitarian aid, supply of agricultural inputs	Kyegegwa
ICRAF	NGO	Energy conservation and tree planting	Arua,
International Aid Service (IAS)	NGO	Provides tree and crop seedlings	Arua,
Joint Efforts to Save the Environment (JESE)	NGO	Energy saving cook stoves, climate smart agriculture practices	Kyegegwa, Kyenjojo
Mercy Corps	NGOs	Climate smart agriculture – supply of drought and disease resistant crop seeds	Arua
Norwegian Refugee Council (NRC)	NGO	Humanitarian assistance, livelihood improvement and climate smart agriculture	Arua

Name	Type of institution	Roles/Responsibility	Coverage
OXFAM	NGO	Humanitarian aid, Sustainable food systems, energy saving cook stoves, capacity building for climate change, livelihood improvement and disaster risk management	Arua,
Samaritan Pulse	NGO	Supporting refugee saving groups, supply of agricultural inputs , training refugees in sustainable agriculture and financial literacy	Kyegegwa
Tooro Botanical Gardens	CBO	Promote the use of indigenous tree species that could be used for agro-forestry	Kyerjojo
WWF	NGO	Sustainable energy – energy cooking stoves; sustainable environment and natural resource management	Arua,
ZOA	NGO	Provides tree and crop seedlings	Arua,
		Development Partners	
Enable	Development Partner	Capacity building and incentives	Arua
GIZ	Development Partner	Promoting clean energy/sustainable sources i.e. energy saving cook stoves	Arua
UNHCR	Development Partner	Key funders of humanitarian and livelihood programmes in refugee settlements	Arua, Kyegegwa

6 GAPS AND CHALLENGES TO MAINSTREAMING CLIMATE CHANGE IN AGRICULTURAL POLICIES AND PRACTICES

This study also sought to establish the challenges affecting the effective mainstreaming of climate change in the agriculture sector. Specifically, it sought to explain, among others, the policy, legal, technical, institutional, and financial gaps and challenges that could be affecting effective mainstreaming and implementation of climate change in the sector.

6.1 Policy gaps

Our analysis reveals that the crucial policies for addressing climate resilient farming for women, youth and refugees are not adequately climate proofed i.e. the gender policy, national youth policy, refugee policy/framework and to some extent, the National Agriculture Policy. While the national agricultural policy recognises the need to address climate change, it does not adequately incorporate the NCCP priority policy interventions. The policy does not also mention the adverse impact of climate change on the sector. Given that agriculture in Uganda is largely rain-fed, one would have expected the agriculture policy goal, objectives and guiding principles to focus on a climate resilient agriculture sector. But this is not the case. This makes climate change a hidden priority in the agricultural and gender policies; hence the need to revise them and make them climate proof.

The NCCP and the Natural Agricultural Policy are both emphatic on research. However, most of the agricultural technologies will be affected by a climate change. Our analysis shows that there is no specific national agricultural research policy and the Agricultural Research Act of 2005 does not incorporate climate change largely because it was put in place before climate change became a priority development issue. The NCCP provides for research to develop drought/flood tolerant crop varieties, livestock breeds and water efficient irrigation systems.

The NCCP prioritizes conducting vulnerability assessment at local levels and promoting community-based adaptation. Considering that rural Uganda depends on agriculture, vulnerability assessments should focus highly on agriculture taking the adaptation needs of the women and youth who form the biggest proportion of the rural population. But at the moment, there is a knowledge gap on the extent of risk to climate change for community in Arua, Kyegegwa and Kyenjojo districts that could inform adaptation policy and practice. The challenge is more pronounced for the women and youth because gender segregated data is lacking. Conducting detailed vulnerability assessments would help understand the extent of climate vulnerabilities in the refugee settlements and host

communities where population pressure is already driving ecosystem degradation and conflicts over natural resources.

A policy gap also exists on addressing land-use change, arising mainly from expansion of agricultural land (for cropping and livestock rearing) that is also a major driver of ecosystem and land degradation. Uganda's critical ecosystems – the forests, wetlands, rangelands and water resources - are facing rising pressure from agricultural expansion (cropping and livestock rearing). The poor/traditional farming worsens land degradation which in turn not only reduces agricultural productivity but also heightens climate change vulnerabilities. A review of agricultural policy with view to incorporating increasing land productivity in a climate smart manner (through sustainable diversification, organic farming and supply of agricultural inputs to rural smallholder farmers), could go a long way in combating ecosystem and land degradation.

Another policy gap is how to simultaneously address the interlinked challenges of food insecurity, energy insecurity and environmental degradation that exacerbate climate change vulnerabilities in the refugee settlements and host communities. The current agricultural policy does not address rural energy security yet it is a critical component of sustainable agricultural systems. Without stable and affordable energy sources, a lot of time is wasted looking for firewood which reduces the time that would be put in agricultural production; a burden which largely falls on the women and youth.

The increasing demand for wood fuel and the ensuing deforestation is also a key driver to land degradation and reduced agricultural yields. This challenge can be addressed through the integration of nature-based adaptation solutions in agriculture policies and programmes. This should be done by implementing a diversified and integrated energy systems such as developing food and livestock production systems that address energy requirements of communities and households.

Whereas most of Uganda is considered to have adequate water resources for domestic use and agricultural production, the high climate variability with extreme temperatures, persistent droughts, and changing rainfall patterns are beginning to reduce water availability for domestic use, cropping and livestock production. In the refugee settlements and host communities, population pressure coupled with ecosystem degradation are causing acute water shortages especially in the dry seasons. Although both the NCCP and the agricultural policy prioritise irrigated agriculture, the latter does not consider how future water availability for agricultural irrigation will be impacted by adverse effects of the projected change in climatic conditions.

The existing agricultural value chains: production, agro-processing, market and marketing and development (for crops, livestock and fisheries) are far from efficient. Yet improved agricultural value chains are crucial for reducing post-harvest losses,

increasing food security, improving profitability of agricultural enterprises, and increasing household incomes which are all critical in enhancing women and youth empowerment and resilience. For the youth, enhanced profitability of agricultural enterprises is crucial in enhancing youth employment, and empowerment. While the current agricultural policy emphasises value addition and commodity value chain development, it does not cater for policy options that foster climate smart value chains that increase the resilience of women and youth to climate change.

6.2 Barriers to climate change mainstreaming and implementation

Weak linkage between science and policy implementation

In Uganda, the linkage between research and policy is weak, and research does not adequately inform policy. Some decision makers believe that scientists and researchers are too academic and that scientific outputs are too academic and unusable for decision making. In most cases the research outputs do not reach the national policy makers, natural resource managers, agricultural officers and farmers. Scientists on the other hand, do not feel comfortable keeping in close contact with policy makers (politicians and government technical staff) which creates a gap between research and policy. The uncertainties surrounding climate modeling and the short-term goals pursued by some politicians makes it rather complicated for politicians to invest much time and money on climate change interventions.

Climate change information and awareness

Mainstreaming climate change into agricultural policy and planning and the implementation of Climate Smart Agriculture interventions require reliable information (both the current climate and the likely future impacts). Reliable and timely climate early warning and disaster preparedness systems that is packaged to various users' needs is needed to support communities and farmers to plan their farming activities to mitigate climate change risks. The NCCP provides for improvement in early warning systems for drought, flood, pest and disease incidence but all districts visited are yet to scale down weather observatory/monitoring stations and climate change models has to their local government level. The existing climate information is not disaggregated to address the needs of farmers, most specifically to address the women, youth and refugee farming needs.

Technical capacity gaps

Technical capacity is perhaps the main barrier to mainstreaming and implementing climate change most especially at the local level. The technical capacity constraints include limited climate change awareness of the need of/and how to mainstream climate

change, and how to monitor and report climate change implementation. There also limited climate change awareness among communities. While climate change adversely affects the agriculture sector and overall local economic development, there is still a perception among the district agricultural and technical staff that climate change is for the environment and natural resources sector to address. Some district technical staff were not aware of the NCCP.

Refugee response programmes in refugee camps lack knowledge and skills to enable them engage in medium to long term climate change planning. Capacity to conduct vulnerability assessments and cost benefit analysis of adaptation options are also lacking despite the fact that they provide basis for adaptation planning. Achievement of climate smart agriculture also requires climate proofed extension and advisory services. However, agricultural and extension staff are not trained in climate change while the agricultural extension policies and programmes do not adequately incorporate climate change. Actually, agricultural extension services are mentioned only once in the national Agricultural Policy (in Section 4.16 on Farmer Organizations). Although MAAIF is implementing the National Agricultural Extension Policy and targets to recruit 12,000 extension staff, only 3,800 had been recruited by the end of 2018 and in the medium term only 5,000 can be recruited due to budget limitations.

Institutional challenges

Structural barriers that include weak institution and governance issues hinder mainstreaming and implementation of climate change. Although the NCCP policy documents stipulate key actors and their roles in the implementation and coordination of climate change actions in the MDAs and LGs. Climate change is crosscutting and multi-sectoral, and indeed some agriculture interventions are spread across sector and MDAs. For example, water resource management and irrigation roles are spread in both MAAIF and MWE, while sustainable land management roles are shared between the agriculture, environment, energy, and lands sectors. The linkages between sectors and other actors to address climate change remain largely unstructured and weak. This is worsened by a lack of any legislation to back up the NCCP to compel sectors and LGs to implement climate change. Some of the challenges are blamed on lack political will to enforce compliance to environment and natural resource management laws and regulations.

Climate change coordinating structures across sectors and within MDAs (and in this case MAAIF), and District Local Governments are also largely non-existent. As a Department in MWE, the CCD faces an uphill task to coordinate powerful MDAs, more especially MOFPED, OPM, NPA and other miniseries. Apart from the CCD, the public service structure does not include climate change officers and climate change coordination structures (climate officers and committees) within the MDAs.

Although MAAIF has put in place a national climate change task force, the mandate of the task force remains largely adhoc/advisory and is not yet institutionalised. Sectors/MDAs only have climate change focal persons/desk officers, but the job specifications/TORs of these officers do not include climate change, and they only take up climate change as an additional responsibility. Most MDAs do not have climate change committees. In such an institutional arrangement, the responsibility for climate change mainstreaming remains unclear. At districts, the NCCP stipulates that at the Natural Resources Departments are the climate change coordination units. But like at the national level, districts do not have designated climate change officers or committees. The climate change role is often taken on by the District Natural Resource Officers who have no specific climate change training and their job description/TORs do not include climate change. It is thus critical that this weak public service is addressed either by revising the Public Service structure to include designated climate change officers in sectors and local governments or changing the TORs of natural Resource/Environment/Production officers to include climate change responsibilities.

Legal challenges

Currently, there is no law to compel sectors/MDAs and LGs to mainstream and report on climate change implementation. Whereas the NCCP requires sectors and MDAs to report to the CCD on climate change implementation, the absence of a compelling law has made implementation of the policy difficult. However, a draft Climate Change Bill is before Parliament, and once enacted into the Climate Change Act, the law will streamline climate change coordination

Gender information challenges

MAAIF lacks a gender strategy and adequate gender staff to mainstream gender issues in the agriculture sector. The budgeting process also lacks gender indicators at national and local levels. Therefore, while both the NCCP and the national agricultural policies may be gender sensitive, the lack of gender segregated data hinders deeper understanding of the way climate change and different adaptation interventions build the resilience of women and youth to climate change. Without this information, it is also hard to get baselines and entry points for mainstreaming and designing appropriate adaptation technologies for women and youth. Informed adaptation planning necessitates detailed gender analysis of each community. Moreover, gender policies and programmes are currently climate change are non compliant and needs to be reviewed to address the gaps.

Lack of a clear monitoring and evaluation framework

The lack of a clear climate change monitoring and reporting framework not only hinders successful mainstreaming but also climate change reporting i.e. measuring progress/

success of mainstreaming and implementation of climate change. Although the NCCP mandates sectors to put in place Performance Measurement Frameworks (PMFs) for monitoring and reporting on climate implementations, all sectors including MAAIF, have not yet developed climate change PMFs. There is also no legal framework that makes it an obligation to monitor and report on climate change. Moreover, climate change indicators are not yet incorporated in the score card used by the OPM to measure performance of sectors in achieving development targets. Besides, the Local Government Performance assessment tools do not have climate change indicators. The positive step in this direction is that in 2018, the CCD launched the National Standard Climate Change Indicators (NSCCI). However, the agriculture sector has not yet started using them in its reporting system. As for the districts visited, they were not aware of these indicators. It is also anticipated that once a climate change law is enacted, MDAs and LGs will be required to monitor and report on climate change implementation.

Climate finance constraints

The cost of adapting to climate change is high estimated at USD 406 million between 2015-2020 whereas the cost of inaction is estimated to be 20 higher than cost of adaptation (Twinomuhangi & Monkhouse, 2015). Inadequate climate finance is a challenge to Uganda –for mainstreaming climate change and implementation of climate change interventions.

Unlike other countries in the East African region (e.g. Ethiopia, Kenya and Rwanda), Uganda does not have a specific Climate Change Fund and the approach used is mainstreaming climate change in the sector and local government budgets, but this has not yet taken root. Having a separate Fund for climate change would have provided a pool into which the GoU, donors and other actors could put financial resources. These finances would then be accessed by government MDAs and LGs, academia and researchers, NGOs and the private sector to implement climate change project based on set criteria.

Whereas the MoFPED, through the 2017/2018 budget circular call, directed MDAs and local governments to mainstream change in their budgets, the existing budgeting systems i.e. the Output Based Budgeting Tool/System (OBT) and now the Performance Budgeting System (PBS) do not have climate change budget codes (budget lines) and indicators to enable sectors and LGs budget for climate change activities. Without climate change indicators, sectors/LGs cannot monitor and report on performance of climate change implementation. Indeed, climate change mainstreaming cannot be said to be complete if budgets are not climate proofed. However, this challenge is being addressed through the on-going Climate Change Budget Tagging (CCBT) process.

Another challenge is that government budget funding to sectors/MDAs and LGs

is limited and sectors have budget ceilings provided by the MoFPED, which affects funding for environment and climate. For example, currently the MWE which now has an additional responsibility for climate change is allocated only 3% of the national budget. It is even worse for LGs whose Natural Resources Departments that are also responsible for coordinating climate change implementation are allocated minimal budgets, sometimes less than 1% of districts budgets. This constrains both mainstreaming and implementation of climate change interventions. Therefore, CCBT alone will not improve climate change funding in Uganda. Our view is that apart from mainstreaming climate change in national and local budgets, putting in place a separate Climate Change Fund is still necessary to provide climate change funding pool in which government, donors, and other actors raise funds that can be accessed by various actors through a competitive process.

However, inadequate capacity to access climate financing from the various climate financing stream exists, is at the moment more limiting than government funding. Although climate change funding might be available with donors/development partners and international financing mechanisms e.g. Global Climate Finance (GCF) and Adaptation Fund (AF), accessing this funding requires that climate change issues are clearly articulated by central and local government institutions. Government officials lack project development and implementation skills/capacities to enable them secure climate funds from non-government sources. Agricultural and gender programmes should therefore prioritise capacity for project development and preparation of bankable projects to enable them access climate finance.

Agricultural insurance

Agricultural insurance is important in providing hedges against a variety of risks, including climate risks, that farmers face in worst years and thus reduces vulnerability levels. It also acts as a foundation for improved productivity – boosting investments in agricultural production that help to lift hundreds of millions out of poverty. The NCCP foresees the need for developing innovative insurance schemes (low-premium micro-insurance policies) and low-interest credit facilities to insure farmers against crop failure due to droughts, pests, floods and other weather-related events. The agricultural policies do not however, provide for such insurance cover.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Agriculture remains central to Uganda's socio-economic transformation and attainment of a middle-income country status although it is highly vulnerable to the adverse impacts of climate change. Uganda's national development policy is largely climate change sensitive providing the main foundation for climate change mainstreaming and implementation. Whereas Uganda's climate change policy mandates sectors and LGs to mainstream climate change in policies, plans, programmes and budgets; and guidelines climate change climate change in sectoral plans and budgets are in place, mainstreaming is not yet fully achieved and the main constrict is lack of a legal framework to compel sectors to mainstream, implement and reporting on climate change. As a result, while some sector policies and programmes are Climate Smart, others are not. Moreover, climate change mainstreaming has been largely top-down and most LGs have not yet mainstreamed climate change in their development plans and budgets.

A good number of Uganda's agricultural policies and programmes address climate change concerns that focus on increasing agricultural production, food security, and improved livelihoods. In addition, the sector has also developed climate specific policies and programmes such as the NAP Ag., CS and guidelines for mainstreaming climate change. Nonetheless, some agriculture policies and programmes are not climate change compliant at all such as the agricultural extension policy, the agricultural research policy, the land policy, the coffee policy and the OWC programme. On the other hand, the national agricultural policy partly addressed climate change. The main barriers to mainstreaming and implementation include policy gaps, weak technical and institutional capacity and financial challenges.

Uganda has also made great strides towards inclusive planning and development, with the achievement registered in strengthening gender equality, women and youth empowerment and refugee response. The climate change policy prioritizes gender sensitive and inclusive climate change mainstreaming and implementation. However, some agricultural policies and programmes incorporate women and youth resilience while others do not. MAAIF also lacks a gender strategy while the national gender policy and youth policies do not incorporate climate change and cannot thus guide the achievement of women and youth resilience. The main agricultural policies address women resilience issues but score less on addressing youth issues. Nonetheless, MAAIF's national strategy for youth employment in agriculture youth could be an entry point for building youth resilience and youth economic empowerment. Local development policies were found to be highly lacking in addressing climate change and fostering women, youth and refugees' resilience. Whereas refugees and host communities are

highly vulnerable, the refugee response policies and programmes are not climate smart and DDPs do not incorporate refugee response.

Lack of reliable climate change information and early warning systems, lack of gender segregated data to inform adaptation policy and planning, and the lack of climate smart agricultural extension and advisory services continue to hinder the adoption of climate resilient agricultural practices. Weak technical and institutional capacity especially at the districts to mainstream and implement climate resilience interventions, and inadequate climate finance are other major barriers. In particular, the limited budget allocation for environment and climate change sub-sectors, failure to integrate climate change in budgets (constrained by lack of climate change budget lines and indicators in the PBS) and lack of capacity to develop bankable climate change projects to enable MDAs and LGs access non-government climate financing are significant barriers that has to be urgently addressed. Finally, without plausible agricultural insurance schemes, climate risks will remain high in the agriculture sector.

7.2 Recommendations

Taking the country's agricultural development and climate change agendas ahead to achieve an inclusive climate resilient agricultural sector is a collective responsibility, and one that will not be achieved without challenges. In making the recommendations below, it is assumed that there is political will and buy-in to address the policy gaps and challenges that constrain mainstreaming and implementation of climate change in Uganda.

Policy development and review

- MAAIF and partners should review the national agriculture policy with view to further entrench climate change in the policy goal, objectives, guiding principles and policy interventions as this will elevate climate change to a higher level in the sector. The reviewed policy should incorporate: (i) nature-based adaptation solutions like ecosystem-based adaptation so that agricultural practices also enhance environmental sustainability; (ii) Integrated Food Energy Systems (IFES) to simultaneously address food and energy needs; (iii) climate smart irrigation and water resource management to ensure future water availability for agricultural production; (v) climate resilient value chains; and (vi) women and youth empowerment and resilience.
- MAAIF, LGs and partners should climate proof the country's agricultural extension and advisory services' policy and practice. It is essential to train, motivate and equip extension workers make them responsive to a changing climate. Agricultural extension and advisory services need to be made gender sensitive and responsive to women, youth and refugee resilience challenges and needs.

- MAAIF, with support from MoGLSD, should urgently develop a climate smart gender strategy to guide efforts towards gender equality and women empowerment in agricultural policy and practice.
- MoGLSD, with support from CCD and partners should climate proof the national gender and youth policies. The Ministry should also support MAAIF, MoFPED, NPA and CCD to develop climate smart gender indicators to guide budgeting, and monitoring and reporting on implementation of women and youth resilience interventions at national and local levels.
- The decentralisation policy is being reviewed and this opportunity should be used by the CCD and MoLG to mainstream climate change in the revised policy.

Climate information services and early warning systems

- UNMA, OPM, MAAIF and DLGs, with support from donors and NGOs should establish climate early warning and disaster preparedness systems packaged to users' needs (include the needs of rural agrarian women, youth and refugees). Co-production and dissemination of weather and climate information that is area and communities' specific is essential for adaptation planning and making farming decisions.
- Institutions to facilitate climate information exchange should be strengthened, including agricultural extension and farmer field schools to foster the use of climate information services in farming decisions.
- Climate change awareness and capacity building
- ACODE and other NGOs should support CCD and LGs to raise climate change awareness among farming communities, district technical staff and leaders, and extension workers. This will facilitate mainstreaming and implementation of climate change policy. Awareness raising should be inclusive targeting women, youth and refugees' adaptation needs.
- CCD, OPM, NPA and MoLG should support sectors and LGs to put in place institutional structures for coordinating the mainstreaming and implementation of climate change strategies such as climate change officers, climate change committees, and PMFs to facilitate the monitoring and reporting on climate change implementation.
- MWE and Parliament should expedite the enactment of a climate change act to make it a legal requirement for sectors and local governments to mainstream, implement and report on climate change. The law will also harmonise coordination of climate change actions across sectors and LGs.

Climate finance and agricultural insurance

- MoFPED should increase funding for environment and climate change in the national and LGs budget to support mainstreaming and implementation of climate change strategies at both national and local government levels.
- With the limited government funding (and budget ceilings), it is essential for the GoU to reconsider its position and put in place a separate Climate Change Fund into which government, donors and other partners can put funds to be accessed by MDAs, LGs, NGOs and private sector on a competitive basis to implement feasible climate change projects. ACODE and CCD could lead the process by conducting a study on climate change financing options to inform the Climate Change Bill 2018.
- To enhance access to non-government climate financing, MDAs and LGs should be assisted to build climate change project development and implementation capacity through training staff in proposal writing and setting project development units.
- To facilitate climate change mainstreaming, MoFPED should fast track the Climate Change Budget Tagging (CCBT) process so that sectors and LGs budget for climate change implementation.
- There is need for MAAIF, MoFPED and financial institutions to prioritise agricultural insurance that addresses climate risks. A conducive policy environment needs to be created for public and private sector actors to provide insurance services to farmers and ensure that all potential agricultural actors benefit from this insurance equitably.

Climate change, refugee response and conflicts

- Refugees and host communities remain vulnerable to climate change. It is thus crucial for OPM and UNHCR to integrate climate change and environmental sustainability issues in the country's refugee response policy frameworks to ensure that they foster climate change resilient refugee and host communities' livelihoods.
- The refugee policy frameworks should be made inclusive, and gender sensitive in addressing women and youth vulnerabilities. In particular, the refugee programmes should incorporate food security, water security, energy security, ecosystem protection, soil fertility and land productivity while taking into consideration the current and future changes in climate.
- The existing natural resource conflicts between refugees and host communities

could undermine security. It is thus essential that the OPM and UNHCR partners such as Care International in Uganda and ACODE to conduct a study on the nexus between climate change, migration, displacement and conflicts that will provide a deeper understanding that can inform policy on migration, refugees, conflicts and human security.

- In addition, vulnerability assessments and cost benefit analysis of adaptation options should be conducted in refugee hosting districts and communities to inform adaptation planning.

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ABOUT ACODE

ACODE is an independent public policy research and advocacy think tank registered in Uganda as a company limited by guarantee and not having share capital. The mission of ACODE is to make policies work for people by engaging in contemporary public policy research and advocacy and advising government and local governments of development policy and policy implementation. ACODE has for the four consecutive years been ranked in the Global-Go-To-Think Tank Index as the best think tank in Uganda and one of the top think tanks in the world. See link [http:// repository.upenn.edu/think_tanks/10/](http://repository.upenn.edu/think_tanks/10/)

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