



ANALYZING AND PRIORITISING CLIMATE CHANGE-RELATED CAPACITIES AND NEEDS OF NATIONAL AND SUB-NATIONAL EXTENSION ACTORS IN UGANDA

Agricultural Climate Resilience Enhancement
Initiative (ACREI)

REPORT
APRIL, 2020



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Disclaimer: The views expressed in this report do not reflect the views of the World Meteorological Organization (WMO) but those of the authors.

Acknowledgement

This study was made possible with financial support from WMO and ICPAC; and technical support from Mr. Sebastian N. Grey of WMO; Mr. Andrew Atingy of FAO-Uganda and the AFAAS team comprising of Mr. Max Olupot who gave overall oversight of the project, Dr. Dan Makosa who provided leadership of the overall study design, and lastly, Mr. Nathan Okwii for his exceptional skills in statistical analysis. We also acknowledge the Chief Executive Officer (CEO) of UFAAS, Ms. Beatrice Luzobe for both the technical and administrative support accorded to the research team in order to ensure timely and successful implementation of the specific tasks of the assignment.

We extend our sincere gratitude to the District Production & Marketing Officers (DPMOs) of Sembabule and Isingiro District Local Governments, Dr. Kalungi Kawooya and Mr. Alloysius Karugaba, respectively, for their effective mobilization of respondents for the survey and Focus Group discussions. Special thanks also go out to all the Key Informants at the national and local levels as well as the survey respondents and participants in the Focus Group Discussions and stakeholder validation workshop, who provided the essential ingredients leading to this rich and insightful report.

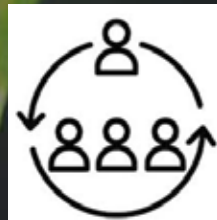


Enabling Environment



- The guidelines for mainstreaming climate change in agricultural policies and plans are in place, but they ought to be further popularized and adapted to local contexts.
- Although a myriad of complementary legal frameworks that guide implementation of climate change related work also do exist, the explicit structures and arrangements that ensure their harmonized implementation, meaningful engagement of stakeholders and continuous improvement, monitoring, and reflection at different levels are still missing. This creates disharmony in coordination and implementation of the policies and strategies, limiting synergies among and across stakeholders.
- Weak enforcement of legal frameworks especially at grassroots continues to undermine capacity to mobilize local resources and innovation for meaningful engagement and action. This is exacerbated by the lack of an overarching Climate Smart Agriculture implementation framework that would facilitate comprehensive planning and holistic redress of climate change issues in agriculture as opposed to having isolated, piecemeal interventions.
- As a result, the trickle-down effect/impact of the policy frameworks remains low as demonstrated by limited scale of implementation and low focused investment at all levels to ensure climate resilient service delivery.

Organizational Capacity



- Degree holders were the most prevalent among extension staff in both public and non-state extension organizations in Sembabule (67%) and Isingiro (63%). However, post graduate holders within public extension services were less likely to be found in Isingiro compared to Sembabule. Both districts, especially Isingiro would benefit from post graduate training as a boost in Local Government capacity for providing leadership in climate change related challenges at this level.
- Overall, about 65% percent of the respondents indicated that their organizations collaborate with other organizations in at least one area of service delivery, with Isingiro exhibiting greater collaborative tendency (70%) compared to Sembabule (30%) due to the greater diversity of actors in the latter. The major areas of collaboration included training (39%), community mobilization (23%), project implementation (11%) and dissemination of information (11%).
- Whereas these show a form of collaboration, they largely represent short to medium term project outputs that do not guarantee sustained impact beyond a given project cycle. Collaborative frameworks need to be comprehensive in terms of stakeholders, with effective community engagement and a broader and long-term view if impact is to be realized sustainably, and at scale.
- Overall, usage of the different climate information sharing methods including fellow extension workers, media, online, and trainings appeared to be fairly distribution across the extension worker categories and districts. However, farmers reported that the climate information received was unreliable as it was not regularly available and was often inaccurate and generic in nature, thus, failing to give point or location specific forecasts.
- Farmers generally perceived government extension services to have higher capacity compared to the non-state extension

organizations as they were considered to have more resources.

➤ Government initiatives like input distribution under NAADS should engage in genuine grassroots consultations so as to better align priorities and expectations in order to avoid wastage of public resources.

Individual Capacities



a) Extension Workers

➤ There are varied capacities among public and non-state extension workers when it came to some aspects of climate change. On a scale of 1-5, non-state extension workers in Sembabule were a little better off than their public sector counterparts with an average score of 3.4 compared to 2.9 with regard to their knowledge and skills in various climate change thematic areas.

➤ However, the overall average score for level of climate change knowledge and skills of all respondents interviewed (2.9) fell way below the minimum desirable score of 4. This implied that a major task for future climate change interventions to improve the knowledge and skill levels and confidence of extension workers in the study areas would have to target all the 14-climate change knowledge and skill areas highlighted. Short courses and workshops on specific topics on climate change were the most preferred modes of training among the actors.

➤ Non-state actors provided more conducive working conditions than their public organizations across the seven parameters, with average scores of 4.4 compared to 3.2 in Sembabule; and 3.6 compared to 3.4 in Isingiro, respectively.

➤ In both districts, facilitation of extension workers with field equipment and demonstration kits scored the lowest among actors in public extension organizations, with a score of 2.2 in Sembabule and 2.6 in Isingiro. With the exception of teamwork which was commendably done, efforts at improving work conditions of extension workers on all the remaining six parameters, with special emphasis on equipping extension workers better with field tools and demonstration kits, especially among the public extension service. Farmers

b) Farmers

➤ Increased drought and general seasonal variability presented the greatest challenge to farmers, resulting into crop loss, scarcity of water and feed for livestock, and postharvest losses.

➤ Farmers' ability to adapt to changes was generally challenged by poor access to resources and complementary services although there were some scattered signs of community initiatives for climate change resilience.

➤ In addition, there is weak farmer institutional capacity to ensure collective action e.g. implementation of bye-laws for environmental protection and dealing with other challenges brought about by climate variability.

➤ These were exacerbated by ignorance about climate change, its causes and the appropriate responses individually and collectively among farmers.

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List of Acronyms

ACCU	Agriculture Climate Change Coordination Unit
ACORD	Agency for Cooperation and Research in Development
ACREI	Agricultural Climate Resilience Enhancement Initiative
AEAS	Agricultural Extension and Advisory Services
AFAAS	African Forum for Agricultural Advisory Services
ATAAS	Agriculture Technology and. Agribusiness Advisory Services
CAN-U	Climate Action Network of Uganda
CAO	Chief Administrative Officer
CDO	Community Development Officer
CC	Climate Change
CCD	Climate Change Department
COVID	Community Volunteer Initiative for Development
CSA	Climate Smart Agriculture
DAES	Directorate of Agriculture Extension Services
DDP	District Development Plans
DFA	District Farmer Association
DLG	District Local Government
DPMO	District Production and Marketing Office
EEA	Enabling Environment for Agriculture activity
FAO	Food and Agriculture Organisation of the United Nations
FFS	Farmer Field School
FGD	Focus Group Discussions
FO	Farmer Organisation
FY	Financial Year
GCF	Green Climate Fund
GEF	Global Environment Facility
ICPAC	IGAD Climate Prediction and Applications Centre
IITA	International Institute for Tropical Agriculture
ISIDIFA	Isingiro District Farmers' Association
ISSD	Integrated Seed Sector Development
JAS-TWGs	Joint Agriculture Sector Technical Working Groups
JCCMAS	Joint Consultation and Cooperation Mechanism for the Agricultural Sector
KII	Key Informant Interviews
LDC's	Least Developed Countries
LG	Local Government

MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MADDO	Masaka Diocese Development Organisation
MDA's	Ministries, Departments and Agencies
MoLG	Ministry of Local Government
MUCCRI	Makerere University Centre for Climate Change Research and Innovation
MWE	Ministry of Water and Environment
NAADS	National Agricultural Advisory Services
NAEP	National Agricultural Extension Policy
NAP	National Adaptation Plan
NAP-Ag	National Adaptation Plan for the Agriculture sector
NARO	National Agricultural Research Organisations
NCCFP	National Climate Change Focal Point
NCCP	National Climate Change Policy
NDP	National Development Plan
NEMA	National Environment Management Authority
NIP	National Irrigation Policy
NPA	National Planning Authority
NRO	Natural Resources Office
OPM	Office of the Prime Minister
PELUM	Participatory Ecological Land Use Management
PICSA	Participatory Integrated Climate Services for Agriculture
SEDIFA	Sembabule District Farmers Association
SG 2000	Sasakawa Global 2000
UFAAS	Uganda Forum for Agricultural Advisory Services
UNADA	Uganda National Agro-input Dealers Association
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNMA	Uganda National Meteorological Authority
VEDCO	Volunteer Efforts for Development Concern
WMO	World Meteorological Organisation
ZARDI	Zonal Agricultural and Research Development Institute

1.1 Climate Change: A Threat to National Development

The effects of climate change on our ecosystems are already severe and widespread, and ensuring food security in the face of climate change is among the most daunting challenges facing humankind. While some of the problems associated with climate change are emerging gradually, action is urgently needed now in order to allow enough time to build resilience into agricultural production systems (FAO, 2016). The Intergovernmental Panel on Climate Change [IPCC] report (2014) has shown that changes in climate are already undermining production of major crops (wheat, rice and maize) in tropical and temperate regions and, without adaptation, this is expected to worsen as temperatures increase and become more extreme. Reports (Challinor et al., 2014b; Asseng et al., 2014) have estimated that global rice, maize and wheat yields are projected to decrease between 3-10% per degree of warming.

In Uganda, the National Irrigation Policy Report (MAAIF & MWE, 2017), has succinctly stated that in the wake of climate change, dependence on rain alone will not sustain Uganda's agricultural sector. As long as agriculture continues to be rain fed its vulnerability to climate shocks will continue to adversely impact its performance in the short medium and long term. Government of Uganda has showed that in 2011 alone, the estimate of loss and damages caused by climate change was US\$ 1.2 billion (about 7.5% of Uganda's GDP) which was higher than the investment in agriculture out of the national budget in that year. There are fears that if the current farming practices in Uganda remain unchanged in the face of the changing climate, agriculture yields will fall drastically and the resultant impact will be increased food insecurity and high poverty levels.

MAAIF & MWE (2017) have reported that previous healthy rains spanning 8-9 months a year provided Uganda with an advantage to grow a variety of food and cash crops, expand livestock farming and increase investments in both capture fisheries and aquaculture. However, with climate change, rains have become shorter (averaging 6-7 months a year since 2010) and droughts longer (with Uganda hitting a high monthly average of 33.8 degree Celsius in March 2016, the highest in its history).

Uganda's efforts to increase production, fight hunger and reducing poverty have been consistently frustrated by the frequent threats and actual occurrences of droughts and floods. Previous reports (World Bank, 2010; Development Strategy and Investment Plan, 2010; Uganda Bureau of Statistics, 2011) indicated that Uganda had a poverty level of 24.5% with 20% of the population being perpetually food insecure. Mwera et al (2014) reported that in 2010, drought accounted for 38% and 36% loss in production for beans and maize respectively leading to a loss of Uganda shillings 2.8 trillion equivalent of 8% loss of Gross Domestic Product (GDP) and 87% loss to agro-industries. These conditions were found to translate into the country's food consumption gaps, high Global Median Acute Malnutrition (GAM) rates, with many people marginally able to meet their minimum food needs especially during dry spells (MAAIF & MWE, 2017). In terms of water usage, MWE (2013) reported that because about 69% of Uganda's water resources originate from outside Uganda, climate change would pose a geo-political challenge with her neighbors especially in controlling the waters except through regional and internal cooperation.

According to the Economic Assessment of the Impacts of Climate Change in Uganda report (2015), drastic changes in weather patterns have altered crop, livestock and fisheries performance causing unpredictability and unreliability in agricultural output particularly over the last decade. This in part informed the warning that Uganda's development prospects will only be achieved if actions were taken early enough to support climate change adaptation.

1.2 Climate Change Interventions: An Analytical Framework

The efforts/ strategies/ approaches for integrating climate change adaptation considerations into policy-making, budgeting and implementation processes at the national, sector and sub-national levels (UNDP-UNEP, 2011) can be broadly categorized into national or sector-wide policy and localized/community level approaches. These two approaches represent a typology of perspectives which have key implications for mainstreaming and effectiveness in terms of achieving intended climate change action outcomes. The former, more often than not take on a more top-down approach while the latter, a more bottom-up approach. Bottom-up approaches for integrating climate change in agricultural extension programs involve specific community-wide interventions given the context of a locality and the climate change project in question, such as agriculture and water catchment management. Such interventions may include: climate change impact, vulnerability and risk assessments (Huq et al., 2003; MWE, 2014; Murphy & Kitamirike, 2019); institutional mainstreaming (for instance, Manual for Trainers: Gender Equality and Gender Mainstreaming, Module 3); Participatory Integrated Climate Services for Agriculture (PICSA) (Dayamba et al. 2018); and building climate-resilience into value chains (ITC, 2015; Dazé and Dekens, 2016).

Analytical Framework for Climate Change Mainstreaming Approaches



Literature generally identifies several critical aspects regarding effective integration /mainstreaming of topical issues such as climate change in development agendas at national or sector-wide level and at lower levels of society. These, for instance, include how national and sector-wide goals and policy are actually translated into local actions; whether emphasis is given to both qualitative and quantitative aspects of anticipated outcomes; existence of shared understanding and appreciation of the issue being integrated or mainstreamed among stakeholders; and coherence of policy frameworks and good leadership to guide implementation. Top-down planning and implementation of mainstreaming campaigns is often associated with government negotiations with donor agencies as opposed to domestic and local agencies. While national and sector-wide approaches have standardized methods and tools, ignoring good local context analysis and failing to stimulate and integrate local ideas must be avoided. In this, fostering institutional change rather than focusing on basic management effectiveness is necessary. Clearly, the capacity of stakeholders at different levels to take ownership of the implementation is vital. It is also apparent that civil society and community-level participation in setting and monitoring such outcomes enhances the framework for accountability of public policy within a given sector (Sibbons et al, 2000). This background provides a framework for critically assessing the capacity of current policy, coordination and implementation frameworks for integrating climate change in agricultural extension programs.

1.3 The ACREI Project

The Agricultural Climate Resilience Enhancement Initiative (ACREI) is a 3-year partnership program between the World Meteorological Organization (WMO), the Food and Agriculture Organization of the United Nations (FAO) and the IGAD Climate Prediction and Applications Centre (ICPAC) funded by the Adaptation Fund. The target countries of the program are Ethiopia, Kenya and Uganda, and it is aimed at supporting:

- i. Community adaption practice,
- ii. Climate proofing of extension systems, and
- iii. Climate informed decision making

Funded under the Adaptation Fund Pilot Program for Regional Projects, the ACREI project promises to be an innovative initiative linking regional and national level climate services capacity to local level adaptation and resilience for smallholder farming communities. Output 2.1 of the project, titled "Sub-national extension actors' technical capacity on climate proof extension system analyzed and capacity needs prioritized" focuses on identifying the extension actors, their capacity needs and gaps and development of a capacity development plan to support enhanced climate knowledge and understanding in extension practice in the target communities. This assignment was done in three project countries, namely; Ethiopia, Kenya

and Uganda under the oversight of AFAAS secretariat. Accordingly, AFAAS solicited the services of the respective Country Fora to carry out the specific activities of the assignment. In Uganda, the assessment was, thus, conducted by the Uganda Forum for Agricultural Advisory Services (UFAAS).

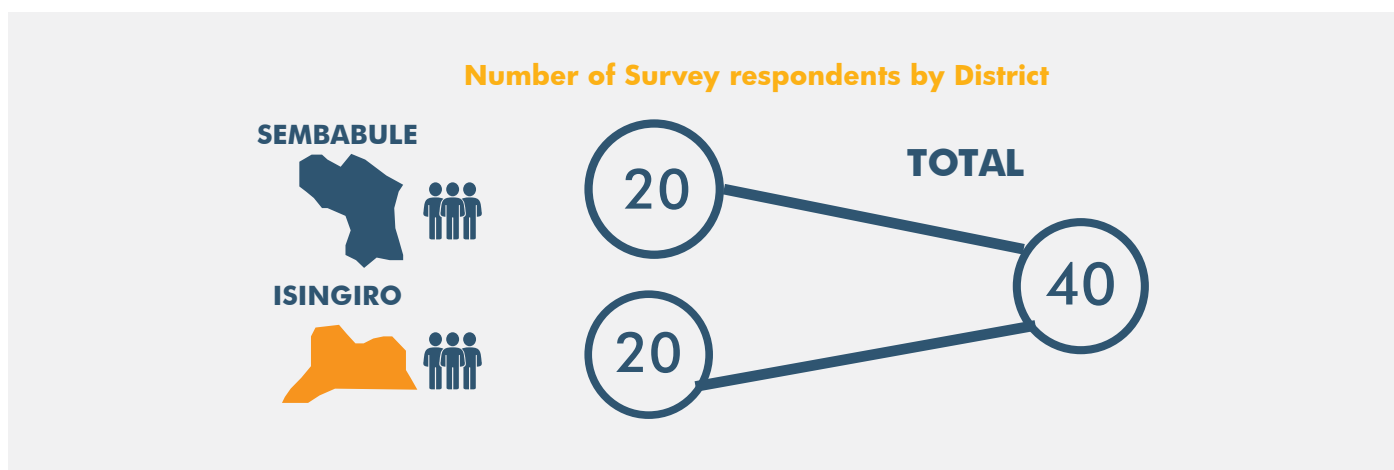
The Specific Objectives of the Assignment Were to:

- Conduct stakeholder mapping and capacity needs assessment on integration of climate change in extension program at sub-national level.
- Develop a capacity development plan to integrate climate change in extension programs at sub-national level.

1.4 Methodology

The study approach included desk review, stakeholder mapping, data collection and analysis, compilation of findings, validation of findings by stakeholders and, finally, development of the capacity development plan.

Data were obtained at national, district and community level. At the national level, a total of ten (10) Key Informant Interviews (KIs) were held with various national level institutions including NARO, MUCRRI, UNMA, CCD, MWE, EEA, and MAAIF. At the district or Local Government level, two (2) KIs were held with the District Production and Marketing Officers (DPMOs) of the Isingiro and Sembabule District Local Governments. At community level, eight (8) Focus Group Discussions (FGDs), four from each of the study districts were held with members of selected farmer groups. Two of the selected groups were had been engaged in the Farmer Field School approach while two had not. This was intended to enable follow up on the FFSs which were initiated by earlier FAO projects. Furthermore, a survey was conducted with a total of 40 participants (public-20 and non-state extension workers-20) at district level to identify key aspects of individual and organizational capacity for effective integration of climate change in extension services. This sample size was determined on the assumption that there were not so many extension actors at the district level and that the overall total of respondents for the study across the three countries would ultimately come to 120 which would be adequate for the analysis.



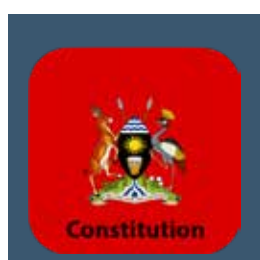
2.1 Enabling Environment

2.1.1 The Policy Frameworks

The enabling environment for integrating climate change adaptation and mitigation in agricultural programs, policies and activities is informed by a host of complementary policies, strategies and guidelines. Huq et al., 2003 in a report on mainstreaming adaptation to climate change in Least Developed Countries (LDCs) noted that efforts made to mainstream adaptation to climate change into national planning and activities in the different sectors were relatively successful for the agricultural sector, for instance, in Mali.

In Uganda, MAAIF has developed guidelines for mainstreaming climate change adaptation and mitigation in the Agricultural Sector Policies & Plans (MAAIF, 2018). A major justification for the guidelines is the fact that the biophysical and socio-economic impacts of climate change and variability have implications on the entire agricultural sector. Secondly, the mainstreaming of climate change mitigation and adaptation into agricultural sector policies and plans supports wider ownership of the climate response and allows drawing on a wider pool of financial and human resources for implementation, and promotes more widespread capacity and institutional building. The key entry points for mainstreaming climate change into agricultural sector policy and plans include policy formulation and or review; planning; resource allocation and program implementation. The following table summarizes the major themes of key government documents regarding integration of climate change in extension services and other agricultural development interventions.

Sample Policy and Strategy Frameworks Guiding Implementation



Uganda Constitution

The State shall promote sustainable development and public awareness of the need to manage land, air and water resources in a balanced and sustainable manner for the present and future generations



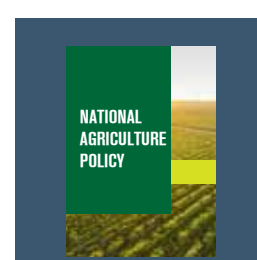
Uganda Vision 2040

Government will develop appropriate adaptation and mitigation strategies on Climate Change to ensure that Uganda is sufficiently cushioned from any adverse impact brought by climate change. The use of the guidelines for incorporating climate change in the sector, and local Government plans and budgets will be popularized



National Climate Change Policy (NCCP)

The goal of the NCCP is to ensure a harmonized approach towards a climate-resilient and low-carbon development path for sustainable development in Uganda. This will be achieved by ensuring that all stakeholders address climate change impacts and their causes through actions that promote a green economy and sustainable development



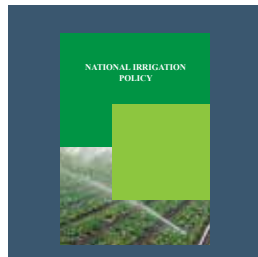
National Agriculture Policy

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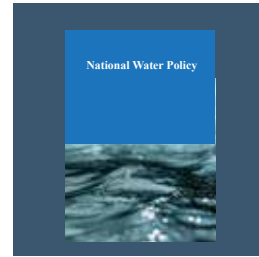
National Adaptation Plan (NAP-AG)

“A climate resilient and sustainable agricultural sector contributing towards achievement of the Uganda Vision 2040” through “To reducing vulnerability and enhancing adaptive capacity of Uganda’s agricultural sector to the impacts of climate change in order to achieve sustainable agricultural development.”



National Irrigation Policy

Goal is to ensure sustainable availability of water for irrigation and its efficient use for enhanced crop production, productivity and profitability that will contribute to food security and wealth creation.



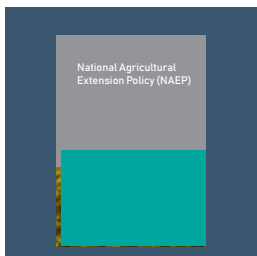
National Water Policy

Overall objective to manage, and develop the water resources of Uganda, in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with the full participation of all stakeholders.



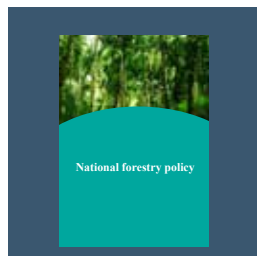
Uganda Meteorology Policy/ Act (2012)

Enable rapid exchange of meteorological related information; establish a network of stations for collecting meteorological data; provide short to long-term weather forecasts; build local and national capacity for the implementing climate and weather programs; promote use of weather and climate services in development planning and build strategic partnerships with stakeholders.



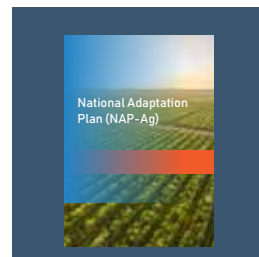
National Agricultural Extension Policy (NAEP)

Two of the objectives are to: establish a well-coordinated, harmonized pluralistic agricultural extension delivery system for increased efficiency and effectiveness; and develop a sustainable mechanism for packaging and disseminating appropriate technologies to all categories of farmers and other beneficiaries in the agricultural sector



National Forestry Policy (2001)

Aims at conserving Uganda’s rich forest biodiversity to meet the needs and aspirations of present and future generations by promoting watershed management and soil conservation; and private investment in forestry activities



National Environment Act and the Land Act 1998

Entrust all wetlands into the hands of the state to ensure their protection and wise use by way of harmonizing the multiple interests

Other complementary and related policies and strategic frameworks include: National Coffee Policy 2013, National Fisheries Policy (2003), Food and Nutrition Policy (2003), Draft Rangeland Policy, The Land policy; National Environment Management Policy (1995); Wetlands Policy (1995); Uganda Strategic Investment Framework for Sustainable Land Management 2010-2020; and Disaster Preparedness and Management Policy (2010).

According to the NAP-Ag and the above cross-sectional review of thematic areas of sample national policy frameworks, Uganda's climate change enabling environment seems comprehensive and elaborate enough to facilitate development of climate resilience. Thus, it can be argued that Uganda's policy environment broadly supports the integration of climate change adaptation and mitigation in agricultural extension at national and sub-national levels.

Key informants at local government level, for instance, noted that mainstreaming of climate change in agricultural extension activities was guided by various government policies and strategies. These included Vision 2040, the National Agriculture Policy 2013, NAEP 2016, NCCP 2015 and the National Development Plan (NDP). They explained that since climate change was one of the areas emphasized in such national documents, the District Development Plans (DDP) were to be aligned accordingly. For instance, both the NDP and Vision 2040 recognize the need to increase production in an environmentally sustainable way.


In spite achieving some milestones particularly in establishing the institutional fabric to handle climate change adaptation and mitigation at the national level, NDP (2010) and the Climate Change Unit (CCU, 2012) alluded to the slow nature of progress in implementation. Generally, effective climate change policy implementation is undermined by various challenges including overlapping mandates; limited technical capacity; weak institutional coordination mechanisms; low budget allocations; low policy literacy at local level; and paying limited attention to local context.

Some policy gaps related to climate change include the lack of a climate change law in Uganda, although the bill has since been tabled in parliament. On the other hand, some existing policies such as the National Forestry Policy (2001) and Wetlands Policy (1995), which were developed before climate change became a topical issue may require review where necessary, for purposes of emphasis and clarity. However, enactment of legal regulatory frameworks requires concomitant mechanism for enforcing such frameworks at all levels. For instance, NAP-Ag notes that notwithstanding enactment of the National Environment Act and the Land Act 1998, wetlands continued to face immense pressure from expanding populations and dwindling productive land.

This is suggestive of weak enforcement mechanisms which jeopardizes systemic development of bottom-up climate change resilience pathways. Weak enforcement of environmental protection ordinances was, for instance, avidly alluded to by farmers as contributing to widespread destruction of the environment. Farmers in FGDs strongly held the sentiment that the National Environment Management Authority (NEMA) was for the most part responsible for the continued destruction of the environment due to connivance of its officers with perpetrators ("big people") for monetary gains. Another farmer sarcastically noted that, "our predecessors who were not as educated stewarded our natural resource endowments better than the current generation which is more 'educated'. Maybe the education they are getting is making them confused." Policy signals that are inconsistent with actions at the grassroots thus, undermine their ability to mobilize local solidarity to form a formidable anchor for bottom-up approaches for integrating and implementing climate change actions within local contexts, sustainably. Politicians were especially blamed for undermining enforcement mechanisms since it is difficult for them to reprimand environment culprits on whom they depend for votes.

Notwithstanding the efforts to mainstream climate change action through a number of policy and legal frameworks, in the end it is the actualization of outcomes that counts. Sibbons et al, 2000 rightly note that whereas formal commitment to objectives relating to mainstreaming an issue tended to be strong at the center, it was subject to 'policy evaporation' as policy and implementation moved from the central to the local level. In general, commitment at government level in mainstreaming climate change is evidenced by the numerous complementary climate change policy frameworks as highlighted above. However, results remain highly dependent on the existence of leadership that is committed to implementation of the policy actions in a coherent and coordinated manner at all levels in addition to other factors (see Sibbons et al, 2000).

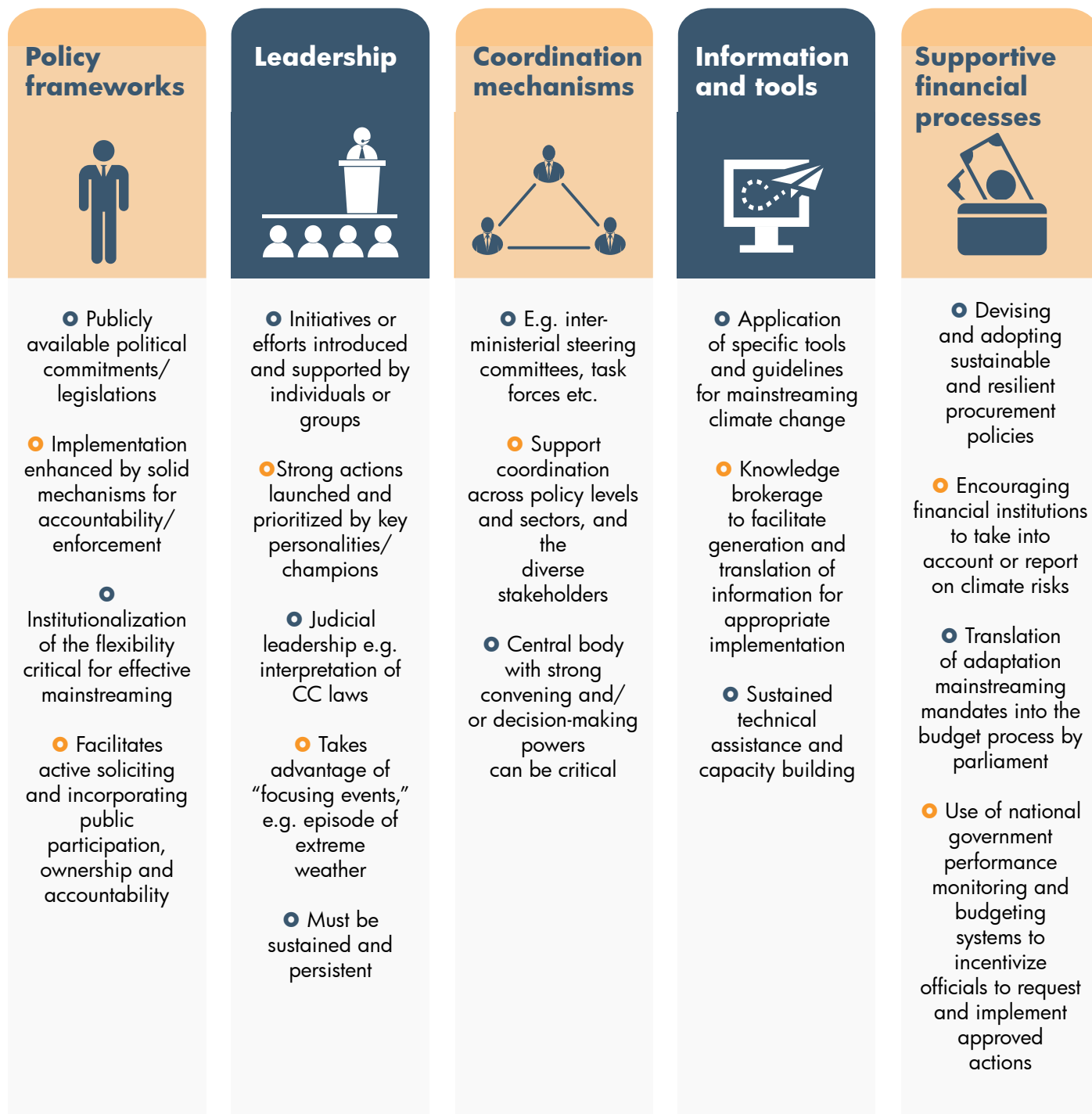
Consequently, there was strong evidence from the study to suggest that the trickle-down effect as a result of the policy frameworks remained low. For instance, the briefing note by Murphy & Kitamirike (2019) on a climate risk assessment of water resources and recommendations for the Ruhezamyenda catchment in the Southwest of Uganda notes that recommended activities for soil and water conservation needed to be accelerated and scaled-up in order to have real impact. Further, Dazé and Dekens (2016) highlight the need for targeting the various value-chain actors in order to build climate resilience along value chains. Notably, smallholders remain highly vulnerable because their incomes and food security are directly dependent on agricultural production, and they normally have fewer assets and alternative sources of income compared



to other value-chain actors. On the other hand, a survey on perceptions of agri-food exporters in Peru and Uganda and their capacity to adapt to climate change (ITC, 2015) noted that exporters in Uganda were not undertaking substantial adaptation measures to build longer-term climate resilience. The need for more resistant/tolerant crop varieties and export diversification were identified as plausible measures that would help in building the resilience of supply chains. However, initiatives were seen as fragmented, diverse and largely confined to pilot activities. A key informant at DLG level suggested that the parish farmer model could be key in concentrating the technologies for demonstration to community as a strategy to promote scaling-out of the technologies at local level.

In order to promote more implementation at local level, broad application of tools e.g. for analysis and prioritization, tracking, and capacity building which are often not used beyond demonstration/pilot projects in day-to-day operations during sectoral planning and implementation (Mogelgaard et al. 2018). In order to help accelerate the move from mainstreaming commitments and plans to implementation, Mogelgaard et al. (2018) thus propose five factors for due consideration, namely, policy frameworks, leadership, coordination mechanisms, information and tools, and supportive financial processes. A summary of the components of the factors is highlighted.

Factors and Key Features for Consideration in Closing the Implementation Gap



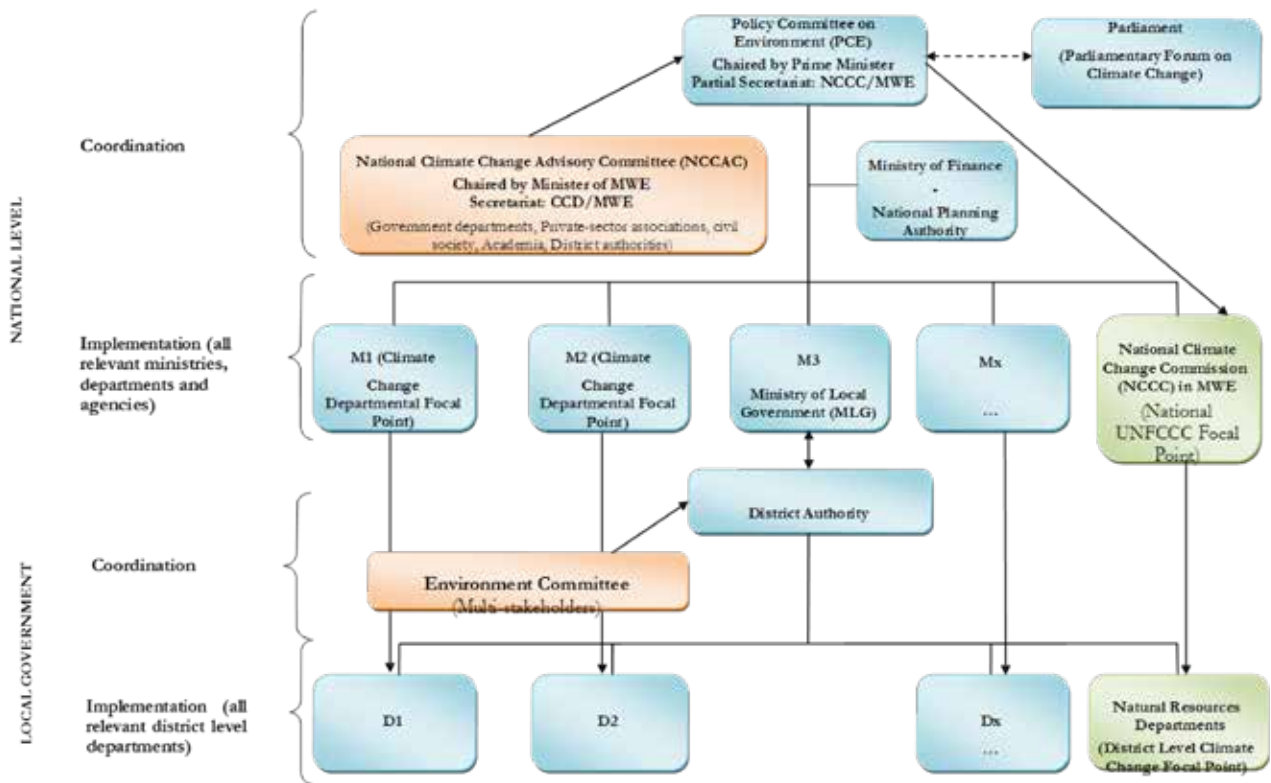
Lastly, several lessons to strengthen implementation at the grassroots can be drawn, for instance, from implementation of climate change projects such as the Ruhezamyenda Catchment Management Plan. Results from climate change risk analyses should be incorporated in existing local plans and this calls for the need for decision makers and stakeholders to be aware of such results. Various channels and mechanisms for sharing such information among stakeholders at different levels e.g. management committees at local level are, thus, important. On the other hand, the results of such an assessment provide evidence for the basis of prioritizing adaptation actions. Generally, prioritizing a few manageable and affordable adaptation actions that can be achieved over the short-medium term e.g. three years—rather than trying to do everything—is a more prudent way to move toward improved climate resilience in a locality. In turn, prioritization plays an important role in guiding the resource mobilization strategy for the respective area, providing a spring board for bottom-up planning and local innovation.

Notably, effective implementation of the priority adaptation actions identified in such climate risk assessments also required integration of actions into other development tools and plans such as district development, sector, and land-use plans. It is therefore important that such plans are reviewed to identify potential linkages with adaptation priorities identified in area climate risk assessments. This further emphasizes the need for a cross-sectoral approach to intervention design meaning that the adaptation actions need to be undertaken in various sectors - such as agriculture, mining, forestry, and disaster preparedness - which requires coordination and integration of adaptation into on-going projects and programs. Monitoring and evaluation is a critical component to ensure that the activities deliver adaptation benefits, reflect lessons from the implementation process, and enable domestic and international adaptation reporting. As such, indicators with baseline information can be developed for priority actions to enable the monitoring and evaluation of the adaptation outcomes.

As indicated in Table 4, there are various existing legal frameworks that directly or indirectly guide mainstreaming of climate change into agricultural extension and development programs. However, these vary in perspective, sector bias, context (e.g. main issues and inspirations), and primary audience, which inevitably poses major coordination and implementation challenges. As Bryson et al., (2006) note, responding collaboratively and effectively to problems that are so interconnected and encompassing is not an easy fit. Implementation of policy to effectively address society's challenges is a highly complex process contributed to by an array of societal actors including business, nonprofits, the media, farming communities, and government ministries and agencies. According to Bryson et al. various aspects contribute to the effectiveness of such multi-level collaborations, for instance, initial conditions, types of linkages and structures (formal or informal); leadership quality; level of trust, capacity for planning and managing conflict, power relations, competing institutional logics e.g. organizational cultures, and differences in measurement of outcomes/accountabilities.

Oversight of the implementation of the NCCP is provided by the Policy Committee on Environment chaired by the Prime-Minister, and advised by the National Climate Change Advisory Committee. The CCD is tasked with coordination of climate change issues between sectors/ministries such as works, energy, water, environment and agriculture, and doubles as the National Climate Change Focal Point (NCCFP) in the Ministry of Water and Environment and the Focal Point for UNFCCC. CCD is expected to provide guidance to implementation of the NAP-Ag and the Climate Smart Agriculture Programs. For instance, the Agriculture Sector NAP was developed through a participatory process under the leadership of the Ministry of Agriculture Animal Industry and Fisheries with guidance from the CCD, MWE. As such, CCD works with climate change coordination units in different Ministries, Departments and Agencies (MDAs) to ensure the mainstreaming of climate change in the different sectors of the economy. It also works with the National Planning Authority (NPA) to ensure the integration of climate change in the NDP and Sectoral Development Plans. CCD works with the Ministry of Local Government (MoLG) and NPA to ensure integration of climate change in District Development Plans (DDPs). The MWE is the National Implementing Entity for the Adaptation Fund, while the Ministry of Finance Planning and Economic Development (MoFPED) is the National Designated Authority (NDA) for the Green Climate Fund (GCF).

Coordination and Implementation Framework for NCCP



MAAIF was expected to put in place an Agriculture Climate Change Coordination Unit (ACCU), which would serve as the Sector Focal Point to implement the NAP and the Climate Smart Agriculture Program. Since Climate Change cuts across the MAAIF sub-sectors/Directorates (Crop Resources, Animal Resources, Fisheries Resources and Agricultural Extension Services), ACCU would be responsible and accountable for ensuring the smooth implementation of the NAP. However, at the time of formulation of the NAP-Ag in 2018, the ACCU was not yet in place mainly due to lack of a budget allocation for climate change activities. Nonetheless, as part of implementation of the NAP, it was envisaged that the existing MAAIF climate change task force (created in 2012) would be strengthened and formalized into a substantive ACCU. The Task Force was expected to draw representation from relevant MDA's, Civil Society Organisations (CSO's), private sector, researchers, academia and individuals. As highlighted in the NAP-Ag, it was primarily the role of the MAAIF Climate Change Task Force to involve all the stakeholders and to mobilize the staff of MAAIF in the implementation and the continuous improvement of the NAP. At the Local Government level, the climate change focal point is anchored within the Natural Resources Department of the District Local Government, which ensures that all departments integrate climate change issues in their sectors into the DDP's.

A major critique of the NCCP is that whereas MAAIF is mandated to: promote and support sustainable and market oriented agricultural production, food security and household incomes in the country, coordination of climate change activities majorly remains the responsibility of CCD in the Ministry of Water and Environment. This coordination arrangement, for instance, bears stark contrast with that of neighboring Kenya which in addition to having NAP and Climate change policies, has gone a further step to put in place a Climate Smart Agriculture Implementation Framework to provide further guidance in mainstreaming Climate Smart Agriculture 2018-2027 (KCSAIF) (GoRK (2018)). Two of the objectives of the framework include developing a sustainable system for achieving a coordinated, coherent and cooperative governance of climate resilience and low carbon growth in the agricultural sector; and strengthening communication systems on CSA extension and agro-weather issues. In the Kenyan context, the CSA objectives are supposed to enhance the achievements of national food security and development goals through: Scaling up/out of proven technologies and practices for resilient livelihoods related to efficient soil and nutrients management, water and on-farm energy resources; Conservation and sustainable use of agro-genetic resources; Sustainable intensification of crop, forage, agroforestry, livestock and fisheries production; Adaptation and mitigation practices in crops, livestock, agroforestry and fisheries production systems; Efficient management of agricultural commodity value chains; Identifying opportunities to leverage climate finance for CSA, including social protection and safety nets where economic models are not viable; Knowledge sharing and effective learning, strengthening key institutions and systems for CSA initiatives; and Mainstreaming CSA elements into national policies and development planning process.

The KCSAIF, for instance, is expected to be implemented through the Joint Consultation and Cooperation Mechanism for the Agricultural Sector (JCCMAS). The structures created to coordinate the direct implementation are focused on agriculture and are not hosted or necessarily controlled by a single ministry as in the case of Uganda where MWE is seen as the key driver of climate change mainstreaming and policy governance. For instance, the Joint Agriculture Sector Technical Working Groups (JAS-TWGs) is expected to provide a uniform platform for intergovernmental technical consultation based on the principle of equitable representation at all levels of government to enhance its effectiveness. As a prerequisite of the Kenya Climate Change Act, each state department and National government public entity is expected to establish a Climate Change Unit (CCU) charged with coordinating implementation of CSA activities at the national and local government levels. The units are also expected to communicate decisions of JAS-TWGs to implementing entities, as well as provide technical support to the management and CSA implementing stakeholders including reporting.

Conversely, however, closely related to the NCCP is the National Irrigation Policy (NIP, 2017). The policy categorically states that the Ministry in charge of agriculture shall be responsible for on-farm interventions which refer to development of hydraulic infrastructure, associated engineering works and irrigation accessories comprising of conveyance from farm gates to farmers' fields and water use management. On the other hand, the Ministry in charge of water shall be responsible for off-farm interventions which refer to development of hydraulic infrastructure and associated engineering works comprising of water abstraction and conveyance to farm gates. At the national level, the Office of the Prime Minister (OPM) is expected to chair an Inter-Ministerial Technical committee on water for production to enhance synergies between implementing sectors (water and Agriculture) in irrigation. A coordination mechanism jointly spearheaded by both MAAIF and MWE is expected to drive the process through a water-for-production sub-sector working group co-chaired in the Ministry of Water and Environment. At district level, a district technical support committee constituting of the District engineer, water officer, forest officer, the heads of production and marketing, the agriculture officer and community development officers in liaison

with line ministries support planning, implementation, monitoring and management of irrigation in their respective districts. Thus, the NIP as opposed to the NCCP provides a more conducive framework for collaboration.

To illustrate the above, the study found that the OPM provided oversight for the coordination and implementation of Water for Production (W4P), an area that has in the past been contentious ground between MAAIF and MWE due to overlapping mandates. The activity was coordinated through a Technical Committee on W4P which meet on a quarterly basis. During technical committee on W4P meetings, MAAIF and MWE shared and harmonized their work plans accordingly. This had been made especially possible by the recently launched National Irrigation Policy. As a consequence of the policy, the two ministries were trying to align themselves with the policy in terms of their roles, for instance, scaling back what does not belong to them such as small-scale irrigation in the case of MWE. With clear roles, the ministries were working hand-in-hand on a project for an upcoming project, namely, Irrigation for Climate Resilience Project which would be due for implementation the following Financial Year. The project was set to look beyond just irrigation infrastructure to tackling other inherent challenges of farmers such as markets. It was also revealed that the two ministries were working together to develop an irrigation master plan for the country, a venture which was cost-shared (50%/50%) between MAAIF and MWE.

2.1.2.1 National Agricultural Extension Policy

On the other hand, MAAIF is expected, through the Directorate of Agriculture Extension Services (DAES) and their staff at the sub-county, to support farmer uptake of irrigation opportunities appropriately. Further still, by implementing the National Agricultural Extension Policy (NAEP, 2016), it is expected that MAAIF will work with relevant ministries, local governments, farmer organizations, civil society networks, private sector umbrella organizations and other non-state actors to establish clear organizational structures and lines of authority for the pluralistic extension system. The study found that MAAIF had a climate change Focal Person who attends meetings whenever called upon by CCD, mainly for updates and trainings on various aspects. However, no explicit reference was made to such key structures or institutional arrangements mentioned in the implementation framework in real life to ensure coordinated action such as ACCU which was meant to link state and non-state implementers at national and local government levels. In fact, the ACCU had not yet taken shape by the time the NAP-Ag was formulated in 2018 due to lack of funds. As such, there remain no clear mechanisms for systematically operationalizing the pluralistic extension system at the different levels which further hinders inter-sectoral collaboration and synergizing for mainstreaming and implementing agreed climate change actions. Notwithstanding, there were signs of various efforts for independent mobilization for climate change action among actors. For instance, CSOs have an organization, Climate Change Action Network of Uganda (CAN-U) whose networks provide entry points for national mobilization for climate change action. That said, it was noted that private sector and civil society were often cagey about declaring their budgets in relation to climate change activities which partly hinders collaborative efforts and effective integration of climate change activities across programs of diverse actors.

At least, theoretically, the NAP-Ag notes that Uganda's decentralized governance structure is able to leverage funds to respective local government level sectors for further decision-making and policy implementation. If well implemented, the structure provides opportunities for local level participation in decision-making on climate-related issues. It also gives local governments responsibility to address planning, developmental and environmental issues. This is critical since local-level planning is paramount in mobilizing uptake of climate change adaptation practices.

2.1.3 Local Government Level Coordination and Implementation Arrangements

The study established that at the District Local Government level, the Natural Resources Officer doubles as the contact person responsible for climate change issues at the District. The District Production and Marketing Department (DPD) together with the Department of Works and Water engage in joint planning and share each other's work plans for input. Normally, engagement of whichever district personnel depends on the nature of the project (e.g. excavation, irrigation, livestock, and fisheries). For instance, for excavation of valley tanks and dams, the Works department consults the department of production regarding the best locations. In such cases, the DPD plays the roles of sensitizing the community members after excavations as well as supporting them in establishing water user committees. Overall, the Natural Resources Officer is the focal person for climate change and plays the role of coordinating and reporting on climate change and policy related issues in the district. However, all other offices report on climate issues during the Technical Planning Committee (TPC) meetings, and through reports to national coordinating offices. It was however noted that in most cases climate change is considered a cross-cutting issue without designated personnel to ensure follow up and implementation. For instance, schools have in the past been targeted for tree planting but no deliberate steps have been taken to ensure trees are planned

by schools. On the other hand, road construction often involves destruction of trees but there is no deliberate plan by construction projects to replant.

The District Development Plans (DDP's) were derived from the District Sector Plans (DSP's) and implemented through annual and quarterly work plans. During its development and budgeting, the issues of addressing climate change are integrated and effective last financial year (FY 2018/2019) climate change mainstreaming became a prerequisite for funding district work plans. However, unlike compliance audits for gender and mainstreaming which had commenced in the district, the climate change mainstreaming audits were yet to follow suit. Indicators for compliance audits for climate change were still being piloted in the districts. Failure for the districts to pass such as audit (in planning and implementation) would attract penalties which may include returning of work plans for revision, and in extreme cases, funds being withheld until requirements are met. The responsibility of monitoring climate change compliance indicators lies with the OPM to which DDPs and annual reports are submitted. Notably, mindset change among district officials was still necessary in order to ensure that climate change mainstreaming agendas are not simply reflected in plans but are actually implemented.

Funding climate change operations at district level was embedded within the district budget. District budgets are often divided into three expenditure categories including wage, development grant and recurrent/operations. Part of the money available from the development grant was used for climate change related projects which was contributed to by MAAIF and MWE. Sembabule and Isingiro being in the cattle corridor, water for livestock production is of high priority in budgetary allocations, though notably, the costs involved in such projects are quite high. According to a key informant from CCD, mainstreaming of climate change into budgets was still being piloted in selected districts such as Sembabule and yet to be rolled out across the country.

2.1.4 Climate Change Related Interventions by Isingiro and Sembabule District Local Governments

For the last four financial years, Sembabule DLG prioritized digging of at least three (3) valley dams. Other activities supported include the following;

- The Agriculture Technology and Agribusiness Advisory Services (ATAAS) project supported the promotion of improved seeds (elephant grass) to support dry season feeding.
- For the last four (4) years pasture and legume seeds have been procured to establish fodder banks, and fodder conservation in partnership with Mbarara Zonal Agricultural and Research Development Institute (MbaZARDI). As a result, a mother garden for improved elephant grass was established at the Sembabule district headquarters as a seed multiplication strategy to avoid having to ferry planting materials from the ZARDI every wet season as was previously done.
- Drought tolerant seed (LONGE 10H and NABE 16) from the National Agricultural Advisory Services (NAADS) have been distributed to farmers for the last six years.
- As of last financial year (2018/2019), the district started piloting low cost irrigation technologies for banana and coffee for farms near water sources. During this period sprinkler guns were given out for three sites. Owing to the success of the pilot projects, additional irrigation kits had since been given out for three more sites.
- Several farmers have also been training in low cost water harvesting e.g. channel water harvesting; and other recommended water and fertility conservation practices such as zero tillage.
- The Natural Resources Department has been instrumental in encouraging tree planting among communities.
- The district also worked with the meteorology (UNMA) early warning department to disseminate seasonal and monthly weather forecasts which are sent to the DPMO who in turn set up a WhatsApp group for district and field staff. Other channels such as radio, religious and cultural institutions were being used in disseminating such information.

Two major climate change projects were reported to have been implemented in the districts. In Sembabule District, the Global Climate Change Alliance – 1 (GCCA1) project which was concluded three years ago supported the excavation of three valley dams, and the establishment of about 48 climate change Farmer Field Schools (FFS). In Isingiro District, the Global Environment Facility (GEF) funded Trans-boundary Agro-ecosystem Management Project for the Kagera river basin (Kagera TAMP) which was concluded in 2014 promoted an integrated ecosystems approach to land management that enhanced local, national and global benefits from ecosystems services. Capacity building on FFS facilitation by training

watershed-based facilitators from 7 FFS was carried out. However, about 50% of the FFS established were reported to have collapsed since closure of both projects. It was noted that extension workers who were linked to some of the FFS had withdrawn their support to the FFS activities due to shortage of funding and follow-up. In addition, limited access to tree seedlings in the district and neighboring areas continues despite having had tree planting previously promoted in Sembabule district. For instance, the GCCA-1 implemented a five-year project which promoted eucalyptus tree planting; however, the seedlings were got from as far as Kampala. As such, there is need for putting in place mechanisms for sustaining the outcomes of such projects in future.

The Sembabule District Farmers Association (SEDIFA) provides several extension services including CSA trainings across all sub counties in the district, mainly on coffee, maize, and beans value chains. TechnoServe is yet another NSA operating in 2 sub counties of Sembabule, supporting several farmers mainly in training in CSA in the coffee value chain. Masaka Diocese Development Organization (MADDO) supports widows and orphans with heifers (as an alternative source of livelihood) and fodder technologies, and works in Lwebitakuli and Mateete sub-counties, serving about 30 households. The ACREI project was highlighted as a new project which was supporting farmers and extension workers to access weather information.

2.1.5 Climate change related interventions by government Ministries, Departments, and Agencies; and Non-state actors at national and sub-national levels

2.1.5.1 Uganda National Meteorology Authority (UNMA)

The Uganda National Meteorology Authority (UNMA) provides various climate and weather services. These include monitoring climate change, vulnerability assessment and hazard mapping, managing weather stations, and providing seasonal weather forecasts; monthly updates; 10-day forecasts (dekadal); and dailies. Such information is made available through the website, radio, TV, emails, and other platforms. At the time of the field work, the Authority had an emailing list of over 2,000 emails in its database. Contacts of stakeholders are normally obtained during events like the Jinja Annual Agricultural Trade show. Stakeholders are also free to call UNMA directly for feedback or inquiries. At the beginning of every season a media conference is held at the Media Center where the seasonal forecast is officially broadcast, at times by the Agriculture Minister. In addition to national conferences, regional awareness workshops together with radio talk shows on popular radio stations are held across the country. Before the seasonal forecasts are done, UNMA holds stakeholder meetings to discuss the climate information and their implication for specific sectors. Each sector representative then provides advisories based on their sector implications. These are incorporated and then broadcast to the public. At the LGs, the information is shared with DPMOs who are the district contact persons of UNMA. In addition, the authority engages stakeholders in planning and decision-making concerning appropriate action. The information passed on to the DPMOs was highly technical (in language terms) since it follows global standards. As such, DPMOs are trained to interpret, understand and also go and train other staffs and farmers. At the time of the interviews, the forecasts were readily available in 35 local languages and the messages were also packaged on audio CDs which can be used for instance on farm days or on radio programs. Forty-one (41) districts had undergone Trainer of trainers (ToTs).

The key informants from UNMA clarified that weather forecasting for farmers was still a pilot project yet to be extended to the remaining districts. They noted that the issue of reliability of the climate information was still a common challenge in the East African region in regard to area specific weather forecasts due to dynamic the nature of local weather systems. For this reason, it is generally hard to have accurate area specific forecasts in the tropics as compare to the temperate region. However, more precision calls for more investments, for instance, in the 1980's the country had over 1000 weather stations but many have been since been abandoned. The Authority was working on proposals with government and development partners e.g. UNDP to increase density of weather stations in the country. Promotion of public-private partnerships to install climate infrastructure would go a long way in contributing to this. For instance, commercial farms (estates) were being urged to invest in such infrastructure e.g. Kakira Sugar Works. UNMA's role then would be to supervise to the sites to ensure right equipment is procured and used properly. This used to be like government policy to require government facilities e.g. prisons, tea factories and others to have weather infrastructure on their premises.

In addition to increasing the density of weather station in the country, the key informants noted several issues that need improvements in order to have more efficient and effective climate information services, including the following:

➤ Need to improve stakeholder engagement especially among media houses, to promote rightful use of climate/weather information. For instance, some media personnel get information from anywhere e.g. internet and wrongfully attribute it to UNMA which tarnishes the authority's credibility.

➤ Need for more research and capacity building in new technologies to improve the efficiency of moving data and information

➤ UNMA services are currently still centralized yet they need to be on the ground by having at least a meteorologist at district level to support related activities. Efforts have been made to decentralize services by dividing the country into 5 zones (north, western, central, eastern and Karamoja). But there is need for office space and logistics.

➤ There is need to integrate weather and climate services into district budgets, implementation work plans and reporting, given that extension workers have in the past been reported to complain that they do not have budgets for this disseminating such information. Extension workers needs to be further sensitized on their role of sharing information since there is no meteorologist at the district and lower levels.

➤ There is a gap in the monitoring weather infrastructure due to limited personnel and budget


➤ Inadequate computing facilities given that the work requires high processing computers and large storage to accommodate the huge data needs. For instance, data is received after every 15 minutes

2.1.5.2 Ministry of Water and Environment and MAAIF: Collaboration in Provisioning Water for Production

According to a key informant from Water for Production, various useful information exist at the district offices. For instance, MWE had a countrywide running project to support people to dig up valley dams since 2008/9. The project consists of a package comprising of an excavator, bulldozer, low bed, tipper truck, and service van. Applications for the services are submitted to district LG office. The daily hire rate was UGX 750,000 including transport, allowance, and service (this excludes fuel which is incurred by the farm owner). Services were decentralized based on 5 regions with offices located in Mbarara, Lira, Mbale, Karamoja and Wakiso. A project to popularize small irrigation projects was also ongoing. The target for the project was to establish at least 30 irrigation sites per region per financial year. The project primarily targets organized farmers, or collective entities with farmland of at least 10-20 acres. It was envisaged that in the following FY, three (3) irrigation sites per constituency would be established under a presidential initiative.

Summary of Climate Change Interventions In Uganda as Adapted from The KII's and Stakeholders Validation Workshop

ORGANIZATION / INSTITUTION	CLIMATE CHANGE INTERVENTIONS	COVERAGE
CCD	<ul style="list-style-type: none"> ○ Curriculum development ○ Training and dissemination ○ Lobbying for funding 	<ul style="list-style-type: none"> ○ Country wide
MUCCRI	<ul style="list-style-type: none"> ○ Capacity building & Policy development 	<ul style="list-style-type: none"> ○ Country wide
USAID	<ul style="list-style-type: none"> ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Feed the Future Districts
NARO	<ul style="list-style-type: none"> ○ Research & development ○ Green energy solutions ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Country wide
ACORD	<ul style="list-style-type: none"> ○ Watershed management ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Northern, North Eastern, West Nile and South-western Uganda)
FAO	<ul style="list-style-type: none"> ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Country wide
CAFE AFRICA	<ul style="list-style-type: none"> ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Country wide
MAAIF	<ul style="list-style-type: none"> ○ Green energy solutions ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Isingiro
HANNS R. NEUMAN STIFTUNG	<ul style="list-style-type: none"> ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Mityana, Mubende, Rakai, Nakasongola, Nakaseke, Masaka.
WFP	<ul style="list-style-type: none"> ○ Green energy solutions 	<ul style="list-style-type: none"> ○ Country wide
V AGROFORESTRY	<ul style="list-style-type: none"> ○ Green energy solutions 	<ul style="list-style-type: none"> ○ Country wide
IUCN	<ul style="list-style-type: none"> ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Country wide
NUCAFE	<ul style="list-style-type: none"> ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Country wide
MAAIF	<ul style="list-style-type: none"> ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Country wide
NAADS	<ul style="list-style-type: none"> ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Country wide
FOOD FOR THE HUNGRY	<ul style="list-style-type: none"> ○ Training and dissemination 	<ul style="list-style-type: none"> ○ Country wide



This inventory of climate change interventions was based on input by key informants and participants during the stakeholder validation workshop. The inventory is by no means exhaustive, but rather an attempt to highlight the scope, and coverage of projects and programs being implemented by diverse actors. As indicated, the major themes of the projects and programs include training and dissemination of technologies, knowledge and skills (for the large part), lobbying for funding, policy development, research and development, green energy solutions, and curriculum development. Some organizations have countrywide mandate and scope of intervention, such as MAAIF and agencies like NARO and NAADS, whereas private actors like local and international NGOs may have more limited mandate and spread of interventions. Noticeably, the involvement of private sector at national and sub-national levels is still low despite the sector's role in ensuring sustainability of interventions.

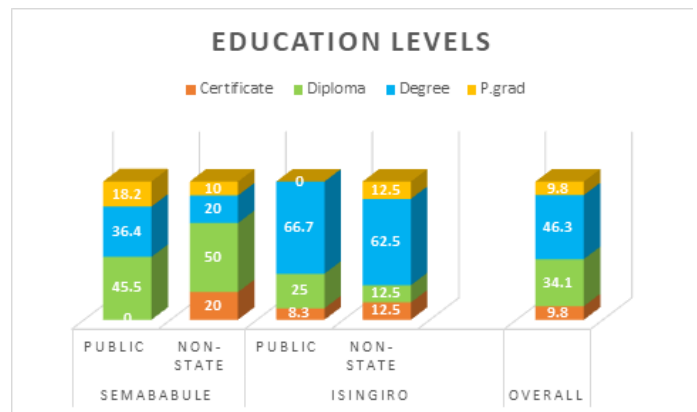
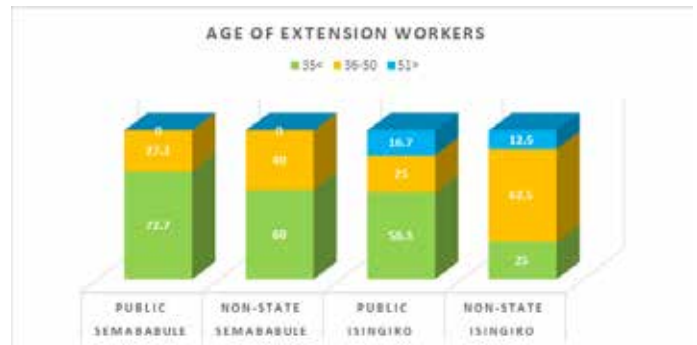
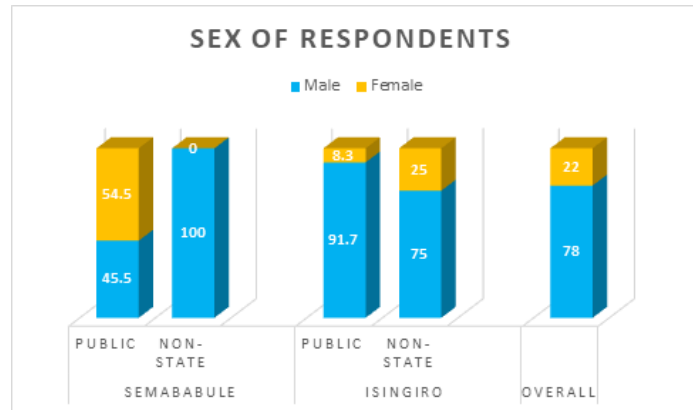
2.2 Organizational Capacities

2.2.1 Demographic Characteristics of Extension Staff

A greater proportion (78%) of the extension workers interviewed in the organizations were male, while less than a quarter (22%) were female. More than half of the respondents were 35 years and below and approximately 37% were in the age bracket 36-50 years, with only 7% of the respondents above 51 years of age. Notably, all the respondents above 51 years were from Isingiro, implying that Sembabule had a younger extension workforce than Isingiro. This was more pronounced in the non-state organizations in Isingiro which registered the least number of respondents with 35 years and below (25%).

Close to half of the respondents (46%) had a degree qualification and about 34% had a diploma qualification. Equal proportions of the respondents (9.8%) had post graduate and certificate qualifications. There was a limited number of extension workers at certificate level in Sembabule public extension service (0%) compared to 20% in the non-state extension organizations. However, Isingiro still utilized the services of certificate holders in public service extension, albeit minimally (8%) and 13% among non-state extension organizations.

Diploma holders were markedly more prevalent in both the public (46%) and non-state organizations (50%) in Sembabule while degrees were more prevalent in Isingiro in both types of extension organizations, 67% and 63%, respectively. Post graduate holders within public extension services were less likely to be found in Isingiro compared to Sembabule. For instance, none of the public extension workers interviewed in Isingiro had a post graduate qualification, compared to 13% in the non-state extension organizations, which may imply that more support for post graduate studies should be focused on Isingiro among the strategies for further boosting the district's Local government capacity for providing leadership in climate change related challenges at this level.



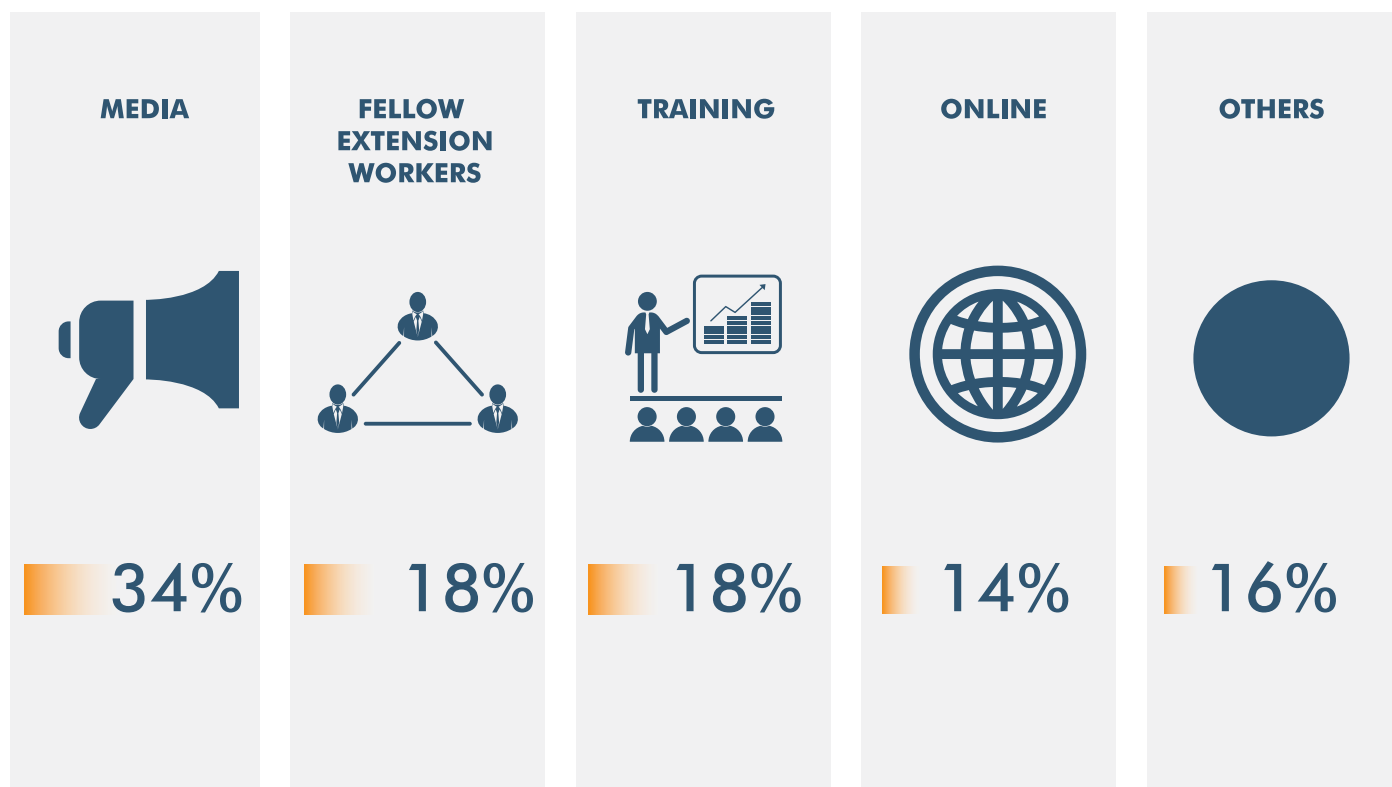
2.2.2 Coordination Among the Organizations

Over 85% of respondents confirmed awareness of other organizations working on climate change within their areas. Of these, over 65% percent of the respondents indicated that their organizations actually collaborated with other organizations in at least one area of service delivery. However, between district, Isingiro exhibited greater collaborative tendency (70%) compared to Sembabule (30%). This was probably because of the wider number of organizations, increasing the opportunities for possible collaboration in the former, which also gave a more even spread of collaboration among the organizations including USAID-Feed the Future, UNMA, MAAIF, Sasakawa Global, Café Africa, FAO-ACREI, NEMA, Rural Poverty Alleviation Initiative, International Lifeline Fund, Isingiro District Farmers' Association (ISIDFA), Local Government and Tree Talk Plus. Conversely, in Sembabule, SEDFA (38%) was the most cited by respondents as a key organization for collaborating with in climate change related work. Other key organizations or projects noted by actors included ACREI, GCCA, and TechnoServe.

The major areas of collaboration included training (39%), community mobilization (23%), project implementation (11%) and dissemination of information (11%). Others included beneficiary identification, funding and input distribution, albeit on a limited scale. Whereas these show a form of collaboration, they largely represent short to medium term project outputs that do not guarantee sustained impact beyond a given project cycle. Collaborative frameworks need to be comprehensive in terms of stakeholders, with effective community engagement and a broader and long-term view if impact is to be realized sustainably, and at scale.

2.2.3 Access to Information, Knowledge; Packaging and Dissemination

From the survey data, about 88% of the respondent's accessed and used climate/weather information in their extension duties. Only 12% of the respondents did not use any form of climate change information in their work. Media (33%) was cited as a major source of information on climate related information. Equal proportions of the respondents (18%) cited fellow extension workers and trainings as their major sources of information on climate change. 'Online' as a source of information was cited by approximately 14% of the respondents.



Across extension worker categories, climate information sharing among fellow extension workers was more prominent among the non-state extension workers (57%), whereas media (58%) and online (64%) methods of information sharing were mainly used by the public extension workers. On the other hand, climate information sharing in Isingiro was more common via fellow extension workers (64%), trainings (64%) and online (54%). In Sembabule, sharing through the media (54%) was the most commonly used. Overall, however, usage of the different climate information sharing methods appears to be fairly distributed across the extension worker categories and districts.

From FGDs with farmers, weather information was mainly received from radio stations although some reported that they could access it on the phones after dialing a code which was given to them by their extension workers. The information received included daily and seasonal weather forecasts of rainfall for certain areas during a specific time frame and it provides expected onset, peak of the rainfall season, cessation of the season and associated advisories such as when to start planting or to wait until steady rains. Other information was received from extension workers.

However, farmers reported that the information was unreliable as it was not regularly available and was often inaccurate and generic in nature, thus, failing to give point or location specific forecasts. In Sembabule for example, information provided was reported to be for the greater Masaka District and for Isingiro, greater Mbarara District. Some farmers indicated that when they perceived the information as wrong, they just abandon it – “after losing my crop twice when I followed the advice, I no longer listen to and use the climate information,” shared a male farmer from Mijwala Coffee Farmers’ Association. Some group members shared that sometimes when they get such information, they share with others in the group but action is very much undertaken on individual basis given the uncertainties surrounding the information and subsequent outcomes of the actions taken.

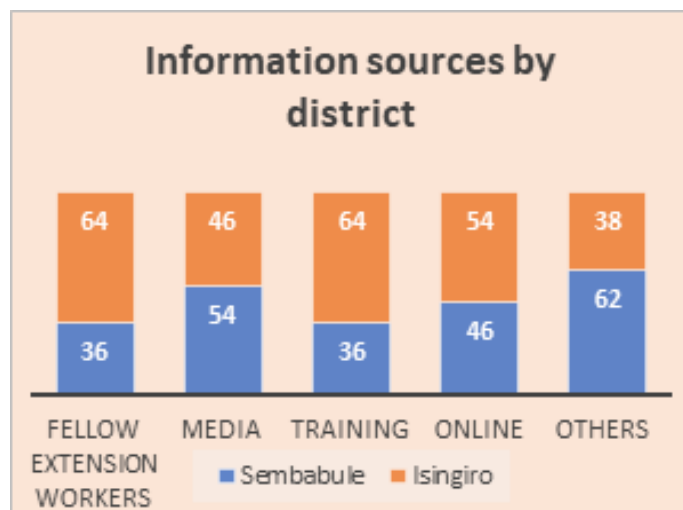
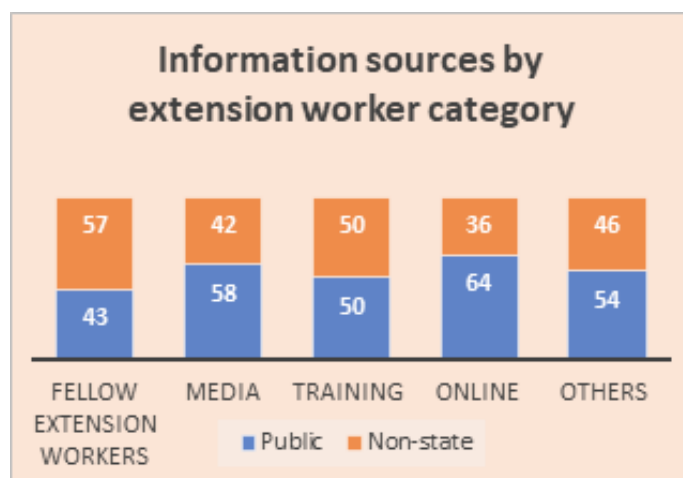
The flow of information was reported to be one way with no clear feedback mechanisms. Most times farmers do not know who to consult on weather information as well as who to give feedback to. This was exacerbated by poor telephone network coverage especially in Bulongo sub-county, Sembabule District, where farmers expressed inability to call into radio talk shows and ask follow up questions concerning the climate information provided. Farmers were requested to make recommendations for improvement of weather and climate information dissemination and some suggestions included;

- Giving more support to the extension workers on the interpretation, use and dissemination
- Improving on the accuracy, reliability and coverage

➤ Identifying other appropriate dissemination channels such as the group chairperson, local council executives, religious and political leaders.

2.2.4 Farmers’ Perceptions of the Capacity of the Organizations to Deliver Climate Extension Services

From the FGDs, farmers generally indicated that they had good access to government extension services. For instance, according to the Bugaba coffee farmers’ group in Mijwala sub county, 5 out of the 11 interviewed had the extension agents’ phone number. Farmers indicated that their extension workers were even able to come all the way to their gardens to show them what to do. In Isingiro however, extension for veterinary services were reported to be very poor with most members in all the groups interacted with not even knowing the mandated veterinary extension workers and the ones known are very unreliable. Interaction with extension workers has been once a week some farmers indicated that it would be better if they interacted with them at least twice a week.



According to the farmers, government extension services had higher capacity compared to the Non-State actors because they were considered to have more resources, although some of the delivery approaches are not favorable - such as the technical terms used. They however, emphasized that in future NAADS needed to consult with them to determine priorities. Failure to make appropriate consultation at the grassroots level leads to misguided priorities and wastage of resources. It is thus imperative that enterprises that work best in a given local context are identified before making interventions. For instance, farmers belonging to the Bugaba coffee farmers' group, Sembabule District emphasized that they were no longer interested in the cassava cuttings and some of the varieties of banana that were recently distributed in the area. Banana varieties like Kibuzi apparently did not do well in the area. In addition to this, training and follow-up on what was given was inadequate.

Farmers also indicated that it was better to give inputs to fewer people instead of distributing very little among many. Some farmer groups indicated that at times the extension workers delivered planting materials late, and linkages with other farmer groups for exchange learning visits were very limited. Generally, however, farmers observed that extension workers were not limited in their knowledge and skills, but rather in their facilitation especially in terms of information materials to use in the field so as to have more tangible community projects, more fuel and airtime.

"We believe that what they are bringing to us is good enough and they have done well" – Farmers of Mijwala Coffee Farmers Association, Mijwala village – Sembabule TC.

From farmers' testimonies, services offered by non-state actors included the following;

➤ TechnoServe carried out soil testing for different areas in Sembabule district, setting demo sites fertilizer use, provision of shade trees in coffee plantations, and training in making manure from grass and dung. It was however noted that the manure had limited impact due to drought.

➤ Sembabule District Farmers Association (SEDIFA) and Isingiro District Farmers' Association (ISIDIFA) on the other hand helped in training the farmer group members in making appropriate planting holes for coffee, making manure and constructing trenches in their gardens for water retention. ISIDIFA is however reported to have several weaknesses in terms of leadership, low membership and limited skills and capacity to provide efficient extension services.

➤ Integrated Seed Sector Development (ISSD) had a well-coordinated and effective structure at the grass roots and supported local chapters such as the South-western Uganda Local Seed Business Association to carry out seed multiplication in Isingiro District

➤ Organized farmer groups such as Kyezimbire Catholic Women's Organization and Farmer Field Schools such as the Rurongo CBO in Isingiro District had lead trainers that were often consulted by farmers. They however lacked up-to-date skills and knowledge on the prevailing climatic issues and training materials such as manuals to guide them.

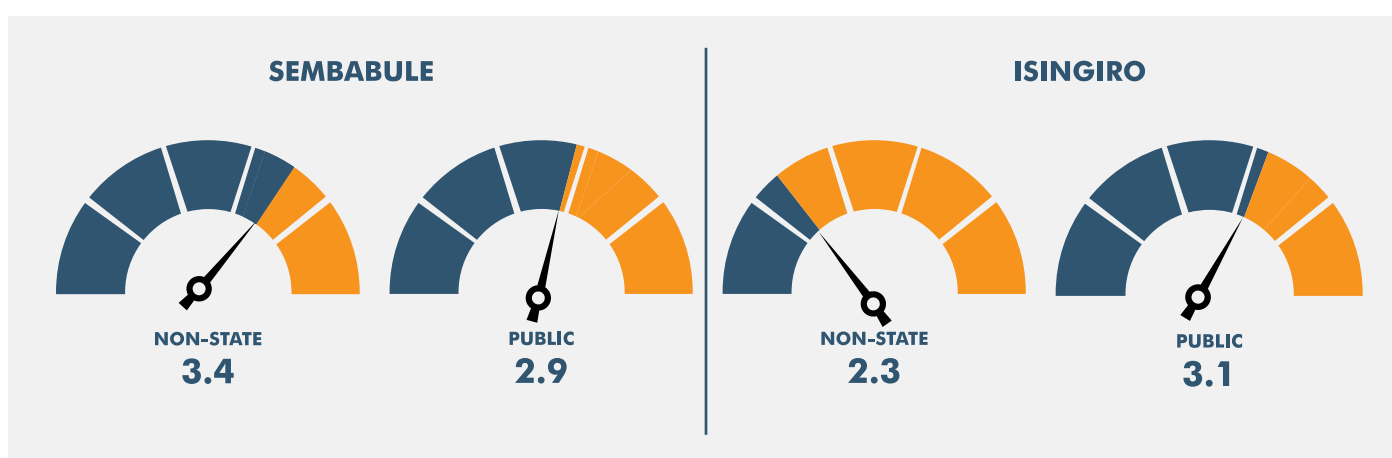
2.3 Individual Capacities

The individual capacities for extension services were indicated by a number of parameters including knowledge and skills of extension workers, access to knowledge and skills as well as the nature of their working conditions which directly or indirectly influence their capacity to deliver effectively. However, farmers' capacities also indirectly facilitate or constrain extension workers' capacities to deliver on their roles. This section thus presents the capacities of both extension workers and farmers highlights the gaps and recommendations for their improvement.

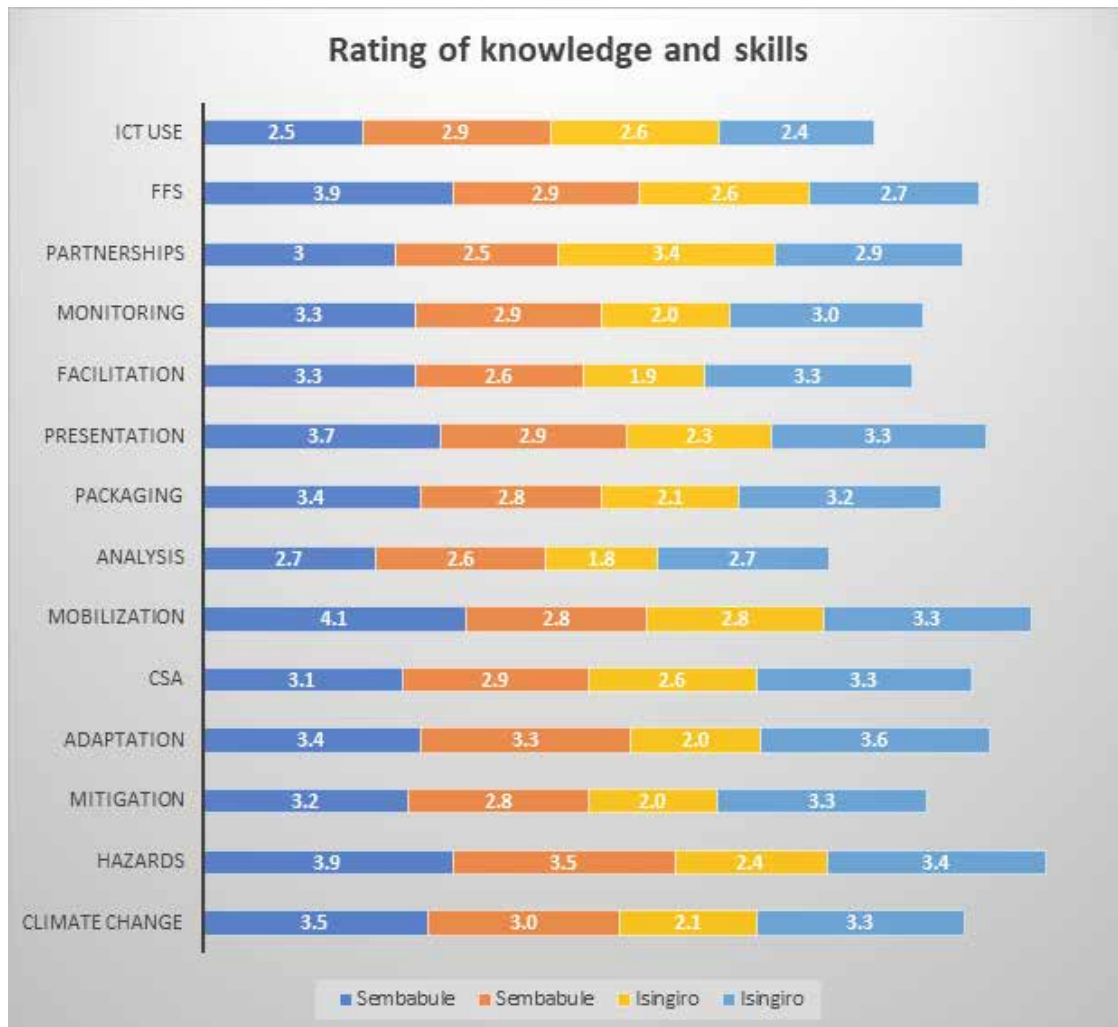
2.3.1 Capacities Of Extension Workers

2.3.1.1 Knowledge and Skills of AEAS Actors

Survey results showed that all the respondents had ever been involved in climate change related activities. Most common activities included; training farmers on integration of trees into the farming systems; planting trees; and sensitization of communities on climate change among others. An analysis of the self-assessment by the extension workers on their level of knowledge in regard to 14 thematic areas was carried out. Using a scale of 1 to 5, where 1=Not knowledgeable; 2=somewhat knowledgeable; 3=Not sure; 4=knowledgeable and 5=Very knowledgeable, the results showed several differences across districts as well as extension worker categories with respect to the 14-climate change thematic areas. On the whole, Sembabule had an edge over Isingiro, with an average score of 3.1 compared to 2.7, respectively.



Whereas non-state extension workers in Sembabule were a little better off than their public counterparts with an average score of 3.4 compared to 2.9, respectively, in Isingiro the reverse was true, with the latter having a marginal edge (3.1) over their nonstate counterparts (2.3). The highest average scores among the climate knowledge and skill categories were for mobilization (3.3), hazards (3.2), and adaptation (3.1) whereas the lowest average scores were for analysis (2.4), ICT use (2.6) and monitoring/mitigation (2.8). Notably, however, the overall average score for level of climate change knowledge and skills of all respondents interviewed (2.9) fell way below the minimum desirable score of 4. It was only in one instance in Sembabule that respondents from nonstate extension organizations scored 4.1 for their knowledge and skills in mobilization for climate change related activities. Thus, a major task for future climate change interventions still remains, that is, to uplift the knowledge and skill levels and confidence of extension workers, generally, regarding all the 14-climate change knowledge and skill areas highlighted.



2.3.1.2 Packaging and Dissemination to Improve Knowledge and Skills

The most preferred method of packaging and disseminating climate change knowledge and skills among respondents was short courses and trainings (35%), followed by workshops on specific topics and the use of manual and guide books.

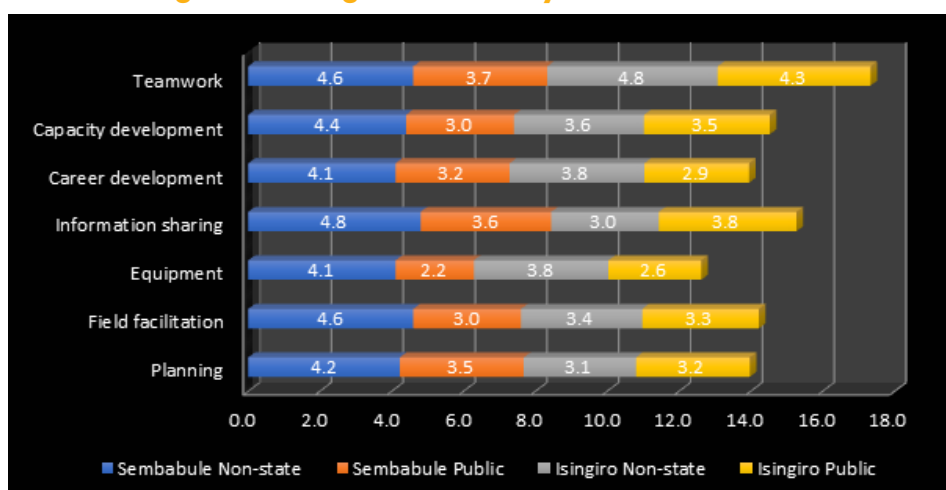


2.3.1.3 Working Conditions of Extension Workers

Respondents assessed their level of satisfaction with their corresponding organizations in relation to climate change aspects including planning process, field facilitation, equipment and materials, information sharing, career development, capacity development and teamwork. Using a scale of 1 to 5, where 1=Not satisfied; 2=A little satisfied; 3=Not sure; 4=Satisfied and 5=Very satisfied, the data generally showed that non-state actors provided more conducive working conditions than their public organizations across the seven parameters, with average scores of 4.4 compared to 3.2 in Sembabule; and 3.6 compared to 3.4 in Isingiro, respectively. As such, non-state actors in Sembabule may be supported to maintain this level of satisfaction or further improve it where possible. In both districts, facilitation of extension workers with field equipment and demonstration kits scored the lowest among actors in public extension organizations, with a score of 2.2 in Sembabule and 2.6 in Isingiro.

Efforts at improving work conditions of extension workers in public organizations in Sembabule should focus on all the seven parameters, with special emphasis on equipping extension workers better with field tools and demonstration kits. In Isingiro, efforts should be made to uplift all the work conditions of extension workers, with the exception of teamwork which was fairly commendable compared to the rest. The overall average score of 3.7 which is less than the minimum desirable score of 4 implies the need for continued efforts in uplifting the working conditions of extension workers, however, with less emphasis on teamwork.

Rating of Working Conditions by Extension Workers



2.3.2 Capacity of farmers

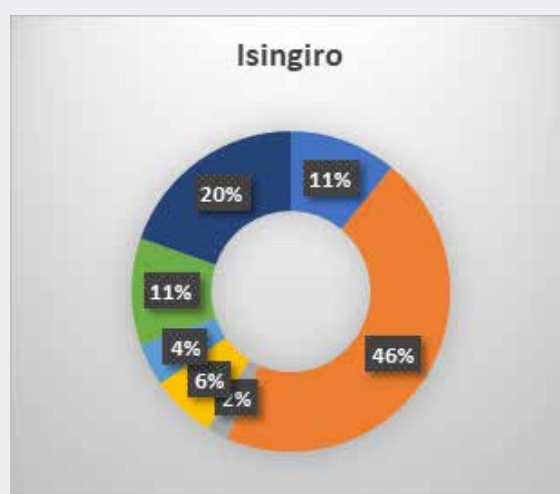
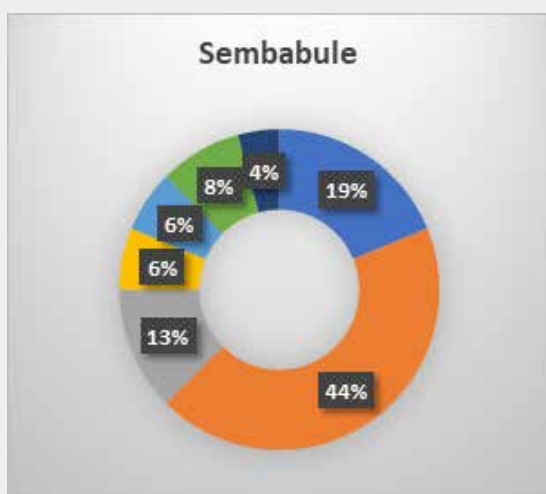
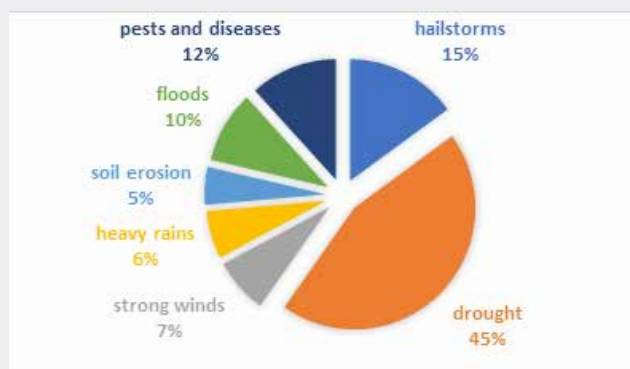
2.3.2.1 Climate Change and Associated Impacts

From the FGDs, the major crops (enterprises) grown by farmers in both Isingiro and Sembabule Districts were coffee, maize, bananas, groundnuts, vegetables and beans, while the key livestock (enterprises) reared included cattle, goats, piggyery, local chicken and apiculture.

Farmers reported seasonal variations reflected by the changes in the months when they plant their gardens. Whereas previously onset of planting in the first season normally happened in February and March, farmers complained that due to delays in onset of rains, planting in some areas was being done in April or May. Similarly, the second season planting normally started around mid-August but was reported to now happen more often in September. In Isingiro District, the change in planting cycles has been more pronounced in the last three years. Prolonged drought and the frequency of dry spells during rainfall seasons were reported to be on the increase and short but high intensity rainfall events were common. Farmers belonging to Mijwala Coffee Farmers Association alluded to increased hailstone and storms which unlike before were now expected to occur almost every season.

The survey results established that the major climate changes hazards extension organizations were most concerned with were; drought (45%), hailstorms (15%), pests and diseases (11%) and floods (10%). However, complaints about increases in strong winds and hailstorms were more pronounced in Sembabule than in Isingiro (13% compared to 2%; and 19% compared to 11%, respectively). Climate change induced pests and diseases on the other hand were more pronounced in Isingiro. Drought was the most prevalent challenge across the two districts as indicated by similar proportions of respondents.

Major Climate Change Hazards Reported by Extension Workers



During focus group discussions with farmers, the changes were reported to have varied effects on crops and livestock throughout the different stages of value chain. For instance, the prolonged dry spells increased the incidences of the coffee twig-borer and fall-army worm while too much rains caused yellowing and root rot in maize and beans. In some cases, due to uncertainty of the rains, some farmers revealed that they had planted up to three times in a season and several reported total crop failure after planting. For instance, one farmer, after planting 40kg of bean seed got only 5kg. Farmers belonging to Twinamagara group in Kilamasi village, Nabitanga sub-county, Sembabule District noted that several of them had lost seeds as a result of planting early due to pest attacks. Insufficient water causes poor filling of coffee beans resulting into increased rejects and low weight, thus fetching a poor price after hulling.

Prolonged drought had also led to drying up of water sources for domestic and livestock use leading to water scarcity and competition of resource use, encroachment on wetlands and other key fragile ecosystems. The most limiting resource in the drought is water since cattle can survive on the dry grass as long as there is water. As such it was noted that drought heightened conflict between crop and livestock farmers as the animals encroach on the crops because of reduced grass. In Isingiro District, this has heightened conflict especially in communities hosting refugees. Despite the presence of some public valley dams such as the Kakinga dam in Sembabule that hold plenty of water, the quality of the water especially during drought was not good because of the poor management practices by the locals. Despite having water management committees in place, their usefulness was still limited due to negative attitudes among community members who seek to violate the bye-laws spelt out.

In order to survive the prolonged drought, farmers reported that they were forced to buy water using water trucks, unlike before. This trend has become more pronounced from the late 1990s. Due to the circumstances, farmers are often left with little produce to store given the pressure to immediately offset loans incurred during the planting period. Farmers noted that the increased unpredictability of rains that extend to the harvesting periods, unlike before, had increased incidences of post-harvest losses, thus the need for better post-harvest technologies such as tarpaulins to safe guard the harvest from rain.

2.3.2.2 Farmers' Adaptation to Climate Change

Farmers indicated that after being trained by extension workers they had taken up new practices including drip irrigation using bottles for vegetable growing near homesteads; trenches, contour bunds, terraces; mulching using banana stems; composting of cut banana stems and residue; drought tolerant and early maturing varieties such as NABE 2, 17, 15, Longe 10H; water harvesting using dam liners and tarpaulin; and early maturing crops and disease tolerant varieties, tree planting. The existence of wetlands has also been leveraged upon especially by the women groups for enterprise and livelihood diversification such as making baskets and other crafts, harvesting grass for sale and also to mulch banana gardens.

2.3.2.3 Threats to Farmers' Capacity to Adapt to Climate Change

However, farmers' capacity to respond appropriately to climate change is affected by various factors that may be seen to fall both in and outside of their control. From the focus group discussions, farmers observed that their capacity to deal with climate change was generally low especially due to limited access to key resources and other services complementary to knowledge and skills they receive from extension workers. It was noted that most farmers in organized groups had received trainings from several extension workers and had the knowledge and skills to put into practice what they had been trained on if only they had the resources, and access to necessary services. To this vain farmers in FGDs illustrated their plight as follows:

➤ Limited access to appropriate financial services, for instance, credit and insurance. They noted that they had only heard of insurance services on radio but these were not yet available in the area. On the other hand, banks treated them like the merchants, expecting them to pay monthly installments which are difficult for them. Repayment terms of at least six months were preferred by group members. Even SACCOs do not guarantee a Safety Net for farmers in terms of financial services. For instance, for a loan of UGX 1,000,000, the SACCO only gives out UGX 850,000 (the remaining is used for loan processing), on top of which an interest of UGX 300,000 is charged (UGX 1 = USD 0.00027)

➤ Limited access to tree nurseries with a wide variety of tree types. As such they were planting mainly eucalyptus because it is cheap at only UGX 30/= per seedling. Given the reducing farm areas, it would also be fitting to promote planting of trees that are beneficial such as fruit trees; and mixed farming (integrated systems of production). Farmers called for more developmental organizations such as MADDO, which promote various activities for improving wellbeing in their communities. Farmers also complained that they had limited access to mulching materials, and fertilizers were expensive.

➤ Limited access to training in livestock management as an avenue for creating an alternative source of livelihood. Related to this was the high incidence of livestock diseases such as swine fever and chicken diseases. Lack of effective means of controlling ticks in cattle forced some of the farmers to resort to using tomato pesticides as a remedy.

➤ Access to piped water on farms is still very limited in the area. In Sembabule for example, the cost of privately piped water is twice (UGX 100) as costly as that which is publicly serviced (UGX 50 per jerrycan). Closely related to this is the limited access to irrigation technologies such as manual pumps, water harvesting technologies; and water sources especially during the drought. It was reported that the 'well to do' farmers were able to excavate their own dams. For instance, in Nsoga parish there were only 2 private dams and these are restricted for use to the public.

➤ Poor linkage to good markets renders farmers as price-takers who continue to receive low prices even when they adhere to new regulations such as drying coffee on tarpaulins which kills their incentive for farming as a business. Lack of grading facilities within community further hinders farmers from benefiting from their efforts. Relatedly, farmers expressed their distrust for traders who are suspected of using faulty moisture-meters whose readings always disfavored them even when they feel they had done their best to dry the coffee. Thus, it would be fitting for farmers to have their own moisture-meters in order to validate those of the traders.

➤ Land fragmentation and control of land resources that impedes decision making especially for enterprises that are land intensive such as tree planting. Women are mostly affected since they have less control on making decisions on use of the land. This was more pronounced in Kyamusoni and Kyezimbi groups in Isingiro District

➤ Lack of byelaws to enable collective action e.g. against the black coffee twig-borer also lowers farmers' capacity to adapt to climatic effects, let alone the confidence that such byelaws will be upheld by community members.

➤ Lack of synergies among government and Non-state actors (especially where conflict of interest exists) limits maximization of opportunities. For instance, TechnoServe in Sembabule tested soil but farmers felt that another (neutral player) such as

government would be more suited to take on the role of availing the appropriate fertilizers.

➤ Weak government response mechanisms delay integration of farmers' feedback into planning and designing of interventions. For instance, farmers pointed out that reports had already reached the district production office concerning farmers' lack of interest in more coffee seedlings, with priority currently given to fertilizers so as to make use of what they already have. As a result, people receive coffee which they don't want which ends up being wasted because no one is even willing to buy it cheaply. Instead farmers wish to further raise the quality of their coffee by planting clonal coffee cuttings as opposed to elite seedlings. They thus recommended that at least 20 farmers in each sub county be supported with clonal coffee cuttings as pilots.

➤ On the other hand, farmers' expectation for support or provision of subsidies to buy tools and implements and seedlings especially tree seedlings, hoes, spray cans, among others could depict dependency which limits their own ingenuity in using local resources to mobilize and solve community challenges.

From the FGDs with farmers, it was also apparent that their basic understating of climate change in terms of its causes and what needs to be done about it and individuals and communities was still inadequate. For instance, the basic cause of the evident changes in climate were attributed to poor methods of farming such as bush burning, clearing of vegetation for setting up livestock farms, use of fertilizers; Deforestation for expansion of farming land and burning charcoal; Destruction of wetlands for cattle grazing, fertile land for agriculture; Increased development such as road construction and population growth that puts pressure on fragile ecosystems. It should be noted that as much as farmers might be aware of the basic causes, there is still a lot of awareness needed. Some farmers are still not aware of the causes and believe in myths and traditional folklore from peers – "the cause of the changes in climate we are seeing today is because of the increased use of solar panels for solar energy. The manufacturers of the solar panels do not want it to rain because there will be no sunshine for charging the solar energy systems" – (a male farmer from Kabingo, Isingiro Town Council).

Notwithstanding the above limitations, there were scattered signs of community-based initiatives with potential for in-building community climate change resilience, if only such efforts can be recognized early and encouraged through local targeting. For instance, the female dominated Twinamagara group in Kilamasi village, Sembabule District, Kyamusoni and Kyezimbi Groups in Isingiro District had a savings and credit component which helped group members to buy pesticides and inputs like tarpaulins as well as feeds for their livestock project. Members of the Kakinga dam farmers' association in Kakinga village, Sembabule District, demonstrated commitment in taking care of the demonstration (vegetable) gardens and goat enterprise set up by them with support of resources from MWE, by buying some inputs such as pesticides and fertilizers and well as constructing a goat structure. The group collectively carried out farm activities including watering, and digging trenches on each other's farm following a timetable.

Additionally, four of the groups (Rurongo CBO and Kabingo FFS in Isingiro, Kakinga Dam Farmers' Association and Twinamagara Group in Sembabule) were under the Farmer Field School approach (FFS) and from the discussions; it was evident that groups under the FFS approach were slightly more organised, more ready and more knowledgeable to handle issues of climate change. The farmer field school approach is a group-based adult learning approach that teaches farmers how to experiment and solve problems independently. In this approach, groups of farmers meet regularly with a facilitator, observe, ask questions and learn together. Reasons they gave included some of the following.

- What is learnt at a farmer field school can easily be adopted at individual household level
- Savings and loans association help in financing some of the adaptation measures such as buying implements
- FFS facilitates wider learning and experience sharing
- The approach introduces members to new technologies, through demonstrations, which can help to increase and improve productivity

3.1 Enabling Environment

The study established that although sector guidelines for mainstreaming climate change in agricultural policies and plans were in place, they were not yet adequately popularized and adapted to local contexts for widespread use by extension workers in their day-to-day operations. Whereas a myriad of complementary policy frameworks guiding implementation of climate change related work were in place, there were no explicit structures and arrangements to ensure harmony in their implementation. The resulting disharmony in coordination and implementation of the frameworks limited scope for synergies among and across stakeholders. Prospects of having an overarching Climate Smart Agriculture implementation framework would go a long way in facilitating comprehensive planning and holistic redress of climate change issues in agriculture at different levels as opposed to having isolated, piecemeal interventions. Such an arrangement would also ensure meaningful engagement of stakeholders for continuous improvement, monitoring, and reflection at the different administrative levels. On the other hand, weak enforcement of legal frameworks especially at the grassroots markedly undermined capacity to mobilize local resources and innovation for meaningful engagement and action. This state of affairs in the country attests to the low trickle-down effect/impact of the policy frameworks on mainstreaming and implementing climate change related actions given their limited scale of implementation and investment.

3.1.1 Implications

- In addition to popularizing the mainstreaming guidelines and their local adaptation, there is need for a national climate learning strategy to promote wider understanding and eliciting the appropriate responses from all stakeholders
- Perform a SWOT analysis of the existing structures and their roles in order to strengthen linkages for effective coordination at the national level
- Sensitize politicians, technocrats, religious, cultural and other leaders as well as the general public to promote critical climate change learning for appropriate response.
- Identify and support extension approaches that empower communities and take collective action for more effective scaling out and up of climate resilient practices through community level partnerships
- Design a Climate Smart Agriculture Implementation framework to harmonize and operationalize agricultural policy on climate change

3.2 Organizational Level

The key issues raised at the local government and organizational level serve to further highlight the limitedness in translation and implementation of the national policy frameworks at the frontline. For instance, uncoordinated action among government and non-state actors was seen to continue leading to missed synergies and opportunities even at this level. Making agricultural extension services more climate resilient could not be overemphasized by the need to effectively integrate grassroots priorities by the government input delivery system (NAADS and OWC) and extension services in line with changing realities as perceived by communities to avoid future wastage of resources.

The lack of clear and generally agreed indicators for climate change mainstreaming compliance, in addition to corresponding incentives and penalties made follow-up and monitoring difficult. Funds specifically designated to climate change mainstreaming activities and out scaling at Local Government level were also limited, although in some instances officials used this as an excuse for not fulfilling commitments related to climate change actions. At project implementation, it was apparent that non-state actors especially NGOs often lacked effective strategies for ensuring sustainability of desirable outcomes from short-medium term projects. The widespread lack of affordable alternative green energy sources e.g. biogas was continuing to increase pressure on the already fragile environment and livelihoods of farming communities. In turn, delivering more tangible community level projects would benefit from improved facilitation of extension workers, especially those in the public sector, regarding access to information materials, fuel and airtime for use while in the field.

3.2.1 Implications

- Develop capacity at Local government and organizational level to identify and lobby for available climate change funding e.g. the Green Climate Fund (GCF) and Global Environment Fund (GEF) and ensuing easy access to such opportunities through appropriate communication strategies and forums
- SWOT analysis of existing structures and roles in a view to strengthen district and lower LG collaboration mechanisms for harmonized implementation and synergies
- Develop and popularize as well as enforce compliance standards, incentives and penalties for climate change mainstreaming and implementation across stakeholder organizations
- Instituting affirmative action at organizational level to expedite implementation of climate change related activities/projects e.g. designating tree planting days and deliberate action in planting trees by road construction companies; in addition to compliance standards and penalties.
- Inbuilding components in projects to ensure building of local capacities and putting in place appropriate incentives as well as linkages that foster ownership for continued community benefits e.g. setting up community tree nurseries within project areas.
- Emphasis be given to promotion of alternative and affordable green energy sources.
- Support farmer participatory extension approaches that involve farmers in planning and priority setting through strong grassroots farmer structures
- Develop and promote comprehensive standards for facilitating field extension staff

3.3 Individual Level – Extension Workers and Farmers

On an individual level, extension workers as carriers of climate change information grapple with appropriate packaging of the information given its inherent uncertainty resulting from its generic nature which introduces errors thereby reducing its perceived reliability among farmers. It was also found that extension workers often lacked confidence about their knowledge on climate change in some aspects of climate change knowledge and skills. With respect to farmers, increased drought and general seasonal variability were the major climate changes in the study districts leading to crop losses, scarcity livestock water and feed, and postharvest losses. Although, these were not entirely new occurrences in the areas, farmers' capacity to adapt in face of increasing intensity of the climate hazards was generally limited by poor access to resources and complementary services, albeit some scattered signs of community initiatives towards climate change resilience. Low farmer institutional capacity to ensure collective action e.g. implementation of bye-laws for environmental protection and dealing with other challenges associated with climate changes remains a key constraint in challenging the status quo. This is exacerbated by the low level of knowledge about climate change among farming communities, including its causes and appropriate responses at individual and community levels.

3.3.1 Implications

- Develop a comprehensive climate communication strategy which should include sensitization of stakeholders on available climate services and opportunities
- Empower farming communities to demand for climate smart agricultural extension services
- Enhance knowledge of public and non-state extension workers on climate change by providing tailor-made short courses, workshops and appropriate training materials
- Identify and support projects that enhance adaptive capacity of communities through improved access to various services and promotion of alternative livelihood strategies e.g. insurance, savings and credit, technologies, market linkage etc.
- Strengthen community level approaches for collective resource management; enforcement of existing laws and byelaws and enhancing self-help initiatives
- Sensitization and awareness creation among stakeholders with emphasis on individual and collective responsibilities in climate change adaptation and mitigation

Conclusion

In conclusion, the findings depict a situation that requires urgent action at the three levels, that is, enabling environment, organizational and individual levels. The capacity challenges revealed by the study are of a systemic nature and requiring multi-pronged solutions at the different levels, at the heart of which is strengthening institutional and coordination mechanisms. An integrated Climate Smart Agriculture Implementation Framework and a National Climate Learning Strategy and implementation framework can go a long way in improving the governance framework for climate change and extension services in the country. Nonetheless, however good and comprehensive such frameworks may prove, their effectiveness and impact can only be judged by how well they are articulated and incorporated within the day-to-day work and contexts of actors at the policy and implementation continuum. Whereas the top-down mainstreaming approach to climate change mainstreaming in extension services is inevitable, it ought to be superimposed with an effective bottom-up approach that should leverage resources, both in the form of human resources, finances, technologies and knowledge (scientific and indigenous) and requisite skills to strengthen community level implementation of recommended actions sustainably and scaling at an appreciable pace. The findings and application thereof are not limited to the study areas, i.e. Uganda, and the respective study districts, Sembabule and Isingiro, but may be adopted to various contexts in respect to the issue of concern. For instance, the information therein can be used to develop Climate Resilience Capacity Development Plans for extension service providers addressing capacity needs at the various levels, that is policy environment, organizational and individual levels. A final output of this study is the capacity development plan in view of the highlighted capacity gaps in mainstreaming and implementing climate change interventions in agricultural extension programs in Uganda, presented in the next section.

Capacity Development Framework



Dimension 1: Enabling environment (Policy)







CAPACITY DEVELOPMENT NEEDS	ACTION	PRIORITY	TARGET GROUP	LEAD AGENCY	OTHER PARTNERS
Nationwide Awareness Creation	Launch national Climate Smart Agriculture symposium to promote national dialogue	LONG TERM	MAAIF staff, Politicians, general public	OPM, MAAIF	CCD (MWE), UFAAS, PELUM, NEMA, CAN-U
	Form/strengthen national Community of Practice on CSA	LONG TERM			
	Hold a national climate change sensitization campaign	LONG TERM			
	Lobby/advocate for a national climate learning strategy	LONG TERM			
	Lobby/advocate for affirmative action e.g. national climate change day; tree planting day;	LONG TERM			









Dimension 2: Organizational Capacities

Strengthening National Coordination Mechanisms	<p>Mapping and reviewing of existing structures, their roles and gaps</p> <p>Create and/or strengthen existing coordination structures</p> <p>Review and mainstream budgets to cater for climate change related events e.g. committee meetings</p> <p>Lobby/ advocate for a Climate Smart Agriculture Implementation framework to harmonize and operationalize agriculture policy on climate change</p> <p>Lobby/ advocate for a national Fund for CSA and budgeting</p>	<p>LONG TERM</p> <p>LONG TERM</p> <p>LONG TERM</p> <p>LONG TERM</p>	<p>MAAIF staff, Politicians, MWE, NEMA,</p> <p>MAAIF staff, Politicians, MWE, NEMA, Non-state actors</p>	<p>OPM, MAAIF,</p> <p>Non-state actors</p>	<p>CCD (MWE), UFAAS, PELUM,</p> <p>NEMA, CAN-U</p>
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CAPACITY DEVELOPMENT NEEDS 	ACTION 		TARGET GROUP 	LEAD AGENCY 	OTHER PARTNERS 
Strengthening Enforcement Mechanisms	<p>Carry out study on enforcement gaps and streamline compliance standards and rewards</p> <p>Sensitize general public and popularize natural resource use compliance standards and rewards</p> <p>Identify and incentivize national and sub-national champions for promoting compliance standards</p>	<p>LONG TERM</p> <p>LONG TERM</p> <p>LONG TERM</p>	<p>MAAIF staff, Politicians, MWE, NEMA, Non-state actors</p>	<p>OPM, NEMA,</p>	<p>Environment Police, MWE, MAAIF</p>
Improving policy outcomes/ impacts	<p>Support/ promote community driven extension approaches e.g. Climate smart village model to demonstrate and promote CS practices among communities</p>	<p>MEDIUM TERM</p>	<p>Extension workers, farmers</p>	<p>SG2000, MAAIF,</p>	<p>MWE, Non-state actors, FO's</p>









CAPACITY DEVELOPMENT NEEDS 	ACTION 		TARGET GROUP 	LEAD AGENCY 	OTHER PARTNERS 
Mainstreaming CC at LG level	<p>Strengthen capacity of actors to successfully apply for externally available funds</p> <p>Train and mentor actors on climate change mainstreaming guidelines in relation to their day-to-day work context</p> <p>Develop, popularize and enforce compliance standards, rewards and sanctions among actors</p>	<p>MEDIUM TERM</p> <p>SHORT TERM</p> <p>SHORT TERM</p>	<p>FOs, extension workers, DPMOs, CDOs, CAOs</p> <p>Extension worker and managers, FOs, CAOs</p> <p>Extension worker and managers, FOs, CAOs</p>	<p>CCD, MAAIF</p> <p>MAAIF, CCD (MWE)</p> <p>OPM, MAAIF, CCD (MWE)</p>	<p>MoFPED,</p>
Ensuring sustained local benefits at scale	<p>Strengthen capacity for networking and partnership among local actors and use of appropriate incentives for ownership</p>	<p>SHORT TERM</p>	<p>Extension worker and managers, FOs, CAOs</p>	<p>LGs, Non-state actors,</p>	<p>UFAAS, DFAs</p>



<p>CAPACITY DEVELOPMENT NEEDS</p> 	<p>ACTION</p> 	<p>PRIORITY</p> 	<p>TARGET GROUP</p> 	<p>LEAD AGENCY</p> 	<p>OTHER PARTNERS</p> 
	Promote appropriate environmentally friendly energy sources	SHORT TERM	Environment committees, extension workers, NROs, DPMOs, CAOs	NEMA, Non-state actors,	MUK
	Orientation of actors in appropriate tools for demand-driven/client-oriented extension service	SHORT TERM	FOs, extension worker, CDOs, CAOs	LGs, Non-state actors	MUK, DEIS
	Building climate resilient livelihoods by promoting livelihood diversity and increased access to climate and other complementary agricultural services among communities; and use of locally available (affordable) resources and indigenous knowledge	SHORT TERM	Extension worker, farmer leaders	LG, Non-state actors,	



<p>CAPACITY DEVELOPMENT NEEDS</p> 	<p>ACTION</p> 	<p>PRIORITY</p> 	<p>TARGET GROUP</p> 	<p>LEAD AGENCY</p> 	<p>OTHER PARTNERS</p> 
<p>Strengthening Collaboration mechanisms at LG level</p>	<p>Review of existing structures, roles and gaps of existing structures</p> <p>Create/ strengthen platform for sharing and networking among local actors</p> <p>Create and share inventory/directory of climate service providers</p>	<p>SHORT TERM</p> <p>SHORT TERM</p> <p>MEDIUM TERM</p>	<p>Environment committees, extension workers, NROs, DPMOs, CAOs</p>	<p>UFAAS</p>	
<p>Appropriate staff support</p>	<p>Review/ develop and promote comprehensive standards for facilitating field extension staff</p>	<p>SHORT TERM</p>	<p>FOs, extension worker and managers, CDOs, CAOs</p>	<p>UFAAS, Non-state actors,</p>	









Dimension 3: Individual capacities

Extension workers

Strengthening climate learning and sharing	Develop platform for regular sharing of available climate and complementary services among stakeholders	SHORT TERM	Farmer/FOs , extension workers	LG, Non-state actors,	FOs
	Train state and non-state extension workers on selected topics	SHORT TERM	Extension worker, farmer leaders	MAAIF, MWE	LG, UNMA, universities
	Identify and link actors to relevant bachelor's and post graduate study opportunities	SHORT TERM	Extension worker	LG, UFAAS	MWE, MAAIF, Non-state actors,



CAPACITY DEVELOPMENT NEEDS 	ACTION 	PRIORITY 	TARGET GROUP 	LEAD AGENCY 	OTHER PARTNERS 
Farmers (community)					
Farmer institutional capacity for collective action	<p>Identify community climate change focal persons/champions</p> <p>Set up community environment committees</p> <p>Train and empower community environment committees in their roles and responsibilities</p> <p>Sensitize community level stakeholders with emphasis on individual and collective responsibilities in climate change adaptation and mitigation</p>	<p>SHORT TERM</p> <p>SHORT TERM</p> <p>SHORT TERM</p> <p>SHORT TERM</p>	<p>Extension worker, farmer leaders</p> <p>Extension worker, farmer leaders, general public, media</p>	<p>LG, Non-state actors,</p> <p>LG, Non-state actors,</p>	

NB: Short-term = 6-12 months; Medium-term = 1 year-3 years; Long-term = 3 years and above

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ANNEXES

Annex 1: ToRs of the study – attached as a separate document.

Annex 2: Check list for key informants and focus group discussions – attached as a separate document.

Annex 3: Literature review – attached as separate document.

Annex 4: Capacity Development Plan – attached as a separate document.



