THE REPUBLIC OF UGANDA

UGANDA CLIMATE SMART AGRICULTURE PROGRAMME

JOINTLY IMPLEMENTED BY

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

AND

MINISTRY OF WATER AND ENVIRONMENT

2015 - 2025

EXECUTIVE SUMMARY

The agriculture sector is a key to overall economic growth and development of Uganda. The sector contributes 20.9 percent of the National Gross Domestic Product and 80 percent of the export earnings. Real growth in agricultural output has declined steadily, from 7.9 percent in 2000/01 to 0.7 percent in 2007/08 (although it did show signs of recovery in 2008/09, with a 2.6 percent growth rate). Agricultural production has increased over the years and this increase is attributed to area expansion rather than increase in productivity with over 95% of the farmers being smallholders with landholdings averaging 2 ha.

The country has a total area of 241,551 km^2 of which about 30% is highly degraded. Available data between 1999 and 2006 indicate that trends of the major crops showed positive increases for cereals (maize, millet, rice and sorghum), beans and simsim, while there has been a significant decline noted for root crops (cassava, Irish and sweet potatoes) as well as export crops (coffee and cotton). The livestock census of UBOS (2009) showed that total cattle ownership increased by 54% since 2005, showing an increasing trend of livestock integration into the farming systems. While fish exports increased dramatically from 1991, there was a sharp decline, falling from a peak of 39,201 tons in 2005 to about 24,965 tons in 2008 as a consequence of overfishing leading to falling stocks and declining catches. Lake Victoria continues to provide the biggest percentage (41.8 percent) of total fish catch, which are dwindling fast, the situation for the other lakes is even worse.

The country's agricultural production system is diverse spread within14 Agro-ecological Zones (AEZs). The zones are characterized by different farming systems determined by soil types, climate, landforms, socio-economic and cultural factors. Poor agricultural land management, increased extreme weather events, and population pressure have escalated land degradation in all the AEZs. The AEZs experience varying levels of vulnerability to climate-related hazards which include drought, floods, storms, and pests and diseases. Furthermore, the International Climate Risk Report labels Uganda as one of the most unprepared and most vulnerable countries in the world. Agriculture is the sector most vulnerable to climate change due to its high dependence on climate and weather. Climate projections show that agriculture systems will suffer with climate change, thus, threatening food production systems and therefore the livelihoods and food security of millions of people, especially women who depend on agriculture. Consistent warming trends and more frequent and intense extreme weather events, particularly droughts and floods have been observed across the country in recent decades. In line with these trends, climate change scenarios consistently project temperature increases across the region, which will require farmers to adapt to changing conditions.

Total dependence on rain-fed agriculture and poor soil health coupled with land degradation increases vulnerability of farming systems and predisposes rural households

to food insecurity and poverty thus eroding their productive assets and weakening their coping strategies and resilience. Increasingly, the onset, duration and intensity of these rains vary considerably from year to year, while the frequency and intensity of the extreme weather events such as drought and floods are on the increase with devastating impacts on the national economy and the livelihoods of the people. Drastic and innovative measures are needed to help farmers and consumers cope with the changes in emerging and projected weather patterns. To address this challenge, the Government of Uganda has identified six strategic priorities as sources of Uganda's agricultural development and growth in a changing climate. The six strategic priorities are:

Improved Productivity and incomes – a pro-growth, pro-poor development agenda that supports agricultural sustainability and includes better targeting to climate change impacts will improve resilience and climate change adaptation. Because climate change has a negative impact on agricultural production, achieving any given food and nutrition security target will require greater investments in agricultural productivity. Public and private sectors as well as public-private partnerships will play a critical role.

Building resilience and associated mitigation co-benefits **-** CSA will help reduce vulnerability of Uganda's agriculture sector by increasing productivity, enhancing adaptation and resilience of the farming systems and reducing emissions intensity in the context of achieving sustainable development and poverty eradication.

Value Chain Integration **-** This approach is holistic in that it considers input supply, production, agricultural services, marketing and business support services as necessary building blocks. Under the approach, both public and private sectors are seen as critical actors in the value chain. Knowledge and capacity building are critical strategic priorities to leverage innovations and increase efficiencies. The approach also provides enabling framework for integrating gender and the needs of the youth.

Research for Development and Innovations **-** Although Uganda has a well-developed agricultural research system, use of modern science and climate smart technologies in agricultural production is still limited. Inadequate research–extension–farmer linkages to facilitate demand-driven research and increased use of improved technologies continue to constrain efforts to increase agricultural productivity as farmers continue to use outdated and ineffective technologies. The role of research will be re-oriented to support innovations that facilitate the transition to climate-smart agriculture by smallholder farmers. New and emerging agricultural research partnerships will identify technological advances that respond to the impacts climate change and climate variability. A major thrust will be use of climate-smart agricultural practices, promoting improved land management and sustainable crop-livestock and fisheries intensification, in order to bolster farmers' adaptive capacity and support the national vision of achieving food security.

Improving and sustaining agricultural advisory Services - Agro-advisory services that include climate applications for agriculture will help farmers to make better and informed decisions in the face of risks and uncertainties, in addition to the integrated management of present and emerging pests and disease challenges. Climate applications include seasonal weather forecasts, monitoring and early warning products for drought, floods and pests and disease surveillance. These products and services would increase the preparedness of the farmers, well in advance, to cope with risks and uncertainties. In this regard, dissemination of agro-weather advisories and other climate-smart agricultural practices will be enhanced through Public Private Partnerships. Furthermore, robust agro-advisory services would catalyse private sector investment in priority areas such as weather-based index insurance and associated infrastructure.

Improved Institutional Coordination **–** Improved institutional coordination is crucial for achievement of horizontal and vertical integration required for effective discharge of the CSA Programme. The achievement of horizontal integration requires a framework that provides for high-level guidance while vertical integration is instrumental in determining the roles of various sector institutions and devolved governments in performing CSA mandates. The proposed coordination framework will improve Inter-Ministerial and Local Government Coordination; enhance partnerships with private sector and civil society organizations; and strengthen coordination with development partners.

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ACRONYMS AND ABBREVIATIONS

ACTED:	Agency for Technical Cooperation and Development
AEZ:	Agro Ecological Zone
ASP:	Advisory Service Providers
ATAAS:	Agricultural Technology and Agribusiness Advisory Service
AU:	African Union
CA:	Conservation Agriculture
CC:	Climate Change
CEWRM:	Centre of Excellence in Water Resources Management
CIGI:	Centre for International Governance Innovation
CLUSA:	Cooperative League of the United States
COMESA:	Common Market for Eastern and Southern Africa
CSA:	Climate Smart Agriculture
CSO:	Civil Society Organizations
DFID:	Department for International Development
DLGs:	District Local Governments
DSIPs:	Develop Strategy and Investment Plan
EU:	European Union
FAO:	Food and Agriculture Organization
FBO:	Faith Based Organizations
GDP:	Gross Domestic Product
GHG	Green House Gas
GOU:	Government of Uganda
ICT:	Information Communication Technology
IEC:	Information Education and Communication
IFPRI:	International Food Policy Research Institute
IPC:	Integrated Food Security Phase Classification
IPPC:	International Plant Protection Convention
ISPM:	International Standard Phyto-sanitary Measures
JICA:	Japanese International Cooperating Agency
MAAIF:	Ministry of Agriculture, Animal Industry and Fisheries
M&E:	Monitoring and Evaluation
MEMD:	Ministry of Energy and Mineral Development
MoES:	Ministry of Education and Sports
MFPED:	Ministry of Finance, Planning and Economic Development
MGLSD:	Ministry of Gender Labour and Social Development
MLHUD:	Ministry of Lands, Housing and Urban Development

MoLG:	Ministry of Local Government
MRV:	Measurable Reportable and Verifiable
MTEF:	Medium Term Expenditure Framework
MTIC:	Ministry of Trade, Industry and Cooperatives
MUK:	Makerere University
MWE:	Ministry of Water and Environment
NAADS:	National Agricultural Advisory Services
NAR:	National Agricultural Research
NARO:	National Agricultural Research Organization
NDP:	National Development Plan
NEMA:	National Environment Management Authority
NPA:	National Planning Authority
OPM:	Office of the Prime Minister
PFA:	Prosperity for All
PIU:	Program Implementation Unit
PMA:	Plan for Modernisation of Agriculture
REDS:	Rural Enterprise Development Services
SLM:	Sustainable Land Management
UBOS:	Uganda Bureau of Statistics
UDHS	Uganda Demographic Household Survey
UNBS:	Uganda National Bureau of Standards
UNCST:	Uganda National Council of Science and Technology
UNDP:	United Nations Development Programme
UNMA:	Uganda National Meteorological Authority
USAID:	United States Agency for International Development
USD:	United States Dollar
WB:	World Bank

FOREWORD

ACKNOWLEDGEMT

1.0 INTRODUCTION

1.1 Background

Agriculture is vital for the development goals of promoting growth and reducing poverty in Uganda. Agriculture supports the livelihoods of 73 percent of the households, provides employment for about 33.8 % (UBOS, 2014) of the economically active population, and over 80 percent of the poorest of the population. The proportional contribution of the agricultural sector to the Gross Domestic Product (GDP) of Uganda currently stands at about 20.9 percent. The sector continues to maintain its historical reputation as the primary driver of economic growth and poverty alleviation. Thus, the sector is most important in terms of food security, employment, household income, raw materials for local industry and exports to regional and international markets (Agriculture Policy, 2013).

Uganda has made great progress in terms of reducing the proportion of the population below the national poverty line. The poverty headcount declined from 56% in 1992/1993 to 31% in 2005/2006. Levels of the poverty headcount are much higher in rural areas compared to urban areas—34% and 14%, respectively—and the reduction over time has been strongest in urban areas. Research has demonstrated that if agriculture in Uganda grew at 6 percent per annum, the poverty rate would be cut by an additional 7.6 percentage to 18.9 percent, much lower than the 26.5 percent that would be reached if agriculture continued to grow at the average rate of 2.7 percent per year experienced in the last 8 years (IFPRI, 2008).

Uganda has a diverse agricultural production system within 14 Agro-ecological Zones (AEZs). The zones are characterized by different farming systems determined by soil types, climate, and socio-economic and cultural factors. The AEZs experience varying levels of vulnerability to climate-related hazards which include drought, floods, storms, and pests and diseases (GoU, 2007). Total dependence on rain-fed agriculture increases vulnerability of farming systems and predisposes rural households to food insecurity and poverty. This is largely attributed to the consistently low yields of major staples (maize, millet, sorghum, beans) and cash crops due to climate change and increasing weather variability. High population growth estimated at 3.2% p.a has led to dwindling of the average household landholding to less than 0.5 ha, accelerated land fragmentation and soil nutrient-mining in areas with high production potential. The predominant smallholder production system is therefore characterized by low use of external inputs (such as improved seeds, agro-chemicals and fertilizer), poor land management practices and rudimentary production tools which contribute to low agricultural productivity and high post-harvest losses currently estimated at 30%. Furthermore, marketing infrastructure and road networks in rural areas are still underdeveloped.

Uganda has the potential to transform from rain-fed agriculture by harnessing the available water for irrigation. According to studies done by JICA, potential irrigable area in Uganda is approximately 202,000 ha with only 14,418 ha under formal irrigation and

67,000 ha under informal irrigation, much of it for rice. The study further indicates that while the total renewable water resources in Uganda is over 66 km^3 only about 22 km^3 is being utilized (for both small and large scale initiatives). There is therefore great potential and could build on the on-going SLM and CSA initiatives. The initiatives include: (1) MAAIF-UNDP-GEF SLM project in the Cattle Corridor districts; (2) MAAIF- NARO-WB- GEF SLM ATAAS Project (3) COMESA, UNDP and FAO project being piloted in five districts in eastern Uganda and (4) the Cooperative league of the United States (CLUSA) in northern Uganda and by Rural Enterprise Development Services (REDS) with the support of development partners including Norway, DFID, EU and USAID. In addition, the country has in place a suite of enabling macro-economic and sectoral policies, strategies and action plans that aim to catalyze agricultural sector development and growth in a changing climate.

1.2 Alignment with the CAADP, National Development Goal, Agriculture Sector Policy and Climate Change Policy

This CSA Program is aligned to the national economic blue print – Uganda Vision 2040, National Development Plan and agricultural sector vision and objectives. At the regional level, the vision responds to the 23rd Ordinary African Union Assembly – Decisions and Declaration (Malabo Declaration), in particular: Assembly/AU/Dec. 538 (XXIII) on Climate Change and agriculture; Assembly/AU/Decl.1 (XXIII) on Accelerated agricultural growth and transformation; and Assembly/AU/Decl.4 (XXIII) on Nutrition security for Inclusive economic Growth and Sustainable Development. At the international level, the CSA Program will contribute to Uganda's efforts to adapt and build resilience in agriculture under the National Adaptation plan (NAP), nationally appropriate mitigation action and intended nationally determined contribution (INDC).

1.3 The process of preparing the CSA Programme

The preparation of the Uganda CSA programme stems from the concerted efforts being made by the Government of Uganda to mainstream climate change considerations into the national development planning and budget and sectoral policies, strategies, programmes and plans. In preparing this CSA Program, joint Ministries of Agriculture, Animal Industry and Fisheries and Water and Environment pursued a consultative approach under the guidance of a multi-stakeholder/multi-disciplinary National CSA Task Force. The Task Force Expert Team draws representation from relevant ministries and departments, parastatals, civil society organization (CSOs), non-governmental organizations (NGOs), community-based organized (CBOs), private sector, researchers, academia and individuals.

The activities that informed the Program include: technical working sessions that carried out a stocktaking of the sector's programmes, strategies and performance from a historical perspective, as well as an analysis of options for agricultural sector growth in a changing climate. Consultative sessions were held with special interest groups, in particular The National Treasury (NDA for GCF), GEF focal point, Ministry of Planning

(integration into development planning and budget), civil society organizations, umbrella private sector organizations and devolved governments, national stakeholder workshops.

The preparation of the Country CSA Program was facilitated by the Expert Team with technical and financial support from the NEPAD Climate Change Fund, the Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC) and the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

2.0 SITUATION ANALYSIS

2.1 General trends

The agricultural sector contributes 20.9% of the National Gross Domestic Product and 80% of the export earnings (UBOS, 2014). Over 95% of the farmers are smallholders with land holdings averaging 2 ha (Kisamba-Mugerwa, 2001), with annual growth rate of about 1.9% (UBOS, 2013). Despite the importance of agriculture in the economy of Uganda, the sectors' performance has not been impressive in the recent years. Real growth rate in agricultural output declined from 7.9% in 2000/01 to 0.1% in 2006/07 (UBOS, 2008). However, the sector recovered and grew at 1.3% and 2.6% in 2007/08 and 2008/09 respectively. This growth of the agricultural sector is much below the NDP annual growth target of 5.6% and the 5.9% growth rate that is required for effective poverty reduction. The current real growth rate in agricultural output (2013/14) is estimated at 2.9% (UBOS, 2014) and all these are below the 6% growth target of the AUs Comprehensive African Agriculture Development Program (CAADP).

Results from the 2014 National Housing and Population Census puts Uganda's population at 34.9 million people and is one the fastest growing in the world at about 3.2%. While Uganda's population is growing at 3.2% per annum, agricultural growth is estimated at 2.9% p.a. Low agricultural production is largely due to declining soil fertility attributed to soil degradation. This is driven by poor farming practices, over-cultivation and low input use by farmers. Other causes of the yield gap were identified as weather variability, and pests and diseases. Opportunities for opening up new land are reducing and problems associated to climate change are becoming more pronounced. Average temperatures in Uganda are likely to increase by up to 1.5^{o}C in the next 20 years and up to 4.3^{o}C by 2080s (DFID, 2008). These pressures require that food production is improved to be in tandem with population growth in a changing climate.

Table 1 *: Average food production indicators (2008 - 2009)*

Country	Total land area, Million Ha 2009	% Agricultural land area, 2009	Potential Arable Land as a % of Agricultural land area-2009	Potential Arable Land as a % of Total land area-2009	Arable Land per Person, growth % p. a 1970-2009	Fertilizer Use on Arable Land (Kg/Ha)-2008	Potential Arable Land actually in use (%)-2009	Irrigation Potential-Thousand ha, 2009	Total Area equipped for irrigation, thousand ha, 2009
Burundi	3	83.7	41.9	35.1	-2.3	2.2	21	215	23
Kenya	57	48.1	19.7	9.5	-2.1	33.3	16	539	103
Rwanda	2	81.1	65.0	52.7	-0.3	8.3	19	165	9
Tanzania	89	40.1	28.2	11.3	-2.0	6.0	25	2132	184
Uganda	20	69.9	47.3	33.1	-1.7	3.4	13	90	9

Source: FAO Statistical Yearbook, 2013

2.2 Agricultural production trends

2.2.1 Crop production

Although agricultural production has increased over the years, this increase is attributed to area expansion rather than increase in productivity. For instance, in 2012 total area planted of food crops increased by 2 percent to 5,729,000 ha. Between 1999/2000 and 2005/06, the production trends of the major crops have been mixed. While positive increases were recorded for cereals (maize, millet, rice and sorghum), beans and simsim, significant declines were noted for root crops (cassava, Irish and sweet potatoes). The performance of crop yields1 is also mixed. Between 1999 and 2006 eight major crops showed substantial reductions in yield while only simsim registered a significant increase.

Table 2*: Production of major crops, 2000 and 2006 (MT)*

Crop	1999/2000	2005/2006	Change (%)
Maize	739,177	2,440,000	230.1
Millet	184,197	188,800	2.5
Sorghum	113,240	162,400	43.4

1PMA Impact Evaluation (2008). The data is based on surveys in only two years so there is room for some scepticism about the size of the variation and to what extent this represents the underlying trend.

Rice	41,896	880,000	2000.4
Beans	495,652	665,000	34.2
Groundnut	125,617	219,000	74.3
Simsim	97,000	166,000	71.1
Cotton**2**	21,439	18,870	-12.0
Irish potato	208,359	154,600	-25.8
Coffee	154,700	120,139	-22.3
Sweet potato	2,620,065	1,696,000	-35.3
Cassava	2,245,882	1,656,000	-26.3
Matooke	6,129,724	5,360,500	-12.6

Source: External Monitoring Unit of ASPS (EMU), 2007: Reports on the Agricultural Modules; UCDA 2006

Table 3: Change in productivity of major crops 1999 - 2006

Crop	**Average yield (kg/ha)**	**Mean yield (kg/ha)**	**Change (%)**
Simsim	114.06	277.80	144
Cassava	401.47	543.70	35
Sweet potato	1,664.20	2,070.20	24
Millet	583.08	718.70	23
Groundnut	679.55	635.90	-6
Irish potato	1,457.20	1,002.70	-31
Rice	1,385.12	733.60	-47
Cotton	627.70	292.20	-53
Maize	1,399.50	551.40	-61
Beans	988.36	358.30	-64
Coffee	1,215.03	368.70	-70
Matooke	8,593.96	1,872.10	-78

Source: EMU 2007

Table 4: Yield gap of selected crops (kg/ha)

Crop	On farmers' fields	On Research station	Yield gap3 (%)
Maize	551	5,000-8,000	**807-1,352**
Beans	358	2,000-4,000	**458-1017**
Groundnuts	636	2,700-3,500	**324-450**
Bananas	1,872	4,500	**140**
Coffee	**369**	**3,500**	**849**

Source: EMU, 2007

2 Cotton data obtained from CDO in bales, converted to kg @ 1bale=185kg and divided by 1000 to get equivalent in tones.

3 The yield gap is the difference between research station yield and farmers yield, expressed as a percentage.

2.2.2 Industrial crop production and exports

Coffee, Tea, Cocoa and palm oil are the main perennial crops for export in Uganda. Overall there was an increase in Coffee volumes (60 kg Bags) exported from 3.3 million bags in FY2012/13 to 3.6 Million bags in FY2013/14. However due to declining world coffee market prices the total earnings dropped by 4% from USD 422million in FY 2012/13 to USD 404 Million in 2013/14 and climate change is likely to exacerbate the decline in coffee production. The Uganda Tea Authority indicates an increase of 5% from 6970 Metric Tonnes in 2012/13 to 64,000 Metric tonnes in 2013/14 with corresponding increase in earnings from USD 107,994 Million to 113,920 million in the same period.

Cocoa production increased by 13% from 19,430 Metric Tonnes in 2012/13 to 22,010MT in2013/14. All the Cocoa produced was exported earning the country USD 58Million compared to USD 46 Million in 2013/14 indicating an increase of 26% in revenue. The total area of Oil Palm planted by small holders now stands at 3,863 Ha while the nucleus estate stands at 6440 ha bringing the total area of oil palm to 10,303 ha. Smallholder farmers have so far harvested a total 28,498 MTs of fresh fruit bunches that have fetched UGX 11.1 Billion Shillings only. Overall there is a general increase in industrial crop production and export.

Cash crops production is increasing as a result of increase in areas under production rather than productivity increase. This is contributing to reduction in arable land under food crops/food security. Increasing population is putting pressure to the current production systems and other natural resources in a non-sustainable way. There is need to improve per capita productivity in a changing climate.

Table 5: Production of cash crops (MT)

Year	Coffee	Tea	Cocoa	Palm Oil	Cotton?	Sugar cane?
2005						
2006						
2007	175,346	44,923	9,399		16,228	
2008	218,781	45,680	8,982		7,950	
2009	195,871	48,663	11,882		17,812	
2010	166,968	49,182	16,478		11,891	
2011	191,371	35,194	17,936		25,587	
2012						
2013						
2014						

Source: NDP, DSIP, Statistical abstracts

2.2.3 Horticultural crops production

A wide range of horticultural crops are produced in nearly all parts of the country throughout the year with practically no irrigation or fertilizer. These include citrus,

papaws, mangoes, pineapples, tomatoes, okra, carrots, pepper, cabbages, bananas, and a variety of other indigenous vegetables. Currently, the export of horticultural products is one of the fastest growing export, sub-sectors in the country (estimated at 20 percent per annum).

Table 6: Area and production of selected horticultural crops in Uganda

Crop	Cropped Area (Ha)	Estimated Production (MT)	Crop Yield (MT/Ha)
Citrus			
Mangoes			
Pawpaw			
Pineapples			
Tomatoes			
Pepper			
Bananas			
Okra			
Cabbages			
Carrots			

Source: DSIP, NDP, MAAIF Annual Reports, External Monitoring Unit, ASPS

2.2.4 Livestock production

Livestock share to the GDP is currently projected at 1.7 percent. In recent years livestock population growth rates have been estimated to grow at 1.4, 2.5, 4.3 and 3.0 for cattle, sheep, goat and chicken, respectively. Productivity of livestock is still low. The most recent livestock census projected average milk production per milked cow per week to be around 8.5 litres and egg rates per week at 4 and 5 for exotic layers and indigenous chicken, respectively. The low productivity was mainly attributed to the dominance of indigenous breeds estimated at 93.6 percent and 87.7 percent for cattle and chicken, respectively. Furthermore, poor feeding and nutrition is still a big challenge across all breed types due to seasonal availability of feed resources and remains the biggest limitation to investment in exotic chicken and dairy. This challenge is likely to be exacerbated by climate change.

Table 7: *Livestock production (2009 – 2014): Source (MAAIF, Planning)*

Number of Live Animals, 1999-2012											
Year/ Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	
Cattle	5,966,000	6,144,000	6,328,000	6,519,000	6,567,000	6,770,000	6,973,100	7,182,293	11,408,740	11,751,002	12,1
Sheep	1,081,000	1,108,000	1,141,000	1,175,000	1,552,000	1,600,000	1,648,000	1,697,440	3,413,340	3,515,740	3,62
Goat	6,396,000	6,620,000	6,852,000	7,092,000	7,566,000	7,800,000	8,034,000	8,275,020	1,2449,656	12,823,146	13,2
Pigs	1,573,000	1,644,000	1,710,000	1,778,000	1,940,000	2,000,000	2,060,000	2,121,800	3,184,300	3,279,829	3,37
Chicken	26,622,000	29,671,000	32,639,000	35,903,000	31,622,000	25,173,720	25,928,932	26,706,800	37,443,880	39,270,000	43,2

2.2.5 Fish production

Ugandan fishery sector has been majorly from natural water bodies (Table 7). Fisheries activities are mainly carried out in open water sources comprising of five major lakes (Victoria, Albert, Kyoga, Edward and George), which are the main sources of fish in the country. Uganda is endowed with proportionately large open water resource accounting for 15.1% of the total surface area. Lake Victoria continues to be the most important water body in Uganda, both in size and contribution to the fish catch followed by Lake Albert, and then Lake Kyoga. Whereas, Lake Victoria, Albert and Edward have recorded steady growth in fish catches in recent years, fish catches in Lake Kyoga, George and Kazinga channel are declining. Lakes account for 90% of the total fish catch. The main challenge for natural wild catch is over fishing and use of poor traditional methods of capture. The other threat is posed by proliferation of the water hyacinth which affects fish breeding sites and recruitment.

Table 8*: Fish catch by production by water source*

	2002	2004	2005	2006	2007
Open water bodies (lakes and rivers)	233.6	387.8	387.7	341.1	348.3
Others including Aquaculture	8.3	40.6	24.1	21.1	21.0
TOTAL	**241.9**	**428.4**	**411.8**	**362.2**	**369.3**

Source: UBOS Statistical abstract, 2009

However, the geographical landscape of Uganda is favorable for aquaculture and fish cage farming.

Table 9*: Trends in fish exports*

Year	Tonnes	USD m	% Total Exports
1990	1,664	1.4	**0.8**
1991	4,687	5.3	**2.9**
1997	11,819	27.8	**4.7**
2002	28,000	80.0	**18.8**

2003	25,080	86.8	**17.0**
2004	29,830	101.0	**16.0**
2005	39,201	143.0	**17.6**
2006	36,461	145.8	**15.2**
2007	31,681	124.7	**9.3**
2008	**24,965**	**124.4**	**7.2**

Source: MAAIF, UFPEA & UBOS, 2009

2.3 Food consumption and nutrition trends

2.3.1 Levels of food consumption

Eighty nine percent of the population in Uganda is minimally food insecure (IPC phase 1). This population still has normal access to food from own production and the market. Ten percent of the total population in the country is in phase 2 (stressed).

Table 10*: Importance of staple food in diet of Uganda*

Commodity	**Quantity consumed**	**Daily caloric intake**	**Share of caloric intake**
	(kg/person/year)	(kcal/person/day)	(percent)
Plantains	172	419	18%
Cassava	101	300	13%
Maize	31	266	11%
Sweet potatoes	82	215	9%
Beans	16	148	6%
Wheat	7	42	2%
Rice	4	53	2%
Others		1,133	48%
Total		2,360	100%

Source: FAO, 2009

Table 11*: Production and trade of food staples in Uganda*

Commodity	**Production**	**Imports**	**Formal Exports**	**Imports as a percentage of apparent consumption**	**Formal exports as a percentage of production**
	(1,000 tonnes)	(1,000 tonnes)	(1,000 tonnes)	(percent)	(percent)
Maize	1,230	33	41	2.7%	2.3%
Cassava	4,986	-	7	0.0%	0.1%
Plantains	9,110	-	-	0.0%	0.0%
Beans	446	3	19	0.7%	4.2%
Rice	105	63	18	42.0%	16.7%

wheat	17	365	1	95.8%	7.4%
Others	8,867	523	513	5.9%	5.8%
total	2,4761	986	598	3.9%	2.4%

Source: FAO, 2009b and FAO, 2009c.
Note: Apparent consumption is production plus imports minus exports and non-food uses. Average over 2005-07

2.3.2 Nutrition trends

According to the 2006 UDHS, 38% of children under 5 years in Uganda are stunted, 16% are underweight, and 6% are wasted. 50% of women and 73% of children less than 5 years are anemic. One out of every five children (20%) and 1 out of every 5 women (20%) are vitamin A deficient. Countries with wide spread iron deficiency as it is the case in Uganda are known to lose 2% of their GDP every year due to poor learning ability and low productivity due to iron deficiency.

2.4 Enabling Policy Environment

Enabling environment for CSA at the macro level is anchored in various National and sectoral policies and legal frameworks drawing inspiration from the National Vision 2040 and the National Development Plan (NDP). Below are the key national and sectoral climate, agriculture and natural resource policies, strategies and legal instruments relevant to CSA.

Table 12*: Key policies relevant for CSA implementation and scale out in Uganda*

Regional	
Comprehensive Africa Agriculture Development Programme (CAADP)	Based on four reinforcing pillars for investment in agriculture to improve performance through strengthening country presence, focused lending program based on coordinated sector plans, enhanced capacity for policy, analytical work, and knowledge/partnership management: 1. **Expanding the areas under sustainable land management** and reliable water control systems. 2. Improving rural infrastructure and trade related capacities for **market access** 3. Increasing **food supply** and reducing hunger 4. Expanding **agricultural research and technology transfer** and dissemination
Macro economics	
Uganda Vision 2040	Conceptualized around strengthening the fundamentals of the economy to harness the abundant opportunities around the country. The opportunities include; oil and gas, tourism, minerals, ICT business, abundant labour force, geographical location and trade, water resources, industrialization, and agriculture. On the other hand, the fundamentals include: infrastructure for (energy,

	transport, water, oil and gas and ICT); Science, Technology, Engineering and Innovation (STEI); land; urban development; human resource; and peace, security and defence.
National Development Plan 2010/11-2014/15 (NDP)	The National Development Plan seeks to address structural bottlenecks in the economy in order to accelerate socio-economic transformation for Prosperity. During the period of the plan the investment priorities inter alia include physical infrastructure development mainly in the energy and transport sectors; facilitating availability and access to critical production inputs especially in the agriculture and industry sector as well as promotion of science and technology innovation.
Prosperity for All	The cardinal principle of Prosperity for All (PFA) is to identify and support economic enterprises that will enable households to earn daily, periodic and long-term income, with a target of UGX 20 million per household per year. To achieve the PFA vision, all government agencies and local governments must implement existing programs in an integrated manner and with a higher level of efficiency in order to bring about economic transformation, especially in rural areas.
Agricultural Sector	
Plan for Modernisation of Agriculture (PMA)	Since 2000, investments in agriculture were guided by the Plan for Modernization of Agriculture (PMA) whose main objective was to reduce poverty through agricultural commercialisation.
Agricultural Sector Development Strategy and Investment Plan (DSIP)	The PMA has since 2010 been replaced by the DSIP. The DSIP is based on a vision of the future, which is to have *"a Competitive, Profitable and Sustainable Agricultural Sector*". Investments under DSIP have been packaged under four Programmes representing the key areas of opportunity: (i) Enhancing Production and Productivity; (ii) Improving Access to Markets and Value Addition; (iii) Creating an Enabling Environment, and; (iv) Institutional Strengthening in the Sector.
The National Agricultural Policy 2013	The vision of the National Agriculture Policy is 'a Competitive, Profitable and Sustainable Agriculture Sector'. The overall objective is to promote food and nutrition security and to improve household incomes through coordinated interventions that will enhance sustainable agricultural productivity and value addition; provide employment opportunities, and promote agribusinesses investments and trade.
The National Agricultural Research (NAR) Policy, 2003	Opening up provision of agricultural research services to competition is expected to increase the efficiency and effectiveness of agricultural research, and therefore explicitly enhances plurality in the provision of research services.
National Fisheries	The National Fisheries Policy caters for the creation of a national

Policy (2003)	network of Lake Management Plans and Beach Management Units (BMUs) for improved management of the fisheries resources.
Environment and Climate Change	
The National Environment Management Policy for Uganda (1994)	The policy contains comprehensive statements of objectives and strategies that directly or indirectly address issues of land and water resources management, which are considered adequate, if well implemented.
National Climate Change Policy	The policy is to ensure that all stakeholders with a role to play in the development of Uganda address climate change impacts and their causes through appropriate measures while promoting sustainable development.
National adaptation Programme of Action (NAPA)	The Program of Action contains 9 priorities focusing on building community and ecosystem resilience to adverse impacts of Climate Change
The National Environment (Minimum Standards for Management of Soil Quality) Regulations	Soil quality standards are certainly essential for sustainable agriculture and other land use practices. It would be useful to apply these Regulations among the different land uses.
Land, Land use and Forestry	
The National Land Use Policy for Uganda, 2008	The policy recognizes the fact that inappropriate decisions in the allocation of land use activities has led to, among others, land degradation, soil erosion, reduced land productivity, wetlands degradation, and loss of vegetation cover and biodiversity. It contains adequate provisions that address sustainable soil and land utilization.
Uganda Strategic Investment Framework for Sustainable Land Management (U-SIF SLM) 2010 – 2020	The goal of the Uganda Strategic Investment Framework for Sustainable Land Management (U-SIF SLM) is to promote key sectors cooperation to improve natural resource based livelihoods and other ecosystem services. The U-SLM SIF is a multi-sector (agriculture, water and environment, lands, energy and trade) national initiative spearheaded by MAAIF to implement the CAADP and TerrAfrica. The U-SIF SLM aims at providing an integrated cross-sectoral approach to investing in solutions to crosscutting SLM challenges. It also aims at scaling-up and mainstreaming SLM into the center of the national development agendas.

2.5 Constraints to agriculture sector development

2.5.1 Land degradation and soil health

Land degradation and soil fertility or nutrient depletion are recognized as a major impediment to increasing land productivity, food security and natural resource conservation. The country has a total area of 241,550.7 Km^2 of which about 30% is highly degraded. Poor agricultural land management, increased extreme weather events, and population pressure have escalated land degradation in all the AEZs. The estimated average depletion rates for Nitrogen (N), Phosphorous (P) and Potassium (K) in Uganda are -21, -8, and -43kg/$ha^{-1}yr^{-1}$(Smaling *et al*., 1997; Wortmann and Kaizzi, 1998). More use of inorganic fertilizer, supplemented with soil and water conservation and organic nutrient supplementation, is central to realizing the productivity and yield increases required to override the current situation. Application of mineral fertilizers is an effective means to reverse soil nutrient depletion and improve land productivity and has been credited for much of the sustained increases in per capita food production in Asia and Latin America (Sanchez et al. 1997), yet currently, only 2% of smallholders use inorganic fertilizer in Uganda (UBOS, 2006).

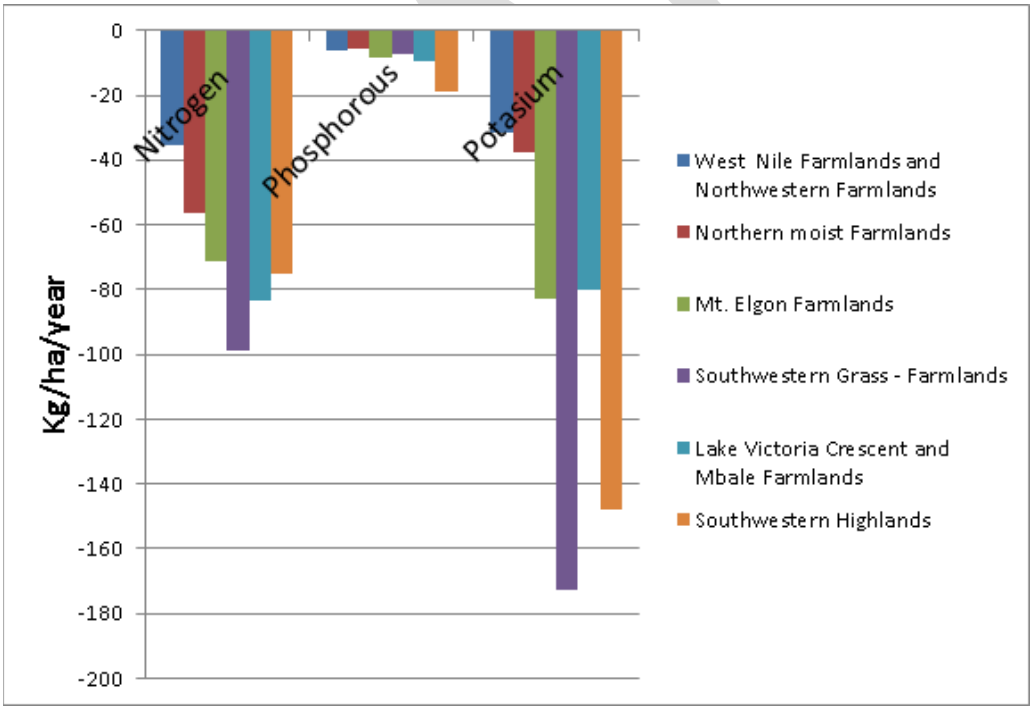


Figure 1*: Estimated average depletion rates for Nitrogen (N), Phosphorous (P) and Potassium (K) in Uganda*

2.5.2 Climate change

Global projections downscaled to Uganda generally reveal a small increase or possible small decrease in annual rainfall in the future (Figure 2). There are indications, however

that there may be an increase in precipitation during December, January, and February, which historically has been the dry season across the country (Figure 3). This increase could have a significant impact on livestock and agriculture — especially on perennial crops and post-harvest activities.

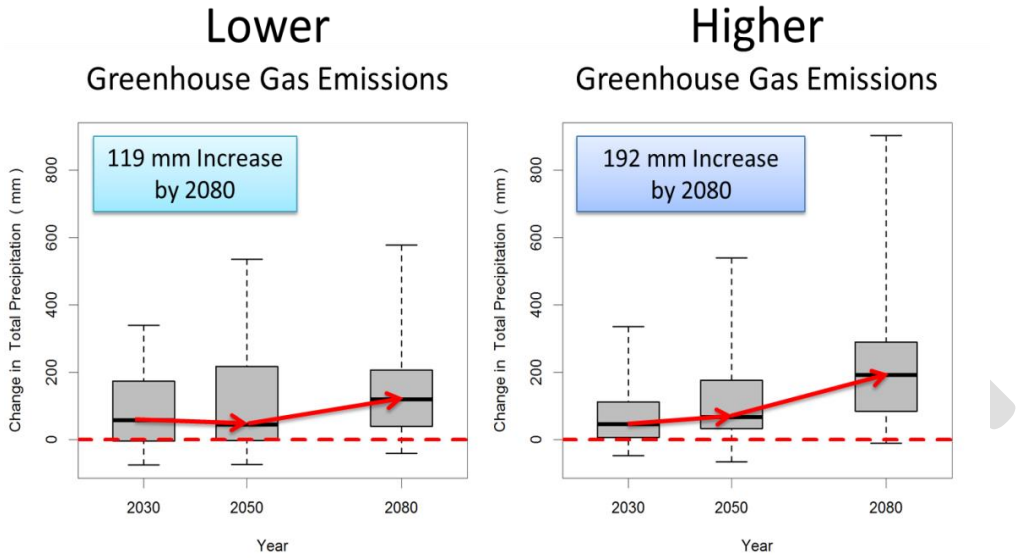


Figure 2: Climate change impacts in Uganda on precipitation in Uganda under lower (RCP 4.5) and higher (RCP 8.5) greenhouse gas emissions scenarios. ***The thick black lines represent the average of 29 different climate models, whereas the grey box and dashed lines represent the range of climate models. Although precipitation is projected to increase by most climate models, the timing of precipitation is also changing with some months projected to decrease***

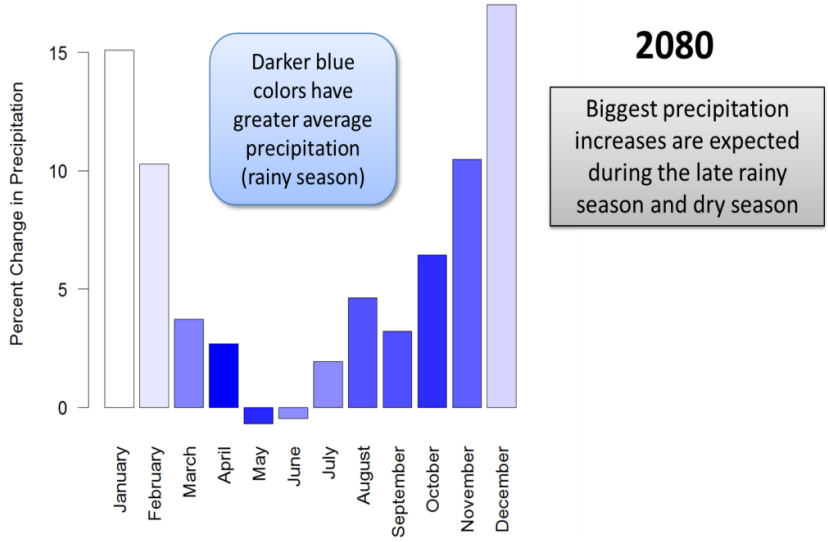


Figure 3*: Percent change in precipitation in 2080 under the higher RCP 8.5 greenhouse gas emissions scenario based on an ensemble of 19 climate models from the IPCC Fifth Assessment Report.* ***The darker bars represent months with greater average precipitation (from Climate Wizard, CIAT, 2015).***

2.5.3 Climate Impacts to Crops

Human induced climate change is likely to increase average temperatures in Uganda by 1.5 ºC within the next 15 years and by up to 3.5 ºC by the 2080s, although some climate models project temperature increases as high as 5.8 ºC. Such rates of increase are unprecedented. Increased temperatures will also lead to greater rates of evaporation and transpiration, which can cause greater moisture stress and rainfall deficits. Most recently in 2010 -2011 damages and losses from rainfall deficits in the agricultural sector were valued at USD 907 million accounting for 77% of the total damages and losses across all economic sectors (World Bank, 2010-11 integrated Rainfall variability impact needs assessment by the department of disaster management OPM).

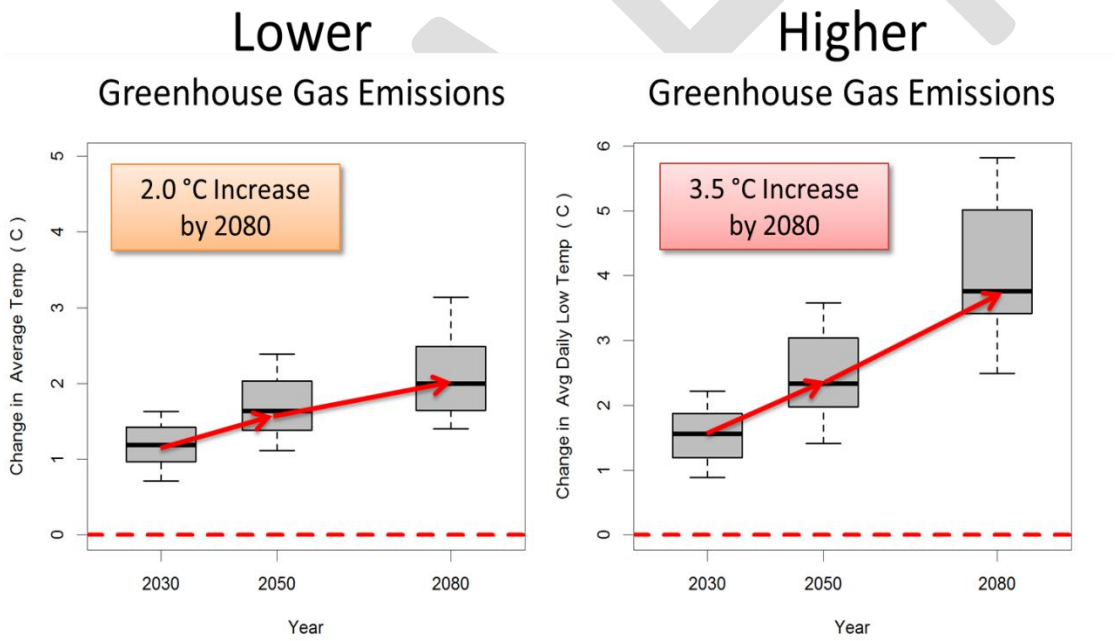


Figure 4*: Climate change impacts to temperature in Uganda under lower (RCP 4.5) and higher (RCP 8.5) greenhouse gas emissions scenarios.* ***The thick black lines represent the average of 29 different climate models, whereas the grey box and dashed lines represent the range of climate models. Although precipitation is projected to increase by most climate models, the timing of precipitation is also changing with some months projected to decrease***

According to the International Climate Risk Report, Uganda is one of the most unprepared and most vulnerable countries in the world (CIGI, 2007). Yet among the most vulnerable countries, Uganda has the least adaptive capacity, making adaptation the most immediate priority for the country. The most dominant and widespread disaster due to

climate change is drought, whose frequency is observed to be on the increase, for example seven droughts were experienced between 1991 and 2000 (GoU, 2007). The 2010/11 drought affected an estimated 2 – 2.5% of national GDP.

Agricultural crop modelling shows that climate change has impacts depending on the crop. Beans are projected to experience the greatest decreases due to climate change, with the potential for a decrease of up to a 70% in suitable for production by 2040-2069 (Figure below). In contrast, millet, banana and groundnut is projected to increase in suitable area, albeit only slightly (5-10%). Above ground biomass is also projected to decease across most of Northern Uganda (Figure 5), which would have great negative implications for livestock in those areas.

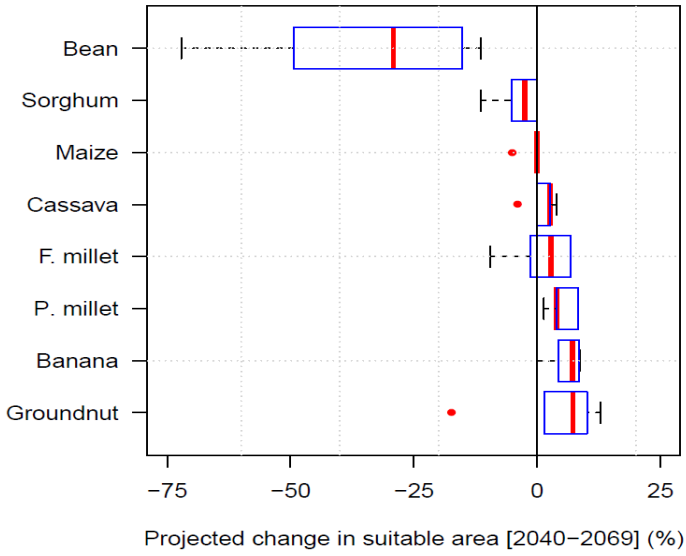


Figure 5*: Percent change in suitable area for major crops in Uganda due to climate change.* ***The red line represents the average projected change and the blue box and dashed lines represent uncertainty associated with the crop modelling. Analysis provide by J. Vargas, CIAT***

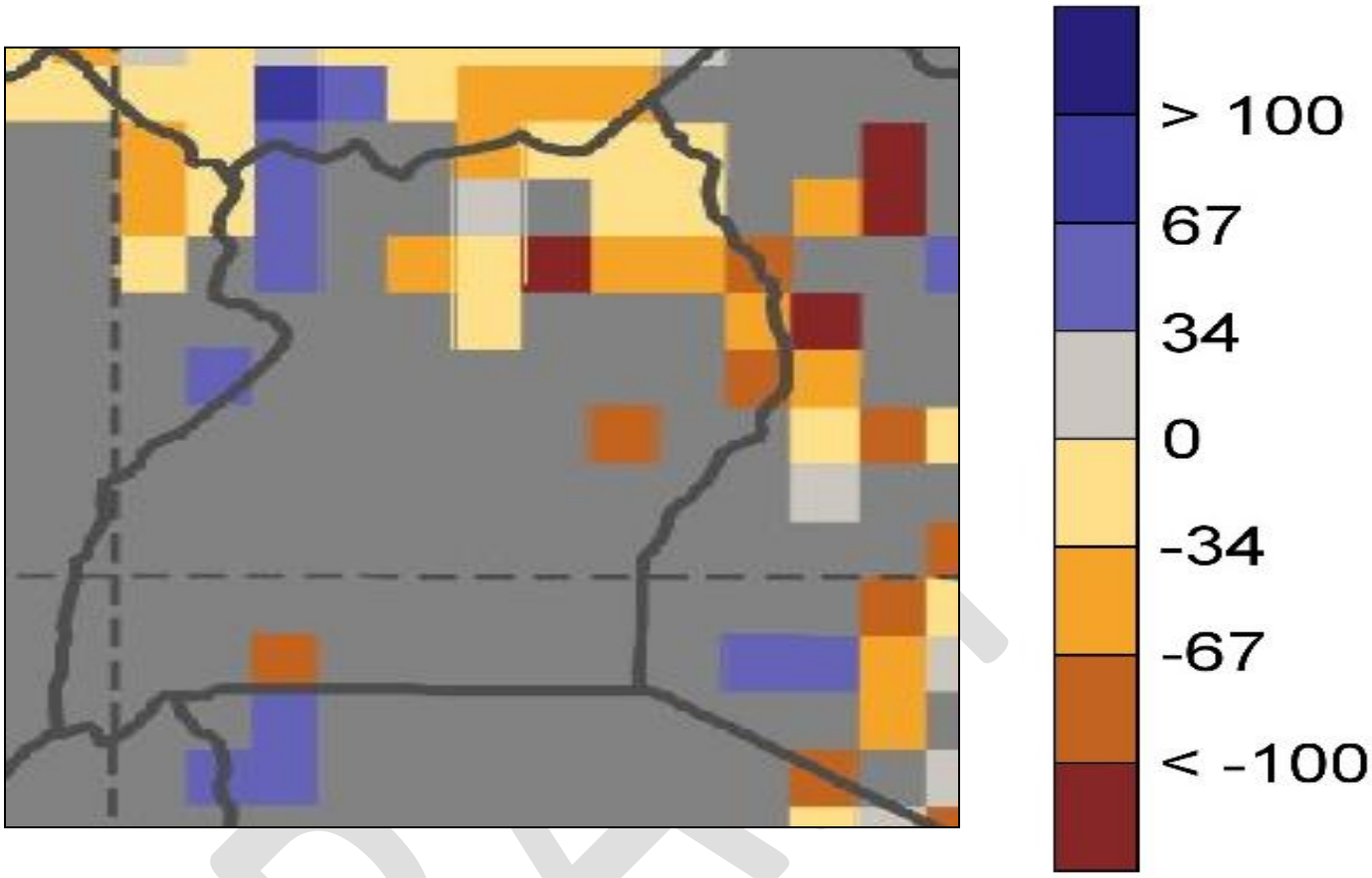


Figure 6*: Projected changes Aboveground Net Primary Productivity (ANPP) in Uganda's rangelands ANPP by 2050s and RCP8.5 (high-end emissions) in relation to the mean value of 1971-1980.* ***This provides a good proxy for climate change impacts to livestock productivity.***

FIGURE 6. AVERAGE ANNUAL PRECIPITATION IN 16 STATIONS (IN MM/YEAR; STATIONS LABELED WITH THE FIRST THREE LETTERS)

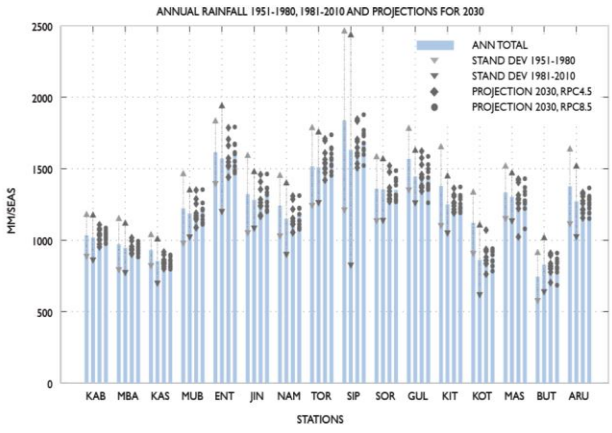


Figure 7*: Average annual precipitation in 16 stations. Source: USAID (2013) Uganda Climate Change Vulnerability Assessment Report. African and Latin American Resilience to Climate Change Project. Pp 76.*

The frequency and severity of floods have also been observed to be increasing. For example, the floods experienced across the country in 2010 affected 50,000 people while 350 people died in the same year due to landslides. Changes in temperature have also had significant impacts on health and agriculture. The country has also seen unprecedented outbreaks of pests and diseases, such as the Coffee Wilt Disease, Banana Bacterial Wilt, etc. in recent years that are likely to be a consequence of climatic change. Other out breaks of pests and diseases that have occurred possibly due to climate change include: the Rift Valley Fever, FMD, ECF, Cassava Mosaic, etc. Uganda's ecosystems are also changing and biodiversity loss is on the increase due to extreme droughts and unsustainable agricultural practices. There has also been unprecedented disappearance of plant species, particularly medicinal plants and pastures and increase in invasive weeds.

Women and Youth in Uganda play a vital role in agriculture, providing most of the labour force. Generally, women contribute about 65% to agricultural production and processing, consequently they are more vulnerable to the adverse impacts of climate change. This is exacerbated by cultural limitations to women and youth in decision making and of limited access to and control over the returns from land. With a growing population of unemployed youth, this calls for a paradigm shift in agricultural development models. Government prioritization of SLM and the new orientation towards CSA provide an opportunity to address inequalities related to women and youth besides increasing productivity and incomes and reducing emissions from the agriculture sector.

Building resilience in the agriculture sector is of paramount importance as risks and vulnerabilities to agricultural and livelihood systems due to climate change are on the increase. .Development of appropriate early warning systems and contingency plans would be critical. There is need to enhance and improve the National Early Warning system in Uganda coordinated in MAAIF in cooperation with the Uganda National Meteorological Authority (UNMA) and the Disaster Preparedness Department so as to ensure that timely climate information, including seasonal forecasts reaches the users especially small scale farmers. In addition, the Famine Early Warning Systems Network (FEWS NET)the leading provider of early warning and analysis on food insecurity has helped to develop the national livelihood zones and baselines, which have been consecutively used (2010, 2011 and 2012) for seasonal outcome analysis assessments. Other initiatives are also being piloted, including a community Early Warning System in Karamoja region by MAAIF, ACTED and OPM.

Emissions from agriculture come from four principal sectors, namely, agricultural soils, livestock and manure management, rice cultivation, and the burning of agricultural residues and open burning from land use clearing. The largest shares of emissions originate from agricultural soils (N_2O), enteric fermentation (the natural digestive processes of ruminants such as cattle and sheep) and rice production associated with CH_4

emissions. It is expected that these emissions will increase because of increased food demand and increased prioritization of rice, meat and dairy production (MAAIF, 2010). This shift will also lead to increased pressure on natural land resources notably, forests, wetlands, and grasslands from agricultural expansion.

Table 13*: GHG emissions from the different sector source categories*

Sector	GHGs	Total sector emission (Gg CO_2 eq.)	% of total emissions
Agriculture	N_2O, CH_4	20,970	57.4
LULCIF	CO_2, N_2O, CH_4	10,465	28.7
Energy	CH_4, CO_2, N_2O,	3,634	12.2
Waste	CH_4	808	1.7
Source: MWE (2014) Uganda Second National Communication to the United Nations Framework Convention on Climate Change, GoU/GEF/UNEP, pp 174.			

MAAIF GHG Mitigation Plan

The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) in Uganda; in an effort to reduce emissions from the agricultural sector across the country and to fulfil its mandate as the lead government agency responsible for the management of the agricultural sector, has developed a GHG mitigation plan(2015) to guide agricultural development with respect to greenhouse gas emissions. It is clear that anthropogenic emissions from agriculture sector, in Uganda, are the principal drivers' of climate change and this plan is one of those activities intended to address the mandate of MAAIF to promote and support sustainable and market oriented agricultural production, food security and household incomes.

This plan is informed by the results of the Agricultural Sector Scoping Study that has just been completed by a team of consultants. In this plan, MAAIF details:

1. Realistic plans for reducing emissions from the agricultural sector;
2. The strategies the ministry will take to reduce emissions by 10 percentage below the 2014 levels;
3. The steps that it will take to monitor its progress towards achieving the recommended targets, and;
4. A funding plan to mobilize resources that will facilitate the achievement of the recommended targets.

MAAIF estimates that total emissions from the agricultural sector were nearly 498.29, 29.47 and 1033.32 Gg for Methane, Nitrous oxide and Carbon dioxide, respectively, in 2008 and these increased exponentially by 30.6, 72.8 and 287.5%, respectively, in 2014. Most of these emissions are attributed to livestock enteric fermentation, manure management, savannah burning and rice cultivation. The mitigation plan presents short-term and long-term emissions reduction goals to guide agricultural development programmes and other decision making processes through 2040. The goals are in line with government development interventions including National Development Planning processes and Vision 2040.

Two main goals of the plan are:

1. ***Short-term 2025 goal***: To reduce emissions by 10 percent below the 2014 levels by 2025
2. ***Long term 2040 goal***: To reduce emissions by 30 percent below the 2014 levels by 2040.

2.5.4 Agricultural finance and investment

Investing in agriculture is key to achieving poverty reduction and food security in Uganda. Studies have shown that public spending provides leverage for other investments. Since the year 2000 investment in agriculture has been guided by the PMA whose main objective was poverty reduction through agricultural commercialization. The PMA recognized the need for investment in other sectors outside agriculture for example roads, financial services, energy, NRM and agricultural education. The findings of the poverty eradication action plan evaluation (GOU, 2008) indicate that the allocation of public expenditure to agriculture can reduce poverty in a number of ways, including by raising produced output in those sectors on which the poor depend most for employment.

The share of approved domestic agriculture budget to the total domestic budget shows a declining trend way below the recommended 10% of annual government expenditure to the agriculture sector (Maputo Declaration, 2003). For instance the share declined from 3.8% in FY 2012/13 to 3.3% in FY 2013/14. The gap between MTEF and approved share has also been widening e.g. 366.8 bn approved to 289.3 bn in 2010/11; 440.7 bn and 294.6 bn in 2011/12 and 630.9 bn and 315 bn in 2013/14.

Table 14*: Financing in Agricultural sector MTEF*

Year	2010/11	2011/12	2012/13	2013/14	2014/15	Average
Percentage	4.7%	4.8%	5.0%	5.2%	5.3%	5%

UGX (billions)	366.8	440.7	525	630	737	539.9

Consequently, the trend of agriculture financing through other mechanisms and the sector proportional contribution to the national GDP is also declining. This trend is likely to continue because of the government medium term prioritization in financing the energy sector and infrastructure for accelerated growth of industry and trade. It is therefore expected that much of the investments will have to come from the private sector. Allocation of credit to agriculture from the formal financial institutions is very low. There is no crop insurance although much of the country's agriculture is rain-fed and is therefore subject to shocks of drought and floods.

2.6 Agricultural Growth potential and sources of Growth

A paradigm shift from the current agricultural practices holds the future of Uganda's agriculture sector. High dependence on rain-fed agriculture and poor soil health increases vulnerability of farming systems and predisposes rural households to food insecurity and poverty thus eroding their productive assets and weakening their coping strategies and resilience. Increasingly, the onset, duration and intensity of rains vary considerably from year to year, while the frequency and intensity of extreme weather events such as drought and floods are on the increase with devastating impacts on the national economy and the livelihoods of the people. Moreover agricultural seasons in some areas of the country are expected to shift. Drastic and innovative measures are needed to help farmers and consumers cope with the changes in emerging and projected weather patterns. In addition, women and youth in Uganda play a vital role in agriculture, Government prioritization of SLM and the new orientation towards CSA provide an impetus for inclusive agricultural growth that not only targets increasing productivity, building resilience and reducing emissions intensity but will also strive to address inequalities related to women and youth engagement in the agriculture sector.

3.0 VISION AND OBJECTIVES

3.1 Vision

The Vision of the CSA Program is a **"Climate resilient and low carbon agricultural and food systems contributing to increased food security, wealth creation and sustainable economic growth in line with the National Vision 2040."**

3.2 Objectives

The five core objectives of the Country CSA Programme are:

1. Increase agricultural productivity through climate smart agriculture practices and approaches that consider gender
2. Increase the resilience of agricultural landscapes and communities to the impacts of climate change
3. Increase the contribution of the agricultural sector to low carbon development pathways through transformation of agricultural practices.
4. Strengthen the enabling environment[4] for efficient and effective scaling up of climate smart agriculture.
5. Increase partnerships and resource mobilization initiatives to support implementation of climate smart agriculture.

Thus, Uganda CSA Programme aims to build resilience of agricultural farming systems for enhanced food and nutrition security through six Programmatic Result Areas, namely:

Result Area 1: Improved Productivity and incomes – a pro-growth, pro-poor development agenda that supports agricultural sustainability and includes better targeting to climate change impacts will improve resilience and climate change adaptation. Because climate change has a negative impact on agricultural production, achieving any given food and nutrition security target will require greater investments in agricultural productivity. Public and private sectors as well as public-private partnerships will play a critical role.

Result Area 2: Building resilience and associated mitigation co-benefits - CSA will help reduce vulnerability of Uganda's agriculture sector by increasing productivity, enhancing adaptation and resilience of the farming systems and reducing emissions intensity in the context of achieving sustainable development and poverty eradication.

Result Area 3: Value Chain Integration - This approach is holistic in that it considers input supply, production, agricultural services, marketing and business support services as necessary building blocks. Under the approach, both public and private sectors are seen as critical actors in the value chain. Knowledge and capacity building are critical

4institutional, policy, legal frameworks

strategic priorities to leverage innovations and increase efficiencies to reduce the greenhouse gas emissions intensity from agriculture and food systems. The approach also provides enabling framework for integrating gender and the needs of the youth in value chain businesses.

Result Area 4: Research for Development and Innovations - Although Uganda has a well-developed agricultural research system, use of modern science and climate smart technologies in agricultural production is still limited. Inadequate research–extension–farmer linkages to facilitate demand-driven research and increased use of improved technologies continue to constrain efforts to increase agricultural productivity as farmers continue to use out-dated and ineffective technologies. The role of research will be reoriented to support innovations that facilitate the transition to climate-smart agriculture by smallholder farmers. New and emerging agricultural research partnerships will identify technological advances that respond to the impacts of climate change and climate variability. A major thrust will be use of climate-smart agricultural practices, promoting improved land management and sustainable crop-livestock and fisheries intensification and integration, in order to bolster farmers' adaptive capacity and support the national vision of achieving food security.

Result Areas 5: Improving and sustaining agricultural Advisory Services - Agro-advisory services that include climate applications for agriculture will help farmers to make informed decisions in the face of risks and uncertainties, in addition to the integrated management of present and emerging pests and disease challenges. Climate applications include seasonal weather forecasts, monitoring and early warning products for drought, floods and pests and disease surveillance. These products and services will increase the preparedness of the farmers, well in advance, to cope with risks and uncertainties. In this regard, dissemination of agro-weather advisories and other climate-smart agricultural practices will be enhanced through Public Private Partnerships. Furthermore, robust agro-advisory services will catalyse private sector investment in priority areas such as weather-based index insurance and associated infrastructure.

Result Area 6: Improved Institutional Coordination - Improved institutional coordination is crucial for achievement of horizontal and vertical integration required for effective discharge of the CSA Programme. The achievement of horizontal integration requires a framework that provides high-level guidance while vertical integration is instrumental in determining the roles of various sector institutions and devolved governments in performing CSA mandates. The proposed coordination framework will improve Inter-Ministerial and local Government coordination; enhance partnerships with private sector and civil society organizations; and strengthen coordination with development partners.

4.0 PROGRAMMATIC RESULT AREAS

4.1 Result Area 1: Improved Productivity and incomes

4.1.1 Component 1: Improved productivity and nutrition

Development issues:

- Low use of CSA technologies and practices in agricultural and fisheries production by men and women farmers/fisher-folks.
- Low use of external inputs by smallholder men and women farmers.
- High levels of stunting and high mineral deficiency levels.
- High poverty levels.
- High dependency of agricultural production, by smallholder men and women farmers on rainfall
- Poor land management practices.

Output 1: Improved technologies adopted by smallholder farmers and yields of staple crops (maize, cassava, beans, rice, sorghum, banana, etc.) increased by 50% by 2025

Actions:

1. Identify, update, disseminate and enhance adoption of existing climate smart technological packages, technologies and practices, including promotion of high value, multipurpose tree crops and agroforestry.
2. Introduce improved crop varieties (high yielding, short duration, disease and pest resistant and nutrient fortified).
3. Increase access to quality external inputs including inorganic fertilizers and their efficient use.
4. Increase access and capacity to use mechanized CSA tools and equipment along commodity value chains.
5. Build capacity and promote learning initiatives for stakeholders on CSA along commodity value chains.

Output 2: Production of livestock, poultry, small ruminants and pigs increased by 25% through adoption of improved technologies

Actions:

1. Introduce improved livestock and poultry breeds.
2. Undertake genetic characterization and improvement of local livestock and poultry breeds.
3. Identify, update and disseminate improved livestock technological packages.

4. Train farmers on livestock disease management and increase access to veterinary services (drugs, diagnostic services) and livestock disease surveillance and control.
5. Enhance training in management skills and practices of farmers, pastoralist and herders in diseases, feeding, breeding and integration under intensive and extensive systems.
6. Develop improved quality (grazing and fodder) feed resources.

Output 3: Productivity of cultured fish (tilapia, clarius and cat fish) increased by 70% and wild catch fisheries increased by 25% by 2025

Actions:

1. Disseminate existing fish culture technological packages throughout the country.
2. Train farmers on stock management, good fishing practices and disease management.
3. Strengthen fish health inspectorate and safety and health of fish products.
4. Train extension agents and farmers in skills and practices for aquaculture management.
5. Develop improved aquaculture quality feed resources.
6. Promote integration of aquaculture in water development for irrigation, livestock and sustainable management of wetlands
7. Put in place and/or strengthen measures for the protection of fisheries breeding sites and fishing gear regulations.

Output 4: Stunting and underweight in children as well as mineral deficiencies in children and women of reproductive age reduced by 50% by 2025

Actions:

1. Promote production and consumption of high quality protein cereals, orange flesh tubers (for vitamin A), fish and leafy vegetables.
2. Develop other high quality staples through breeding – cassava, rice, potatoes, banana, etc.
3. Promote fortification of staples during processing (micronutrient fortification and blending products).
4. Educate and train consumers on appropriate food combination.

4.1.2 Component 2: Irrigation and water management

Development issues:

- Overdependence of agriculture on poor and erratic rainfall (rain-fed agriculture).
- Inadequate infrastructure development for irrigation, drainage and water storage
- Inefficient use of existing irrigation systems.

- Low productivity on existing irrigation systems.
- High water wastage and poor water management.
- Inadequate and un-coordinated information in irrigation research, science and technology.

Output 1: Irrigation schemes productivity increased by 25% and integrated farming systems increased by 50% by 2025

Actions:

1. Promote development and diffusion of appropriate efficient small-scale irrigation technological packages.
2. Train extension workers on irrigation and water management technologies and skills to enable them undertake irrigation extension, participatory methods of dealing with farmers as well as market extension.
3. Build the capacity of water users associations in agricultural water management and their obligations as major beneficiaries.
4. Undertake comprehensive management needs assessment of existing large-scale irrigation schemes.
5. Establish links to input and output markets and service providers of irrigation technologies (strengthen value chain).

Output 2:20,000 ha of micro irrigation schemes developed by 2025 to benefit 40,000 households

Actions:

1. Conduct studies on the irrigation potential and identify sites in various river floodplains and underground water sources for micro-irrigation systems.
2. Train farmers and private sector in the installation, operation and maintenance of recommended irrigation technologies.
3. Facilitate procurement and delivery of irrigation equipment through suppliers who can provide technical backstopping and training of local artisans.
4. Undertake technical and environmental studies of available water bodies to establish their potential to supply water for irrigation, livestock and aquaculture.
5. Train extension workers and farmers in water management and use of irrigation technology and practices.
6. Support initiatives to develop water systems for irrigation and livestock.
7. Build capacity of water committees in watersheds to manage water for irrigation, livestock and aquaculture.
8. Sensitize and incentivise the private sector and local manufacturers to supply equipment, inputs and provide services to scale up water for irrigation, livestock and aquaculture.

Output 3: 100,000 ha of integrated farming systems with sustainable water harvesting and management schemes developed by 2025 to benefit 200,000 households

Actions:

1. Identify suitable sites for rainwater harvesting and agricultural water management schemes.
2. Train farmers/ household members in water harvesting and agricultural water management technologies.
3. Facilitate the construction of water harvesting structures at household and community levels.

4.2.3 Component 3: Improved food storage and distribution

Development issues:

- High post-harvest losses along the value chains.
- Low integration of commodity markets.

Output 1: Post harvest losses along staple food crops (maize, rice, cassava, beans), livestock and fish value chains reduced from 30% to 10% by 2025

Actions:

1. Invest in improved appropriate storage facilities (including for bulk and long term storage) and technologies along the value chain and improve post-harvest management to reduce spoilage and microbial risks.
2. Train producers, processers and marketers in post-harvest management, preservation and long term storage of food, and seed and conservation of dry season pasture and feeds.
3. Provide regular market information (deficit/ surplus areas) to improve distribution of agricultural commodities/ food stuffs.
4. Facilitate establishment of marketing centers in rural areas with the appropriate infrastructure.
5. Link at least 70% of communities in each district by feeder roads to various marketing centers and highways.
6. Introduce technology and practices for more efficient harvesting, drying and handling of crops.

Output 2: Private sector capacity enhanced to store 200,000 Mt of grain annually and to process and package 50,000 Mt of cereals, cassava and sorghum products annually by 2025

Actions:

1. Strengthen the warehousing receipt system and link smallholder farmers to warehousing receipt system in the grain supply chain.
2. Rehabilitate existing warehouses and silos and establish public-private-partnerships management.
3. Support private sector to invest in food processing as well as value addition, including packaging and branding.
4. Facilitate linkages with relevant service providers and markets (inputs and outputs).

4.2.4 Component 3: Increased Growth in Incomes

Development issues:

- Low levels of income from food and cash crop production by men and women smallholder farmers.
- Low productivity of animal breeds and low production of improved breeds to meet demand.
- High levels of animal diseases and inadequate feed and water for animals.
- Limited market linkages for livestock and livestock products.
- Low production of culture fish to meet the increasing demand.
- Limited adoption of integrated farming production systems with potential high incomes.
- Many scattered small producers.
- Limited access to input and output markets.
- Potential for urban and peri-urban agriculture as a source of food and income is under exploited.

Output 1: Income from food and cash crop production by men and women increased by 20% and 30%, respectively by 2025

Actions

1. Build capacity of nursery operators in all crop-growing areas and support them to expand and improve quality of seedlings.
2. Build capacity of certified seed producers and support them to expand and improve quality of seed.
3. Build capacity of food and cash crop farmers to improve productivity and produce quality.
4. Facilitate contractual arrangements between food and cash crop producers and market/ industry.
5. Develop and promote innovative micro-financing packages to facilitate food and cash crop farmers to access credit.
6. Promote diversification and integration of agricultural enterprises to spread climate risks.

7. Step up use of multi-purpose trees, crops and dual purpose livestock types.
8. Promote diversification of livelihoods through promotion of alternative non-weather based and off-farm enterprises.

Output 2: Income from livestock production by men and women increased by 20% and 25% respectively by 2025

Actions

1. Rehabilitate, restock and build capacity of livestock breeding centers to produce improved breeds of livestock for farmers.
2. Facilitate and support the acquisition of improved breeding stocks by men and women farmers.
3. Provide adequate and effective extension knowledge and agro-weather information.
4. Increase coverage, efficiency and sustainability of animal health and artificial insemination services.
5. Develop and support innovative micro-financing packages to support livestock-keepers access to credit and markets.
6. Identify areas with acute problem of water for livestock and support construction of watering points.
7. Facilitate and support establishment of quality pastures and feeder crops for farmers.
8. Promote value addition for livestock products.

Output 3: Income from culture fish production by men and women increased by 20% by 2025

Actions

1. Rehabilitate, restock and build capacity of fish breeding centres.
2. Facilitate and support acquisition of breeding stock by men and women fish farmers.
3. Train farmers in the establishment and maintenance of aquaculture infrastructure, feeding and management of fish.
4. Facilitate contractual arrangements between fish farmers and market.
5. Promote value addition for fish products.
6. Develop improved aquaculture quality feed resources

Output 4: Output for Urban and peri-urban agriculture increased by 30% by 2025

Actions

1. Support District Councils to zone areas within urban and peri-urban areas for agricultural activities.

2. Train urban and peri-urban producers in good agricultural practices.
3. Monitor the safety of outputs and mitigate the negative effects from urban and peri-urban agriculture.
4. Enforce laws relating to urban and peri-urban land use.

Output 5: Increase the proportion of women and youth participating in CSA initiatives by 50% and 20%, respectively by 2025

Actions

1. Promote CSA technologies and practices that reduce the labour load/ drudgery.
2. Empower women and youth to adopt CSA practices including agribusiness as part of the development programs for women and youths.
3. Develop gender sensitive CSA training manual and curricular for use by communities and integration in training and demonstration of CSA in school and vocational skills development programs respectively.
4. Promote youth involvement in the application of ICT in CSA agribusiness and agro-advisory services.
5. Develop capacity to foster integration of gender into CSA.

4.2 Result Area 2: Building resilience and associated mitigation co-benefits

4.2.1 Component 1: Improve soil health and restore degraded lands

Development issues:

- Declining soil fertility
- Nutrient depletion and loss of biodiversity
- Land degradation and soil erosion
- Low capacity at all levels for implementation CSA and SLM practices
- Low adoption of CSA and SLM technologies and practices at farm level
- Low use of soil productivity enhancing inputs and soil protection practices and technologies.
- Limited availability and high cost of the technologies
- There are only a few CSA and SLM activities with limited coverage.
- Weak collaboration of relevant ministries and agencies to ensure CSA and SLM upscaling.
- Almost total dependency on rain-fed agriculture.
- Increasing frequency of extreme weather events such as droughts; floods and landslides; high temperatures; and wind and hailstorms.
- High levels of poverty, low diversity of income and livelihoods, HIV/AIDS, insecurity and weak institutions.

Output 1: Adoption of climate smart technologies and sustainable land management practices by 1 million households by 2025

Actions

1. Establish CSA/ SLM knowledge hubs across the country to support adoption of CSA and SLM technologies and practices by men and women that improve soil health and restore degraded lands.
2. Enhance the capacities of private sector service providers and farmer-based organizations to support farmers' adoption of existing/ new/ improved CSA and SLM technologies and practices.
3. Improve the management of agricultural soil/ nutrients/ water and increase availability of soil analysis, land use and farm planning services.
4. Develop and integrate CSA and SLM principles into farmer-field schools, primary, secondary and tertiary curriculum.
5. Provision and supply of quality CSA inputs and planting materials
6. Establish mechanisms for joint planning and implementation of CSA and SLM at the community level.
7. Promote and build capacity in the use of tools for landscape approaches.
8. Support land suitability mapping, land use and farm planning in micro and macro-watersheds country-wide.
9. Increase number of extension agents and land users with skills in soil health improvement and soil and water conservation.
10. Support initiatives for community awareness, mobilization and action to control soil erosion, reforest and protect and conserve of degraded agricultural landscapes and watersheds.

Output 2: Technology dissemination and adoption for scaling up of CSA and SLM promoted by 2025

Actions:

1. Develop and implement sustained awareness creation program on CSA and SLM in addressing soil health and land degradation.
2. Facilitate the development and implementation of at least 5 District CSA Programmes annually.
3. Facilitate the dissemination and adoption of CSA and SLM technologies and practices at the farm level across the country through District CSA Programmes.
4. Promote locally available CSA technologies

Output 3:CSA and SLM knowledge to support policy and investment decision making generated and adequately managed by 2016

Actions

1. Establish, operationalize and regularly update a robust CSA/ SLM Knowledge Platform with disaggregated data on men and women.
2. Document and publicize successful CSA/ SLM technologies, practices and interventions.
3. Develop policy briefs on CSA best practices to inform policy makers
4.

4.2.2 Component 2: Conservation of Natural Resources and Catchments

Development issues:

- Deforestation
- Forest degradation, soil erosion and siltation
- Loss of biodiversity
- Decreased forest cover

Output 1: The National REDD+ Strategy implemented

Actions

1. Protect water catchment areas through integrated watershed management.
2. Promote best management practices for natural resources management to improve and maximize net benefits for the farmers.
3. Promote upstream water catchments conservation to reduce sediment yields into the river and lake systems.
4. Develop a business model for ecosystem management in order to facilitate payment for ecosystem services (e.g. tourism revenue used to motivate farmers to conserve wildlife and payment for water in urban areas used to pay farmers for conservation of water catchments).
5. Develop and implement management plans for ecosystems in order to encourage sustainable use.
6. Document biodiversity in the ecosystems including below ground biodiversity and develop eco-tourism opportunities in such areas.
7. Undertake natural resources accounting for ecosystem.
8. Support development of the REDD+ strategy
9. Promote both upstream and downstream water catchments conservation

Output 2: Farm forestry increased by 20% by 2025

Actions

1. Identify and promote agroforestry species for different agro-ecological zones and support farmers to increase tree cover on their land to at least 10%.
2. District Councils to undertake afforestation and reforestation through Public-Private Partnerships.
3. Promote and support on farm soil conservation activities covering all farmers.
4. Monitor trends in land use management.

5. Support use of spatial information systems

4.2.3 Component 3: Insurance and other Safety Nets

Development issues:

- High vulnerability and increasing climate change risks.
- Shifting spatial and temporal distribution of climate events.
- High incidence of poverty making it difficult for small scale farmers to bounce back after experiencing extreme weather events and climate variability.
- Inadequacy of traditional approaches to risk transfer and risk management.

Output 1: Crop and livestock weather-indexed insurance increased by 30% by 2025

Actions

1. Develop and implement varied innovative crop and livestock weather-indexed insurance packages.
2. Invest in the agro-meteorological infrastructure to support weather-indexed insurance
3. Enhance the capacity of micro-finance institutions to act as agents to deliver innovative crop and livestock weather-indexed insurance packages.
4. Raise awareness within the insurance industry of extreme weather and climate risks and communicate actions and opportunities.
5. Undertake farmer education and address barriers to uptake of weather-indexed insurance products with a view to gain their trust.
6. Explore ways of using other safety nets and alternative risk transfer instruments.

4.2.4 Component 4: Early Warning System and Disaster Preparedness

Development issues:

- Susceptibility of crops, livestock and fisheries to extreme weather events and pests and diseases.
- Inadequate capacity to down scale weather information.
- Fragmented early warning systems.
- Insufficient weather information flow networks.
- Inadequate systems, knowledge and capacity at household, community, district and national levels to respond to emergencies.

Output 1: A Comprehensive Early Warning System and Contingency Plan developed and implemented by 2017

Actions:

1. Increase coverage of automated weather monitoring stations country-wide and integrate use of indigenous knowledge into community early warning systems.
2. Strengthen and integrate the use of scientific and indigenous knowledge to improve weather forecasting to inform better farmer decisions
3. Monitor crops, livestock and fish pests and diseases
4. Facilitate specialized training to increase scientific knowledge and improve accuracy of models for predicting weather.
5. Build capacity to downscale global and regional climate change information to national and sub-national level to support decision-making.
6. Construct vulnerability maps to support targeting of food security and emergency preparedness interventions.
7. Develop tools to support vulnerable households and communities to establish household community systems that can respond to emergencies (with regards to food insecurity).
8. Establish a National Seed Disaster stock and establish capacity for a 6-month of food strategic stocks (maize, rice and sorghum).
9. Producing and disseminate EWS messages that include risk information; designed to link threat levels to contingency preparedness and response actions (using colour, flags, etc.); understood by authorities and end users; and issued from a single (or unified), recognized and authoritative source.
10. Develop a wide range of IEC tools to disseminate early warning information to stakeholders.
11. Incorporate traditional/ indigenous knowledge (ITK)

4.2.5 Component 5: Synergies in adaptation and mitigation of Climate Change enhanced

Development issues:

- Striving to achieve low carbon development pathway as a response to the National Development Plan.
- Agricultural sector contributing highest national GHG emissions by sector.
- Optimizing adaptation actions that have mitigation co-benefits.
- Increasing soil carbon to enhance soil fertility.

Output 1: Reduction of GHG emissions intensity from the agriculture sector

Actions

1. Promote adoption of low-cost climate smart technologies that minimize emission of carbon dioxide, enhance soil carbon sequestration while increasing productivity and efficiency in use of agricultural resources.
2. Develop and operationalize a national carbon accounting and measurement, reporting and verification (MRV) system.
3. Support collection, aggregation, processing and analysis of monitoring data.
4. Conduct cost benefit analysis/impact assessments of CSA.
5. Support development and dissemination Policy briefs on vulnerabilities, risks and opportunities on GHG emissions and climate change in the Agricultural Sector.
6. Undertake studies to increase scientific knowledge on vulnerability and GHG emission of the agricultural sector.

4.3 Result Area 3: Value Chain Integration

4.3.1 Component 1: Development of new products

Development issues:

- Most agricultural commodities are sold in their raw form and are thus bulky with short shelf lives and inconvenient to use.
- Limited value chains development and low agribusiness skills.
- Disjointed value chains with regards to most agricultural commodities with limited marketing of agricultural primary produce.
- Primary production with inadequate primary processing and low value addition.
- High level of postharvest losses at farm level.

Output 1: At least two new commercially viable products developed from each of the staple crops, horticultural crops, livestock and fisheries by 2025

Actions

1. Invest in research and development and innovations into new product development.
2. Develop products that are not bulky, have long shelf life, are safe and convenient to use.
3. Promote innovation platforms.
4. Institute competitive grant scheme for research into new product development.
5. Identify existing value addition technologies and incentivize the private sector to promote them and innovate.

Output 2: Efficient pilot value chains developed for two selected commodities in each agro-ecological zone

Actions

1. Establish regional hubs (a cluster of District Councils in the same AEZ) for value chain development and backstopping.
2. Identify and build capacity of actors in value chain processes.
3. Undertake advanced market feasibility studies to promote demand for the selected commodities.
4. Facilitate linkages to markets for the selected commodities.

4.3.2 Component 2: Increased competitiveness and enhanced integration into domestic, regional and international markets

Development issues

- Low levels of local market penetration by smallholder men and women farmers.
- Low capitalization of bulk traders.
- Poor grading and standardization system.
- High consumer preference of imported commodities that have local substitutes.
- Inadequate volumes with the required specifications and quality to supply the international market.
- Limited capacity to fully comply with international sanitary and phytosanitary (SPS) standards.

Output 1: Marketed output of food and cash crops, livestock and fish products increased by 50% by 2025

Actions:

1. Create agricultural, livestock and fish commodity hubs through participation of private sector especially micro-financiers and apply viable models of linkage with smallholders.
2. Facilitate capacity building of farmers on demand- and market-driven production.
3. Design and launch a market promotion program for import substitution commodities.
4. Work with supermarkets, hotels and restaurants to participate in selected commodity value chains with a smallholder production base.
5. Build capacity of extension agents to support diffusion of skills for primary processing to reduce post-harvest loss and enhance value of agricultural produce.
6. Source, introduce and popularize appropriate technologies, machinery and equipment for agro-processing
7. Mobilize and build capacity of smallholder farmers for collective and cooperative effort to engage in more efficient handling, storage, agro-processing and marketing.
8. Promote investment in handling, storage and marketing physical infrastructure that increase shelf life of agricultural goods.

9. Develop infrastructure and create organization capacity for commodity bulking and market linkages to enhance product quality and profitability.

Output 2: Export of non-traditional agricultural commodities by men and women smallholders increased by 50% by 2025

Actions:

1. Identify successful lead private sector organizations with access to assured markets and apply viable models of linkage with smallholder producers.
2. Design sustainable programmes to support the certification of smallholders for export markets.
3. Develop branding of Uganda produce for regional and international markets.

Output 3: Grading and standardization systems of agricultural commodities (crops, livestock and fish) developed and improved

Actions:

1. Develop grading and standardization systems for agricultural commodities that do not have grades and standards.
2. Promote the adoption of grading and standardization systems for all agricultural commodities for both domestic and export markets.
3. Improve inspection and regulatory services for implementation of agriculture commodities quality standards.
4. Support and promote investment in core sanitary and phyto-sanitary infrastructure and systems that enhance agricultural commodity safety.
5. Strengthen market information systems that increase access to market and trade opportunities.
6. Support and promote investment in physical trade and marketing infrastructure including stores, cold chains, markets and handling at farm, community, zonal and national level to increase storage capacity and sustained quality of agricultural commodities.
7. Develop human and institutional technical capacity for commodity quality and safety along value chains.

4.4 Result Area 4: Research for Development and Innovations

4.4.1 Component 1: Agricultural research funding and Uptake of Agricultural Technologies and Innovations along the Value Chain

Development issues:

- Low public expenditure funding into agricultural research.

- Limited participation of private sector in funding agricultural research and innovations.
- Poor management of agricultural research information.
- Poor coordination and collaboration among the institutions involved in research.
- Less efficient and effective technologies, practices and approaches to increase the productivity and resilience of the agricultural sector.
- Low technical and infrastructural capacity for research
- Inadequate harnessing of indigenous knowledge and local innovations that contribute to resilience and climate mitigation in the agricultural sector**.**

4.4.1.1 Output 1: Increased funding in research and development and innovations by 50% by 2025

Actions:

1. Increase public expenditure into research and development and innovations for CSA through national budget.
2. Incentivize private sector investments in research and development and innovations.
3. Facilitate research, development and wide access to drought and disease tolerant and quick maturing crop varieties and livestock breeds.
4. Conduct participatory research work on improved technologies and practices that is informed by needs of users and agro-ecological zones along the value chain.
5. Enhance adaptive research on climate resilient and productivity enhancing technologies, including indigenous knowledge and local innovations, on-farm and on-station demos/trials.
6. Conduct on-farm research into low-cost appropriate technologies and practices and deliver them as packages to farmers.
7. Strengthen the infrastructural and technical capacities of the agricultural research centres.
8. Establish and operationalize a research fund
9. Develop and operationalize a robust mechanism for knowledge and Information management

Output 2: Adoption of improved CSA technologies and practices by men and women along the value chain increased by 30% by 2025

Actions

1. Build the capacity of extension, producers and other stakeholders in the use of existing/new/improved CSA technologies and practices.

2. Support development of private sector inputs supply and distribution networks and appropriate CSA technologies outreach activities.
3. Train farmers and extension agents in use of technologies and practices for conservation of soil moisture and nutrients and improve their use efficiency.
4. Set up nurseries and distribution system for agro-forestry tree seedlings in agricultural landscapes.
5. Support field demonstration/field days/study tours/farmer exchange visits to enhance adoption of existing/new/improved CSA technologies and practices.
6. Enhance/support the dissemination of CSA technologies (packaging, monitoring and feedback) e.g., farmer field days, exchange visits, farmer competitions & shows

4.4.2 Component 2: Research Extension Linkage strengthened and made functional by 2016

Development issues:

- Poor management and sharing of agricultural research information.
- Poor packaging of research information for the benefit of farmers.
- Lack of appropriate platforms for researchers and farmers to interact and share knowledge and experiences.

Output 1: Research Extension Linkage and made functional by 2016

Actions:

1. Strengthen platforms through which researchers will have regular contacts with stakeholders and other users at the national, Zonal, District and farm levels.
2. Prepare CSA information packages and disseminate them to interested stakeholders using ICT.
3. Promote innovation platforms that build on indigenous knowledge and partnerships along the commodity value chains.
4. Establish unified diagnostic service centres for soil, plant, forestry, water and animal health) at district level.

4.5Result Area 5: CSA Knowledge, Extension and Agro-weather Services

4.5.1 Component 1: CSA knowledge generation and dissemination

Development issues

- Fragmented CSA knowledge and understanding of what CSA is.
- Lack of CSA knowledge management system across the country.

Output 1: Robust CSA Knowledge Management System (Platform/Hub) across the country established

Actions

1. Undertake a CSA knowledge mapping, audit and analysis.
2. Build a CSA knowledge Warehouse.
3. Develop and maintain a CSA knowledge management system.

Output 2: Synthesis reports and case studies on CSA best approaches and guidelines prepared and disseminated /CSA based approaches and guidelines documented and disseminated

Actions:

1. Undertake analyses and provide tools to support CSA decision-making.
2. Package and provide synthesized information on CSA approaches and case studies on CSA best approaches.
3. Develop, test and implement CSA guidelines and decision-making support tools.
4. Promote integrated extension and agricultural advisory services.
5. Build capacity and equip extension service in delivery/ dissemination of CSA technologies and practices.

Output 3: Communications packages and Multimedia CSA knowledge products produced

Actions:

1. Produce regular CSA information and communication materials for key stakeholders to support and inform policies, planning and agricultural advisory services.
2. Produce CSA information and communication materials to strengthen capacity of researchers, private sector, CSOs and farmer organizations to influence policy.
3. Develop practical and applied training materials and packages for training on CSA.
4. Support the development of a communication strategy and communication tools on CSA.
5. Make an inventory of available materials at all levels

Output 4: CSA knowledge networks and partnerships strengthened

Actions:

1. Strengthen CSA knowledge and information sharing networks/forums.

2. Develop a portfolio of information sharing technology tools to support sharing of CSA information and learning resources.
3. Establish CSA knowledge partnerships on knowledge generation, sharing and mobilization with governments, international organizations, research institutions, farmer organizations, private sector and civil society organizations.
4. Support establishment of regional CSA learning/ demonstration centres.

4.5.2 Component 2: Enhance extension of climate information services and agro-weather advisories

Development issues

- Low use of climate information services and agro-weather advisories in agricultural planning and farm management decision-making.
- Inadequate agro-climate information services and inappropriate agro-weather products.
- Limited understanding of the impact of climate change and weather variability on the entire agricultural value chain.
- Low integration of climate science with agricultural research

Output 1: Agro-climate information services and timely use of agro-weather products increased by 40% by 2025

Actions:

1. Identify appropriate climate/weather services and products for small-scale farmers.
2. Downscale forecasted weather to various localities to promote the appropriate climate/weather services and products for small-scale farmers.
3. Strengthen pre-season dissemination of agro weather advisories.
4. Institute in-season community agro-weather monitoring and post-season agro-weather review.
5. Strengthen integration of climate science with agricultural research.

Output 2: Farmers and other actors in the agricultural value chain utilizing ICT to access services increased by 30% by 2025

Actions

1. Increase the use of ICT in data management, knowledge sharing and monitoring of CSA.
2. Scale up the use of ICT tools for dissemination of CSA extension messages, weather/climate and marketing information.
3. Integrate the use of ICT into existing agricultural and climate information management systems.
4. Promote use of ICT in monitoring climate risks.
5. Promote us of ICT in monitoring GHG emissions in the agricultural sector.

5.6 **Result Area 6: Improved Institutional Coordination**

4.6.1 Component 1: Improve Inter-Ministerial and County Government Coordination

Development issue:

- Weak inter-ministerial coordination.
- Weak coordination between national and local governments on agriculture related issues.
- Low capacity for cross-sectoral planning.
- Ineffective communication within and between ministries.

Output 1: A joint platform for collaboration between ministries responsible agriculture, livestock, fisheries, environment, forestry, water, energy, lands, local governments, planning and finance established and strengthened by end of 2015

Actions:

1. Develop and implement an inter-ministerial communications strategy with respect to inter-ministerial coordination on matters relating to CSA.
2. Introduce a CSA biannual joint planning and review session between inter-ministerial team and the District teams.
3. Strengthen and train national and District staff in cross-sectoral planning implementation and monitoring and evaluation.
4. Build capacity for policy analysis and review at the national and District levels.
5. Establish a framework for disseminating CSA programmatic planning and implementation as well as annual reports and studies and receiving feedback at national and district levels.

4.6.2Component 2: Partnerships with private sector and civil society organizations

Development issue:

- Lack of structured framework for private sector and CSOs to engage national and local governments on CSA issues.
- Inadequate incentives for private sector to invest in CSA.

Output 1: Platforms for private sector and CSOs engagement with national and local governments established and strengthened by end of 2015

Actions:

1. Engage private sector to identify opportunities and incentives to catalyze increased investments in CSA activities.
2. Organize regular consultative meetings with private sector and CSOs on the planning and implementation of the CSA activities.
3. Publicise the Country CSA Programme among private sector and CSOs with a view to identifying areas for their participation.
4. Establish communication channels for consultations between private sector and CSOs in the programmatic planning and implementation of CSA activities at the national and district levels.

4.6.3 Component 3: Programmatic Coordination with Development Partners strengthened

Development issue:

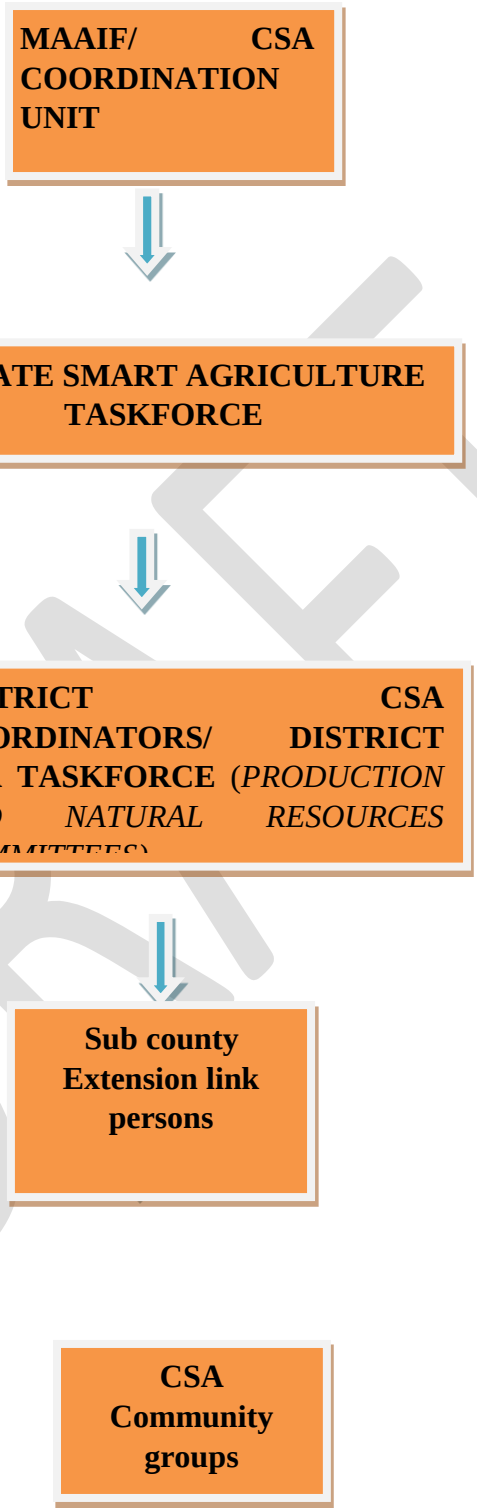
- Fragmented projects/ programmes on CSA or CSA-related initiatives.
- Varied financial management, procurement, monitoring and evaluation systems.
- Weak ownership of intervention at the national and district levels.

Output 1: GoU – Development Partner Coordination and Collaboration strengthened and Development Partners fund a common Country CSA Program by end of 2015

Actions:

1. Harmonize GoU and development partners' investments in CSA through a common Country CSA Programme.
2. Strengthen collaboration between GoU and the development partners' Agriculture Coordination Group (with a standing agenda item on programmatic planning and implementation of CSA Programme).

5.0 COORDINATION FRAMEWORK



6.0 ROLES AND RESPONSIBILITIES

One of the expected outcomes of national CSA Programme is the establishment of national and local partnerships that operate across sectors and leading to the adoption and institutionalization of CSA approaches. The delivery mechanism for CSA implementation is expected to facilitate the realization of local and global linkages by targeting mostly small scale farming activities.. CSA interventions (Table 18) within the framework of rationalized land use planning, community participation, coalition building at local and national levels and integrated ecosystem/ watershed approach are expected to contribute towards realization of local and global environmental benefits

Implementation of the programme will take place through existing structures. The need for an all-inclusive and integrated implementation approach that takes into account synergies and partnerships between various players in dealing with challenges of climate change is well articulated and needs to be understood by stakeholders. Due to its multi-sector nature, the CSA programme will involve many stakeholders at the various levels. Consequently it is vital to establish a well-structured and coordinated implementation arrangement that will bring together all the actors.

The implementing institutions will be in five main categories:

- NGOs, CSOs, CBOs
- Private sector organizations
- Local governments
- Parastatals
- Government institutions

1	**National Government**	**Government ministries: Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Ministry of Water and Environment (MWE) and other government agencies**	**Policy implementation, Coordination, Resource mobilisation. Extension services, Regulation, Standards, Early warning information, Personnel management and development**
		National Agricultural Research Organization (NARO)	Technology development, validation, evaluation
		Uganda National Meteorological Authority (UNMA)	Weather and Climate information/ weather forecasts

		Ministry of Lands, Housing and Urban Development(MLHUD), Ministry of Trade Industry and Cooperatives (MTIC), Ministry of Energy and Mineral Development(MEMD), Ministry of Finance Planning and Economic Development (MFPED) and Ministry of Local Government ,	To participate as members of CSA Taskforce and the Inter- Ministerial platform on CSA
2	District Local Governments	Local Councils District Technical Departments	Mobilise farmers' participation in CSA Programs, Prioritises, Plan and budget for CSA in local governments.
3	Private sector	Insurance Companies	Provision of crop, fisheries and livestock insurance services
		Financial Institutions	Provision of financial products that support CSA including credit and banking services and guarantees to farmers and the private sector
		Input suppliers, produce buyers and service providers	Provision of goods and services for Market information, provision of credit, provision of market for produce implementation of CSA and
4	Farmers Institutions	Uganda National Farmers Federation, Farmer Cooperatives Farmers Associations	Facilitation of group formation/SACCOs, awareness, mobilisation, advocacy and coordination of partnerships for CSA, implementation of CSA activities; promotion of group marketing and

			warehouse receipt systems
5	Civil Society Organizations	**Faith Based and Cultural Institutions,** NGOs, CBOs	Advocacy, capacity building and support implementation of CSA interventions
6	Development Partners	ODA Climate finance	Contribution towards policy development and implementation; financial support for development

7.0 MONITORING AND EVALUATION

The program will be monitored through the following M&E activities.

(i) Monitoring of activities will be based on the CSA Results Based Logframe (Table 16) and the Results Monitoring Framework (Table 17). Two Results Monitoring Frameworks will be developed – one for the first five years and the second one to be developed after the mid-term review.

(ii) **Program start**: A Program Inception Workshop will be held within the first 2 months of Program start. The Inception Workshop is crucial to building ownership for the Program results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues including:

- Assist all partners to fully understand and take ownership of the Program. Detail the roles, support services and complementary responsibilities of all stakeholders. Discuss the roles, functions, and responsibilities within the Program's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for Program staff will be discussed again as needed.
- Review the Program Results Framework and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule PB meetings. Roles and responsibilities of all Program organisation structures should be clarified and meetings planned. The first PB meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

- Progress made shall be monitored using a Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated.
- Based on the information recorded, Program Progress Reports (PPR) can be generated in the Executive Snapshot.

Annually: Annual Program Review/Program Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since Program start and in particular for the previous reporting period (30 June to 1 July).

The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward Program objective and Program outcomes - each with indicators, baseline data and end-of-Program targets (cumulative)
- Program outputs delivered per Program outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management

Periodic Monitoring through site visits: stakeholders will conduct visits to Program sites based on the agreed schedule in the Program's Inception Report/Annual Work Plan to assess first hand Program progress. Other members of the Program Board may also join these visits. A Field Visit Report will be prepared and will be circulated no less than one month after the visit to the Program team and Program Board members.

Mid-term of Program cycle: The Program will undergo an independent Mid-Term Review at the mid-point of Program implementation. The Mid-Term Review will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of Program implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about Program design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the Program's term. The organization, terms of reference and timing of the mid-term review will be decided after consultation between the parties to the Program document. The Terms of Reference for this Mid-term review will be prepared by the Ministry of Agriculture, Animal Industry and Fisheries based on guidance from the COMESA Coordinating Unit.

End of Program: An independent Terminal Evaluation will take place three months prior to the final PB meeting and will be undertaken in accordance with COMESA guidance. The terminal evaluation will focus on the delivery of the Program's results as initially planned (and as corrected after the mid-term review, if any such correction took place). The terminal evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by MAAIF based on guidance from the COMESA Coordinating Unit.

Learning and knowledge sharing: Results from the Program will be disseminated within and beyond the Program intervention zone through existing information sharing networks and forums.

The Program will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to Program implementation though lessons learned. The Program will identify, analyse, and share

lessons learned that might be beneficial in the design and implementation of similar future Programs.

There will be a two-way flow of information between this Program and other Programs of a similar focus.

Table 15*: Program Monitoring and Evaluation*

M&E activity	Purpose	Responsible Parties	Time frame
Inception Workshop and Report	Awareness raising, building stakeholder engagement, detailed work planning with key groups	▪ Program Manager ▪ Program Implementation Unit (PIU) ▪ COMESA	Within first two months of Program start up
Inception report	Provides implementation plan for progress monitoring	Project Manager	Immediately following IW
Measurement of Means of Verification of Program results.		▪ Program Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. ▪ PIU, esp. M&E expert	Start, mid and end of Program (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Program Progress on *output and implementation*		▪ Oversight by Program Manager (MEE) ▪ PIU, esp. M&E expert ▪ Implementation teams	Annually
Periodic Project Review by Steering Committee	- Assesses progress, effectiveness of operations and technical outputs; - Recommends adaptation where necessary and confirms forward implementation plan	Project team	Every six months
Periodic status/		▪ Program manager	Quarterly

progress reports		and team	
Mid-term Review	- Progress and effectiveness review for the program, provision of lessons learned - Reviews effectiveness against implementation Plan	▪ Program manager (MEE) ▪ PIU ▪ COMESA ▪ External Consultants (i.e. evaluation team)	At the mid-point of Program implementation.
Terminal Evaluation	- Highlights technical outputs - Identifies lessons learned and likely design approaches for future projects, assesses likelihood of achieving design outcomes	▪ Program manager (MEE) ▪ PIU ▪ COMESA ▪ External Consultants (i.e. evaluation team)	At least three months before the end of Program implementation
Audit	- Reviews use of project funds against budget and assesses probity of expenditure and transactions	▪ COMESA ▪ Program manager (MEE) ▪ PIU	Yearly
Visits to field sites		▪ COMESA ▪ Government representatives	Yearly

7. IMPLEMENTATION PLAN WITH BUDGET (000'$)

RESULT AREA	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	TOTAL
Result Area 1 : Improved Productivity and incomes											
Improved Productivity and Nutrition	1,850	1,850	1,850	1,850	1,850	,850	850	850	850	850	13,500
Irrigation and water management improved	8,450	8,450	8,450	8,450	8,450	1,820	1,820	1,820	1,820	1,820	51,350
Improved food storage and distribution	825	825	825	825	825	450	450	450	450	450	6,375
Increased Growth in Incomes	3,450	3,450	3,450	3,450	3,450	1,820	1,820	1,820	1,820	1,820	26,350
Result Area 2: Building resilience and associated mitigation co-benefits											
Improve soil health and restore degraded lands	1,5450	1,5450	1,5450	1,5450	1,5450	1,1820	1,1820	1,820	1,820	1,820	36,350
Conservation of Natural Resources and Catchments	5,450	5,450	5,450	5,450	5,450	1,820	1,820	1,820	1,820	1,820	36,350
Insurance and Other Safety Nets	1,825	1,825	1,825	1,825	1,825	1,450	1,450	1,450	1,450	1,450	16,375
Early Warning System and Emergency Preparedness	7,625	7,625	5,625	825	825	825	825	825	825	825	26,650
Synergies in adaptation and mitigation of Climate Change enhanced	3,450	3,450	3,450	3,450	3,450	820	820	820	820	820	21,350
Result Area 3: Value Chain Integration											
Development of new products	5,500	5,500	5,500	5,500	5,500	520	520	520	520	520	29,100
Increased competitiveness and enhanced integration into domestic, regional and international markets	725	725	725	725	725	450	450	450	450	450	5,875

Result Area 4: Research for Development and Innovations											
Agricultural research funding and Uptake of Agricultural Technologies and Innovations along the Value Chain	3,225	3,225	3,225	3,225	3,225	1,850	1,850	1,850	1,850	1,850	23,375
Research Extension Linkage strengthened and made functional	1,225	1,225	1,225	1,225	1,225	850	850	850	850	850	10,375
Result Area 5: CSA Knowledge, Extension and Agro-weather Services											
CSA knowledge generation and dissemination	2,110	2,110	2,110	2,110	2,110	850	850	850	850	850	14,700
Enhance extension, climate information services and agro- weather advisories	1,110	1,110	1,110	1,110	1,110	726	726	726	726	726	9,180
Result Area 6: Improved Institutional Coordination											
Improve Inter-Ministerial and Country Government Coordination	200	200	200	200	200	150	150	150	150	150	1,750
Partnerships with private sector and civil society organizations strengthened	300	300	300	250	250	250	250	250	250	250	2,650
Programmatic Coordination with Development Partners strengthened	250	250	250	250	250	200	200	200	200	200	2,250
TOTAL											**333,905**

Table 16: Country CSA Program result-based logframe

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	TARGET AREA/GROUP	PERFORMANCE INDICATORS	INDICATIVE TARGET AND TIMEFRAME
I: VISION/GOAL	**LONG TERM**			
1.1 ***Sustainable agricultural and food systems that contribute to agricultural growth, national food security and improved livelihoods***	(i) Increase in yields (ii) Increase in incomes (iii) Improved food security		***(i)% change in agricultural yields of participating households(by gender)*** ***(ii) % change in agricultural income of participating households (by gender)*** ***(iii)Land area(ha & Km) with improved land and water management practices*** - Need indicator for food security	
II: PROGRAMME AREAS	**RESULT AREAS (Intermediate Results)**			
Result Area 1 : Improved Productivity and incomes				
Component 1: Improved productivity and nutrition	1.1.1Increased yields of staple crops (maize, cassava, beans, rice, sorghum, banana, etc.)- [small holder farmers]	1.1.1 Smallholder farmers and input suppliers • Lake Victoria Basin, Mid Western, South Western Highlands, North and Eastern	1.1.1 Number of technologies adopted by smallholder farmers and % increase in yields of staple crops	1.1.1At least 30 CSA technologies adopted and yields of staple crops increased by 50% by 2025.

	1.1.2Improved production of livestock, poultry, small ruminants and pigs adopted by farmers	1.1.2 Farmers, pastoralist, herders and livestock health service providers • Country - Wide	1.1.2 Improvement in production of livestock, poultry, small ruminants and pigs	1.1.2 At least 25% increase in production of livestock, poultry, small ruminants and pigs by 2020
	1.1.3 Increased productivity of cultured fish (tilapia, clarius and cat fish) and *wild catch fisheries*	1.1.3 Fishermen and farmers • Cultured – river systems with reliable water tables / hydrology • Wild catch - Lakes Victoria, Kyoga, Albert, Kazinga Channel	1.1.3 Increase in productivity of cultured fish and wild catch fisheries	1.1.3 At least increase of 70% productivity for cultured fish and increase of 25% for wild catch fisheries by 2025
	1.1.4 Reduced s*tunting and underweight in children as well as mineral deficiencies in children and women of reproductive age*	1.1.4 Children, women of reproductive age • Country-wide	1.1.4 % reduction in stunting and *underweight*	1.1.4 At least 50%*reduction by 2025.*
Component2: Irrigation and water management	1.2.1*Increase in productivity at irrigation schemes and in integrated farming systems.*	1.2.1 Farmers at large irrigation schemes and small scale irrigation farmers &service providers of irrigation technologies(value chain) • Mubuku, Kiige; Doho; Olweny irrigation schemes • Integrated farming systems – all agro-ecological zones	1.2.1 Increase in productivity at irrigation schemes and in integrated farming systems	*1.2.1 At least 25% increase in productivity at irrigation schemes and 25% in integrated farming systems by 2025*
	1.2.2 Increased number of households practicing micro irrigation	1.2.2 Micro irrigation farmers & micro irrigation service providers • Country – wide	1.2.2 Number of households benefiting from micro irrigation and area /ha under micro irrigation	1.2.2 At least 40,000 households *benefit/practicing micro irrigation and* 20,000 ha

				under micro irrigation schemes by 2025
	1.2.3 Increased production from households practicing *integrated farming systems with sustainable water harvesting and management schemes*	1.2.3 Farmers practicing integrated farming systems with sustainable water harvesting and management schemes • Cattle Corridor; Semi-arid areas	1.2.3 Number of households benefiting and area under integrated farming systems with sustainable water harvesting and management schemes	1.2.3 At least 200,000 households benefit; and 100,000 ha under integrated farming systems by 2025
Component 3: Improved food storage and distribution	1.3.1 Reduced p*ost harvest losses along staple food crops (maize, rice, cassava, beans), livestock and fish value chains*	1.3.1 Farmers, fishermen and value chain service providers - Country – wide	1.3.1 % reduction in *Post harvest losses*	1.3.1 R*eduction from 30% to 10% in post harvest losses by 2025*
	1.3.2 Improved capacity of the *Private sector to store, process and package cereals, cassava and sorghum products*	1.3.2 Private sector value chains for *cereals, cassava and sorghum products* - *Mid- West; Northern and Eastern*	1.3.2 Tons stored, processed and packaged	1.3.2 At least 200,000 Mt of grain stored and 50,000 Mt processed and packaged annually *by 2025*
Component 4: Increased Growth in Incomes	1.4.1 Increase in i*ncome from food and cash crop production by men and women*	1.4.1 Farmers[men, women, the youth] and input suppliers [especially seed suppliers] - Country- wide	1.4.1 % increase in income	1.4.1 Increase by 20% and 30%, in income for men and women respectively by 2025

	1.4.2 Increase in income from livestock production by men and women	1.4.2 Livestock farmers, herders and value chain service provider for livestock products - Cattle Corridor & Other areas	1.4.2 % increase in income from livestock farming/production	1.4.2 Increase by 20% and 25% for men and women respectively by 2025
	1.4.3 Improved incomes from culture fish production by men and women	1.4.3Cultured fish farmers and associated value chains - River basins with reliable water tables	1.4.3 % increase in income from culture fish	1.4.3 At least 20% increase in income for men and women by 2025
	1.4.4. Increased output from Urban and peri-urban agriculture	1.4.4. District councils / LGs; urban and peri-urban farmers/producers - Urban and peri-urban areas - Lake Victoria Crescent	1.4.4 % increase in output	1.4.4 At least 30% increase in output for/from Urban and peri-urban agriculture by 2025
	1.4.5Increased participation by women and youth in CSA initiatives	1.4.5 Women and youth practicing CSA technologies - Country – wide	1.4.5 % increase in the proportion of women and youth practicing CSA	1.4.5 At least 50% and 20% increase in the proportion of women and youth respectively by 2025.
Result Area 2: Building resilience and associated mitigation co-benefits				
Component 1: Improve soil health and restore degraded lands	2.1.1Increased a*doption of climate smart technologies and SLM practices*	2.1.1 Large scale and small scale farmers; degraded areas - Country -wide	2.1.1 Number of households adopting CSA and SLM practices	2.1.1 At least 1 million household by 2025
	2.1.2 CSA and SLM technologies disseminated adopted	2.1. Small scale farmers; LGs; CSOs and Private Sector - Country-wide	2.1.2 Number of farmers adopting SLM and CSA technologies /practices	2.1.2 At least 1 million household by 2025

	2.1.3 Knowledge generated and adequately managed to support CSA and SLM policy and investment decision	2.1.3 MAAIF; NGOs; Research and Academia; CSOs; Private Sector - Country- wide	2.1.3 Number of CSA and SLM knowledge /information products /packages generated and adequately managed to support policy and investment	2.13 At least 20 CSA and SLM information products/packages generated by 2016
Component 2:Conservation of Natural Resources and Catchments	2.2.1 Water catchment areas conserved/rehabilitated and the National REDD+ Strategy implemented	2.2.1 MWE; Community groups; CSOs; NGOs; Research and Academia - Mid West; Albertine Region; Highlands and River Basins/catchments	2.2. Ha of land/catchment areas rehabilitated / conserved	2.2.1 At least 50,000 ha of degraded catchments / areas rehabilitated /conserved by 2025
	2.2.2 Increase in farm forestry productivity	2.2.2 MWE; Farmers; Extension Workers; Tree Nursery operators; Private Sector - Country-wide - highly degraded areas; steep slopes/mountainous areas; integrated farming areas	2.2.2 % increase in farm forestry productivity	2.2.2Farm forestry productivity increased by 20% by 2025
Component 3: Insurance and Other Safety Nets	2.3.1 Increase in weather-indexed insurance for crop and livestock	2.3.1 Crop and livestock farmers; insurance service providers; Research and Academia; MAAIF & MWE; Meteorology Dept. - Country -wide	2.3.1 % increase in Weather-indexed insurance for crop and livestock	2.3.1 Increase by at least 30% by 2025
Component 4: Early Warning System and Emergency Preparedness	2.4.1 Reduced vulnerability due to Comprehensive Early Warning System and Contingency Plan	2.4.1 MAAIF & MWE; Research and Academia; Meteorology; MAAIF; Prime Minister's Office and farmers; LGs; Regional EWS and DRR Centres - Country-wide	2.4.1 An operational EWS and Contingency Plan	2.4.1 At least 1 comprehensive EWS and Contingency Plan by 2017

Component 5: Synergies in adaptation and mitigation of Climate Change enhanced	2.5.1 Adaptation and mitigation practices to reduce GHG emissions intensity from the agriculture sector/ MAAIF GHG Mitigation Plan implemented	2.5.1 Farmers; Research & Academia; MAAIF; MWE-Climate Change Dept.; LGs - Country-wide	2.5.1.1 % reduction in GHG emissions from the agriculture sector	2.5.1.1 reduction by 10% below the 2014 levels by 2025(MAAIF GHG Mitigation Plan, 2015)
			2.5.1.2 Number of adaptation and mitigation practices	2.5.1.2 At least 20 adaptation and 15 mitigation practices adapted by 2025
Result Area 3: Value Chain Integration				
Component 1: Development of new products	*3.1.1* Products developed from each of the staple crops, horticultural crops, livestock and fisheries	3.1.1 Research and Academia; Value Chains / Private Sector partners; Farmer Organizations - Country -wide	3.1.1 Number of commercially viable products developed	3.1.1. At least two new products developed from each of the staple crops, horticultural crops, livestock and fisheries by 2015
	3.1.2 Value chains developed in each agro-ecological zone for selected commodities	3.1.2 LGs, Value chain service providers/ Private Sector; Farmer Organizations - Country-wide	3.1.2 Number of efficient Value chains	3.1.2 At least 2 value chains for selected commodities in each agro-ecological zone by 2025
Component 2:Increased competitiveness and enhanced integration into domestic, regional and international markets	3.2.1 Increase in volume of marketed food and cash crops, livestock and fish products	3.2.1 Farmers; traders; value chain service providers/ Private Sector; LGs; RECs/ Farmer Organizations - Country- wide	3.2.1 % Increase in volume of marketed food and cash crops, livestock and fish products	3.2.1 At least 50% increase in the volume of marketed food and cash crops, livestock and fish products by 2025
	3.2.2 Increase in export of non-traditional commodities by men and women smallholders	3.2.2 Lead private sector organizations; certification and branding service providers; RECs - Country -wide	3.2.2 % increase in export of non-traditional commodities by men and women smallholders	3.2.2 At least 50% increase of non-traditional commodities by men and women smallholders by 2025

	3.2.3 Improvement in the grading and standardization systems of agricultural commodities (crops, livestock and fish)	3.2.3 MAAIF, UBS; Research and Academia; Private Sector; farmers; Farmers Organizations; fishermen and fish traders/ RECs - Country-Wide	3.2.3 Number of grading and standardization *systems of agricultural commodities (crops, livestock and fish)*	3.2.3 At least 10 grading and standardization systems *of agricultural commodities (crops, livestock and fish)in practice by 2025*
Result Area 4: Research for Development and Innovations				
Component 1: Agricultural research funding and Uptake of Agricultural Technologies and Innovations along the Value Chain	4.1.1 Increase in research outputs for development and innovations	4.1.1. GoU, Policy and Decision Makers; Development Partners; MFPED; Research and Academia, Value chain actors; farmers and the Private sector - Country-wide	4.1.1 % increase in funding	4.1.1.At least 50% increase by 2025
	4.1.2 Reduced vulnerability due to climate change impacts / effects [Increase in adoption of *improved CSA technologies and practices by men and women along the value chain]*	4.1.2 MAAIF, Field extension workers, farmers; Farmer Organizations; CSOs; researchers; Private Sector - Country- wide	4.1.2 % increase in adoption of improved CSA by men and women along the value chain	4.1.2 At least 30% increase by 2025
Component 2: Research Extension Linkage strengthened and made functional	4.2.1 Improvement in the Research Extension Linkages	4.2.1 National platforms;Researchers;, LGs; Farmer organizations and Private Sector - Country- wide	4.2.1 Number of Research extension Linkages / platforms established and operational	4.2.1 At least 20 research extension linkages / platforms established by 2016
Result Area 5: CSA Knowledge, Extension and Agro-weather Services				

Component 1: CSA knowledge generation and dissemination	5.1.1 National CSA Knowledge Management System (Platform/Hub)	5.1.1. Research and Academia; MAAIF& MWE; Platform hubs; LGs; Farmers Organizations; CSOs; Youth Organizations - Country- wide	5.1.1 RobustCSA Knowledge Management System (Platform/Hub)	5.1.1 At least 1 national CSA Knowledge Management System (Platform/Hub) operational by 2017
	5.1.2 Documentation and dissemination of information on CSA best practices	5.1.2 Researchers; MAAIF; Extension workers; farmers; Platform hubs; LGs; Farmers Organizations; CSOs; Youth Organizations - Country - wide	5.1.2 Number of synthesis reports and case studies on CSA best approaches and guidelines prepared and disseminated	5.1.2 At least 20 synthesis reports and case studies on CSA best approaches and guidelines prepared and disseminated by 2017
	5.1.3 Production of IEC materials / packages on CSA	5.1.3 Policy makers, Farmers Organizations, Schools, Faith and Cultural Based Organizations; Youth Organizations - Country- wide	5.1.3 Multimedia CSA knowledge products, training and communication packages	5.1.3 At least 5 multi-media CSA products; 5 training modules and 5 communication packages prepared and used/disseminated by 2017
	5.1.4 Improved/strengthened *CSA knowledge networks and partnerships*	5.1.4 Governments, international organizations, research institutions, farmer organizations, private sector, civil society , Faith Based and Cultural organizations/institutions	5.1.4 Number of networks, forums and partnerships	5.1.4 At least 30 networks, forums and partnerships developed and operational by 2017
Component 2: Enhance extension, climate information services and agro- weather advisories	5.2.1 Increase in agro-climate services and use of agro-weather products	5.2.1MWE; Researchers; Agro-Meteorology; Small scale farmers, CSOs; - Country-wide	5.2.1 Number of agro-weather products	5.2.1 Number of agro-weather products increased by 40% by 2025

	5.2.2 Increase in use of ICT by farmers and other actors in the agricultural value chain	*5.2.2 MAAIF; Farmers and other actors in the agricultural value chain;* Youth Organizations - Country-wide	5.2.2 % increase in use of ICT by farmers and other actors in the agricultural value chain	5.2.2 At least by 30% by 2025
Result Area 6: Improved Institutional Coordination				
Component 1: Improve Inter-Ministerial and Country Government Coordination	6.1.1. Strengthened collaboration between ministries responsible for agriculture, livestock, fisheries, environment, forestry, water, energy, lands,local governments, planning and finance	*6.1.1.Lead ministries responsible for agriculture, livestock, fisheries, environment, forestry, water, energy, lands, local governments, planning and finance* *- National*	6.1.1 Joint platform for collaboration between the line/relevant ministries	6.1.1. Functional platform in place by end of 2015
Component 2: Partnerships with private sector and civil society organizations	6.2.1.Strengthened partnerships/engagement between government with private sector and civil society organizations	6.2.1 Private sector and civil society organizations, government - National & Regional	6.2.1. Platform for private sector and CSOs engagement with national and county governments	6.1.2 Operational platform by end of 2015
Component 3: Programmatic Coordination with Development Partners strengthened	6.3.1 Strengthened *Coordination* and collaboration between GoU and the development partners to support funding of the Country CSA Program	6.3.1 GoU and *Development Partners; CSOs* *-National*	6.3.1 Programmatic planning and implementation of CSA Programme	6.3.1 Programmatic planning and implementation of CSA Country Programme operational by end of 2015

Table 17: Results Monitoring Framework[for the first 5 years – up to mid-term review]

		Target Values					Data Collection and Reporting		
PDO & Strategic Action Key Outcome Indicators[5]	**Baseline[6]**	**YR1**	**YR2**	**YR3**	**YR4**	**YR5**	**Frequency and Reports**	**Data Collection Instruments /Methodology**	**Responsibility for Data Collection**
PDO Level Results									
1 Indicator One:									
2 Indicator two:									
KRA 1:									
Intermediate Result 1:									
Intermediate Result 2:									
KRA 2 :									
Intermediate Result 1:									
Intermediate Result 2:									
Intermediate Result 3:									
4									
5									
KRA 3 :									
1.									
KRA 4:									
KRA 5:									

[5] Intermediate Result Indicator for Strategic Actions
[6] Unit of measure should be agreed & if possible additional column inserted

KRA 6:									

Table 18. CSA Technologies Recommended for adoption (Source: U-SLM-SIF[2010] & MAAIF GHG Mitigation Plan[2015])

CSA / SLM best practices/ technologies available in Uganda and other areas in the region for scaling-up

I. Practices to improve SWC

- Community based participatory watershed management
- Construction of SWC structures [contour bunds, channels, live/ grass contour bunds in low lying areas or foot slopes, terraces]
- Conservation agriculture [minimum soil disturbance, cover crops, mulching, judicious crop rotations, basins etc]

II. Practices to restore and maintain soil fertility

- INM
- Adapted leguminous cover crops for improved fallows [biological nitrogen fixation]
- Compost making and application
- Agro-forestry

III. Water for production & domestic use

- Water harvesting structures/ valley tanks and dams; ferro cement tanks
- Small scale irrigation
- Run-off harvesting

IV. Practices to increase forest cover [afforestation; reforestation] or reduce pressure on forests

- Biomass management (Agro-forestry & afforestation; reforestation)
- Energy saving stoves[house hold and institutional]
- Efficient kilns for charcoal production
- Gasification
- Woodlots

V. Alternative livelihoods[to reduce pressure on sensitive/fragile ecosystems]

- Bee keeping
- Bio trade
- Zero grazing, ruminants,
- High value crops e.g. fruits & vegetables, apples for the highlands
- SLM friendly products Gum Arabic, Aloe Vera, shea nut butter, etc

VI. Green House Gas Mitigation Practices (Source: MAAIF GHG Mitigation Plan)

- Promote Use of tubular polyethylene bio-digesters and urea-molasses mineral block as nutrient supplement in animal production to reduce methane emission from enteric fermentation

Upgrading of feed storage and distribution systems

Promote suitable rangeland and pasture management practices (irrigation, manuring, fertilizer application, and grazing management)

Promote use of improved fallows such as *Crotolariagrahamiana, Calliandracalothyrsus, CajanusCajan, Sennasiamea, Sesbaniasesban* and *Tephrosiavogelii,*

- Enact and enforce Ordinances, by-laws and codes of practice on savannah/bush burning
- Restore wetlands
- Promote production of low methane emitting rice cultivars / upland rice
-

[Table to be improved / additional CSA technologies to be added]