



Project Identification Form (PIF) entry – Full Sized Project – GEF - 7

Strengthening the Adaptive Capacity and Resilience of Communities in Uganda's watersheds

Part I: Project Information

GEF ID

10203

Project Type

FSP

Type of Trust Fund

LDCF

Project Title

Strengthening the Adaptive Capacity and Resilience of Communities in Uganda's watersheds

Countries

Uganda,

Agency(ies)

AfDB,

Other Executing Partner(s)	Executing Partner Type
Ministry of Agriculture, Animal Husbandry and Fisheries	Government

GEF Focal Area

Climate Change

Taxonomy

Focal Areas, Biodiversity, Community Based Natural Resource Mngt, Protected Areas and Landscapes, Biomes, Wetlands, Climate Change Adaptation, Climate Change, Private sector, Disaster risk management, Adaptation Tech Transfer, Community-based adaptation, Complementarity, Climate resilience, Climate information, Climate finance, Least Developed Countries, Livelihoods, Mainstreaming adaptation, Ecosystem-based Adaptation, Land Degradation, Sustainable Land Management, Sustainable Livelihoods, Restoration and Rehabilitation of Degraded Lands, Ecosystem Approach, Income Generating Activities, Sustainable Agriculture, Community-Based Natural Resource Management, Food Security, Sustainable Development Goals, Stakeholders, Beneficiaries, Participation, Type of Engagement, Consultation, Communications, Awareness Raising, Civil Society, Community Based Organization, Private Sector, Local Communities, Gender Mainstreaming, Gender Equality, Gender results areas, Capacity Development, Adaptive Management, Commodity Supply Chains, Integrated Programs, Sustainable Food Systems, Food Systems, Land Use and Restoration, Integrated Land and Water Management, Food Security in Sub-Sahara Africa, Sustainable Production Systems, Resilience to climate and shocks, Agroecosystems, Knowledge Exchange, Capacity, Knowledge and Research, Adaptive management, Learning, Knowledge Generation

Rio Markers

Climate Change Mitigation

Climate Change Mitigation 0

Climate Change Adaptation

Climate Change Adaptation 2

Duration

48 In Months

Agency Fee(\$)

831,643

Submission Date

4/5/2019

A. Indicative Focal/Non-Focal Area Elements

Programming Directions	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
CCA-1	LDCF	7,398,000	73,000,000
CCA-2	LDCF	1,551,772	17,000,000
	Total Project Cost (\$)	8,949,772	90,000,000

B. Indicative Project description summary**Project Objective**

To build adaptive capacity of rural communities and reduce their vulnerability to climate change and variability through integrated watershed management, climate-resilient infrastructure and sustainable agriculture.

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
--------------------------	-----------------------	-------------------------	------------------------	-------------------	-----------------------	--------------------------

Component 1 - Climate-resilient infrastructure implemented for enhanced livelihoods	Investment	<p>Outcome 1.1. Climate-resilient watershed management reduces the vulnerability of local communities and physical assets and natural systems</p> <p>Outcome 1.2. Reduced risk of river flooding increases resilience of local communities</p> <p>Outcome 1.3. Increased climate resilience through improved water access</p>	<p>1.1.1. Afforestation/ Reforestation of an estimated 2,500 ha of forest land</p> <p>1.1.2. Community support for agroforestry practices to an estimated 3,000 ha</p> <p>1.1.3. Community support for conservation agriculture for an estimated 3,500 ha in selected degraded areas</p> <p>1.1.4. Alternative livelihood activities (fish farm integrated units, fruit orchard, honey production) promoting sustainable wetland/watershed management and sustainable resource management and restoration developed and promoted</p> <p>1.2.1. 25 km river bank protection/restoration intervention, including small-scale flood reduction infrastructure in selected areas integrated with ecological measures</p> <p>1.3.1. Climate-resilient community water supply systems constructed</p> <p>1.3.2. Climate-resilient community based water harvesting, storage and distribution systems (valley tanks/small earth dams) designed/ built in the four watersheds (300,000 m3), based on projected changes in rainfall patterns and intensity.</p> <p>1.3.3. 20 community rainwater harvesting tanks provided for communal use</p>	LDC F	6,960,800	52,000,000
---	------------	--	---	----------	-----------	------------

Component 2 - Strengthened capacity of communities and institutions for climate resilient planning in four watersheds	Technical Assistance	<p>Outcome 2.1: Strengthened capacity of communities to implement measures for wetland and watershed management for climate resilience</p> <p>Outcome 2.2: Strengthened institutional and planning capacity for wetland management</p>	<p>2.1.1. 4 Community based watershed plans level produced that are gender balanced and climate smart.</p> <p>2.1.2. Community awareness and capacity building for forest reforestation, management, Soil conservation etc</p> <p>2.1.3. Capacity building undertaken for Community driven wetlands management</p> <p>2.1.4. Community awareness and capacity building for riverbank protection</p> <p>2.1.5. Community organization and training in management, O&M of RWSS systems</p> <p>2.2.1. 3 Wetlands Management Units mapped</p> <p>2.2.2. Wetlands Management Plans prepared</p>	LDC F	810,800	27,000,000
---	----------------------	--	--	----------	---------	------------

Component 3 - Climate information integrated into development plans & early warning systems	Technical Assistance	<p>Outcome 3.1. Improved access to climate information and early-warning systems at national, watershed and local levels</p> <p>Outcome 3.2. Efficient and effective use of hydro-meteorological information for making early warnings.</p>	<p>3.1.1. Expansion of weather and climate observing network (installation of 10+ meteorological monitoring stations with telemetry, archiving and data processing facilities)</p> <p>3.1.2. Expansion of hydrological network (installation of 10+ hydrological monitoring stations with telemetry, archiving and data processing facilities).</p> <p>3.1.3. Development of Strategy for scaling-up the climate and weather information systems, and enhancement of station operation and maintenance in the long term.</p> <p>3.2.1. Development and installation of a flood early warning and response system</p> <p>3.2.2. Development, packaging and dissemination of weather and climate information for sensitizing vulnerable communities on weather and climate information use and</p> <p>3.2.3. Strengthening human resources capacity in weather observing, forecasting and information management</p>	LDC F	585,800	3,800,000
---	----------------------	---	--	----------	---------	-----------

Component 4 - M&E and Adaptation Learning	Technical Assistance	<p>Outcome 4.1. Lessons learned and best practices from pilot activities, capacity development initiatives disseminated</p> <p>Outcome 4.2 M&E aptly pursued, and lessons captured and widely disseminated</p>	<p>4.1.1. Knowledge management system in place and operational</p> <p>4.1.2. Development and dissemination of knowledge and learning materials on climate change, rural infrastructure and ecosystem management through existing networks and platforms.</p> <p>4.2.1 M&E system designed and implemented at all levels</p> <p>4.2.2 M&E project reports, briefs and other</p> <p>4.2.3 Compilation of project good practices and lessons learned documented and disseminated to raise awareness on effective adaptive management options for further up-scaling</p>	LDC F	175,716	200,000	
Sub Total (\$)					8,533,116	83,000,000	
Project Management Cost (PMC) ⓘ							
					LDCF	416,656	7,000,000
					Sub Total(\$)	416,656	7,000,000
					Total Project Cost(\$)	8,949,772	90,000,000

C. Indicative sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
GEF Agency	AfDB	Loans	Investment mobilized	79,800,000
Government	Uganda	In-kind	Recurrent expenditures	10,200,000
			Total Project Cost(\$)	90,000,000

Describe how any "Investment Mobilized" was identified

The co-financing presented represents the financing plan for the AdFB baseline project operation "Agricultural Value Chain Development Programme"

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
AfDB	LDCF	Uganda	Climate Change		8,949,772	831,643	9,781,415
Total GEF Resources(\$)					8,949,772	831,643	9,781,415

E. Project Preparation Grant (PPG)

PPG Amount (\$)

200,000

PPG Agency Fee (\$)

18,585

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
AfDB	LDCF	Uganda	Climate Change		200,000	18,585
Total Project Costs(\$)					200,000	18,585

Core Indicators Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

Part II. Project Justification

1a. Project Description

1-1: Adaptation problems, root causes and barriers that need to be addressed;

The PIF is for a project on strengthening adaptive capacity and resilience of communities in four highly vulnerable watersheds of Uganda. It will be co-financed by the AVCP project in Uganda which is funded by the African Development Bank following a request from the Government of Uganda.

The LDCF project will be implemented in Bukedea district, within the Awoja catchment downstream of the sub catchments of Sironko, Simu-sisi, Muyembe and Sipi (see figure 1). The upstream watersheds vary in ecological characteristics, upland use, and environmental issues that influence their overall productivity and ecological integrity. They contain some primary forest areas and wetlands which offer important hydrological services.

The project which is in line with Uganda's National Adaptation Plan of Action (2008), and related policy instruments like the recently submitted Uganda's Intended Nationally Determined Contribution (indc), October 2015, will be implemented by the Ministry of Agriculture, Animal Industry and Fisheries. It will strengthen the capacity for climate change adaptation and resilience in four watersheds under the Agricultural Value Chain Development Programme (AVCP) in Uganda. This will be done through 1) Community Tree Growing /afforestation; 2) Land Degradation Management; 3) Strengthening Hydro Meteorological Services; 4) strengthening Community Water and Sanitation and water for improved agricultural production. Under its long term goals, Uganda's NAPA has the aim of ensuring that all stakeholders address climate change impacts and their causes through appropriate measures, while promoting sustainable development and green growth.

Climate change and variability are already affecting the availability of water in Uganda and this is expected to increase over time. Over the past three decades, increasing temperatures, shifting rainfall patterns and climate hazards – in particular droughts, floods and severe storms (hail, thunder, lightning and violent winds) – have undermined social and economic development in Uganda. The main economic sectors directly affected by water supply and variability are domestic, agriculture and livestock, fisheries, aquaculture, forestry and tourism

Climate hazards have negatively affected the livelihoods of ~150 000 people and resulted in ~74 deaths per year. It is widely accepted that extreme weather events have been increasing and becoming more severe in recent years in Uganda. To give an indication of the order of magnitude of current losses, these are estimated to be about US\$470 million to food crops, cash crops and livestock as a whole, resulting from the 2010-11 drought (Office of the Prime Minister(2012)). This equates to about 16% of the total value of these items in GDP for 2011. The annual damage figure of US\$47million to crops from the 2008 drought (given in NEMA, 2008) is equal to approximately 3 per cent of the value of all cash and food crops

Uganda's economy and local communities are vulnerable to climate change and variability as a result of a number of compounding factors: i) heavy reliance on natural resources, particularly within the agricultural sector; ii) dependence on rain-fed agriculture; iii) close linkages between agriculture performance and climatic changes – with gross domestic product (GDP) and inflation rates closely corresponding to seasonal rainfall patterns; iv) high population growth rates

– ~3.2% per year – that in combination with high poverty levels reduce capacity to cope with climate hazards; v) low per capita income of ~ US\$506; vi) limited financial capacity to fund adaptation measures; vii) weak and inadequate infrastructure; viii) inadequate supply of clean water and sanitation facilities; and ix) inadequate availability of health and medical services .

Floods and droughts have the greatest impacts on local communities as well as socio-economic sectors – particularly the agriculture sector .Increases in droughts, floods, temperatures and severe storms will negatively affect crop growth and many aspects of the value chain including drying, storage and transport to market. Other predicted socio-economic impacts will result in the reduction of: i) national security; ii) the life-span and durability of infrastructure; iii) hydropower production; iv) human health; and v) ecosystem integrity, and thus natural capital. Climate change is expected to disproportionately affect vulnerable groups. These include the poor, people living with disability and HIV/AIDS, youth and children – orphans in particular – the elderly, refugees, and marginalised communities^[1] .

Current and future impacts of climate change therefore make adaptation urgent. Without adaptation, the negative effects of climate change will undermine years of development assistance and asset accumulation in Uganda. Effective adaptation planning –in the context of this project and in particular for an increase in intensity and frequency of droughts, floods and severe storms requires (i) improved climate monitoring and early warning systems, (ii) reduced vulnerability of people, livelihoods, physical assets and watersheds to the adverse effects of climate change, through improved storage and reduced land degradation and (iii) Strengthening institutional capacities for effective climate change Adaptation

Adaptation Problems

- **Increased Climate variability.** Hydrometeorological hazards, including flash floods and landslides are major causes of the human losses and property damages in the project area. Since 2001 there has been an increase in extreme weather patterns in the region resulting in extended dry spells every second or third year (2002, 2004, 2006, and 2009) or floods such as those experienced in 2007. In the last two decades, there were at least 14 major flood events, affecting an average of about 68,000 people (World Bank, 2011). The areas within Awoja that were the most affected by floods include: Sironko, Bulambuli, Kapchorwa, Kween, Kumi, Bukedea, Serere and Soroti. These cyclic extreme weather conditions have affected crop production and pasture for livestock in the region, thereby having a direct negative effect on the livelihoods of the population. Degraded ecosystems are less able to buffer against the effects of flooding. Unstable soils lead to landslides and mudslides. Efforts to increase upstream afforestation in the upper and mid-catchment areas are not at scale to make a sufficient difference in increasing much needed water retention, thus reducing flood impacts in the lower catchment. Drought impacts are exacerbated by the poor condition of water infrastructure. Climate change is expected to further alter hydrology and water demands, threatening the resource base necessary to provide desired water services and pointing to the need for additional adaptation (World Bank, 2011). This, therefore, makes it essential to adopt corrective measures in order to fully benefit from, and sustain the catchment area, soil and water resources.

The project watersheds experience a range of climate change-induced impacts, many of which are increasing the burdens on the public health system. The most significant include the increased prevalence of climate-related water-borne, vector-borne and food-borne diseases, as well as traumatic injuries and deaths from extreme weather events such as floods. Increased intensity of floods and droughts has implications for sustainability of Water sanitation and Hygiene (WASH) services. A large proportion of the rural poor also do not have pit latrines/ toilets. An increased intensity and frequency of floods and droughts may like other natural disasters often lead to several negative consequences, such as: Increased pollution of drinking water resources during floods; Increased outbreaks of water borne diseases from floods; Increased risk of malaria due to increasing temperatures; Increased water shortages in dry rural

areas where populations depend on shallow streams, swamps and springs which dry up during droughts; Increased vulnerability of crops due to both floods and droughts; and Increased vulnerability of food security, as the population increases and crops are susceptible to floods and droughts. Climate change is expected to affect the capacity and operations of existing water and sanitation infrastructure and services.

Increasing water stress and loss of production. Prolonged and severe droughts have led to low water levels in water bodies, underground aquifers and reservoirs, affecting the hydrology, biodiversity and water supply (GOU, 2007). A baseline survey undertaken by Forestry Sector Support Department (MWE) for implementing the Farm Income Enhancement & Forest Conservation Project (FIEFOC) found out that 49% of the respondents indicated that the quantity of water in their area had reduced over the previous 10 years. The Kumi/Bukedea project area was one of the most affected districts, with households moving long distances to access water (2-4 Km).

In Uganda, livestock production is concentrated along 'the cattle corridor' and animal husbandry is a considerable source of income representing 7.5% of the GDP and 17% of the agricultural GDP. It is estimated that losses due to bad weather can sometimes be as much as 30% of the annual agricultural production, which may represent total loss at micro levels (NDP II, 2015). In an already drought afflicted region, additional climatic stresses are expected to be detrimental to food security and development. The rapidly growing population poses a bigger challenge in addressing this problem. Climate change will likely increase food insecurity and malnutrition.

Recent studies financed by the UK Department for International Development (DFID) and the Netherlands Directorate-General for International Cooperation (DGIS), estimate a much greater level of demand and some potential reductions in water supply. Total demand is estimated to increase from 408 million cubic meters a year (MCM/y) in 2010 to 3,963 MCM/y in 2050^[2]. Total unmet demand will then rise from 3.7 MCM/y to 1,651 MCM/y in this period under climate change. In most months water shortages will be enormous. The NDP II, outlines planned interventions to increase the provision of water for production facilities, this includes storage for WfAP including livestock watering; improving storage, Improving national capacity for water resources management (WRM) and implementing identified climate change (CC) adaptation measures.

Underlying causes

Low institutional capacity and high dependency on subsistence agriculture makes the project area vulnerable to climate change and variability. A climate change risk report by the Center for International Governance Innovation (CIGI) has labelled Uganda as one of the most unprepared and vulnerable countries in the world and as such with the least adaptive capacity to the impacts of climate change. According to a recent report by the Environment Alert (2010), climate change adaptation at all levels among various stakeholders in Uganda is very weak, which has been attributed to limited options for livelihood, lack of support to climate change adaptation actions (community and national levels) in policies and program implementation, limited knowledge on climate change adaptation options; and poor planning without consideration of current climate change variability and impacts. Rainfed agriculture contributes nearly one-quarter of GDP and employs about 70% of the population^[3]. Total dependence on rain-fed agriculture, poor soil health and land degradation increase 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

Sparse and deteriorating hydro meteorological systems. Uganda suffers from a shortage of timely and reliable information regarding the different components of vulnerability, resilience and adaptation. *Uganda's* NAPA and Vision 2040 (pg 101) notes that there is still poor understanding of climate change and variability in Uganda and hence inadequate adaptation measures currently in place in the country. The Awoja catchment specifically suffers from i) insufficient

hydro-meteorological observing stations to monitor the state of the climate and hydrology, map risks and detect long-term trends; ii) limited use of climate forecasts and; iii) limited packaging of information to inform risk reduction efforts in different sector and iv) inappropriate communication of early warning system messages and vi) lack of trained personnel. It is necessary to strengthen the capacity of the National Meteorological Authority and the Directorate of Water Resources Management Department to provide efficient, timely and reliable weather and climate information. This project aims in part at strengthening the hydromet systems in the project area through improving capabilities to generate and use climate information in the planning for and management of climate induced hazard risks. It will achieve this by implementing the transfer of appropriate technology, infrastructure and skills.

Degraded forests and insecure flows of forest ecosystem services make communities vulnerable to climate variability and change and lead to increased adaptation costs. Firewood provides 95% of Uganda's energy needs (NAPA 2008). As a result of growing population and demand of forest products, expansion of agricultural areas and increasing prices of electricity, pressure on forest resources has increased tremendously, especially in the four watersheds. In fragile ecosystems, deforesting and/or degrading forests predispose poor communities to climate change disasters (e.g. landslides), exacerbate the severity of some disasters (e.g. floods and windstorm) and trigger a downward spiral of food insecurity and its consequences (NAPA 2008). Most deforestation exercises are associated with the continued demand for agricultural land, fuel-wood, charcoal, construction materials, large-scale and resettlement of people in forested areas. The NDP II specifically outlines interventions to increase afforestation, reforestation and adaptation through sustainable forestry (NDP II, pg 170).

Degradation of natural systems which increases vulnerability to adverse effects of climate change. Although land degradation is caused by poor land use, increasing population growth and increasing climate variability and change have compounded this problem. Land degradation plays a large role in the onset of flood events in the project area and have also contributed to droughts as soils lose their capacity to store water for later release, either to streams/evapotranspiration. There have been high rates of soil erosion and loss of water especially in mountain area, where most water sources are found, due to steep slopes, poor land use and management, landslides and other extreme events. The population pressure has led to land fragmentation and has pushed farming activities into marginal areas that are vulnerable to soil erosion and nutrient loss, and increased encroachment of ecologically fragile areas such as wetlands, riverbanks and protected forests for farming purposes. This increases the communities' vulnerability to climate change. The average annual soil loss over the entire basin is estimated at 3.78 tons/ha. Climate change is expected to increase the vulnerability of communities in the watersheds through higher-intensity rainfall and greater frequency of floods, landslides, and wildfires. Integrated land use management to address the impact of climate change in the NAPA is crucial.

Wetland habitat fragmentation and floodplain reduction resulting in reduced adaptive capacity. The Awoja catchment has both permanent and seasonal wetlands. Within Awoja, wetland areas located in Kumi, Soroti and Katakwi account for more than one third of their total district areas. Wetlands play a particularly important role in this context acting as a sponge for the absorption, storage and gradual release of water. Currently wetlands are under pressure from a range of factors such as habitat change, slash and burn agriculture, overgrazing, fishing malpractices, and pollution from agricultural run-off. Encroachment on wetlands is common during droughts when rain-fed agriculture has failed. This destroys the wetlands thus changing the microclimate. The cultivation of upland rice, already limited by droughts, to replace paddy rice grown in wetlands is likely to be compromised by greater droughts. This will increase the rate of interventions needed in this sector to ensure sustainable wetland use. The NDP II outlines planned interventions for reducing wetland degradation (NDP II pg. 170). This includes the development of wetland management plans for equitable utilisation of wetland resources

Long-term solution and barriers to achieving it:

It is expected that as climate change unfolds the frequency and intensity of climate related shocks will change, therefore adaptation in the four watersheds in the project area is one way to increasing resilience to a changing climate. The Government of Uganda (NDP II) has prioritized policy and implementation efforts related to climate change adaptation efforts in the following key sectoral areas:

- Water resources management and protection to reduce vulnerability to irregular rainfall patterns. Systematic meteorological and hydrological data collection is needed to establish early warning systems for wind storms, floods, drought and other hazards, preventing losses of human lives, delivering reliable information to farmers, and increasing accessibility and reliability of agriculture insurance products.
- Ecosystem and environmental protection from encroachment and habitat destructions, including forests and wetlands that play a key role in limiting various climate-change related threats
- Agricultural production and development which is better adapted to climate change-related risks and does not itself contribute towards climate change
- Health sector response aimed at preventing and/ or responding to increased health-related threats linked to climate change risks.

- There are significant policies, institutional, financial, technological and informational barriers that prevent timely adaptation to climate variability in the project area. These barriers include the following:

Barrier # 1: Limited adaptive capacity (technical and financial) to address future climate events. The National Meteorological services in Uganda do not have adequate capacity to provide accurate and timely user specific weather and climate forecast. There is no systematic forecasting of climate hazards, risks and timely dissemination of warning. This is due to lack of weather stations, time series data and inadequate human resources. Further, maintenance of monitoring equipment, the human capacity to use and repair this equipment, process data and develop early warning packages, all require constant income streams and annual budgets. When climate information is available (monitoring and forecasts), it should be translated into specific hazards experienced by different sectors and users e.g. heat units for agriculture. Without translation into information that can be easily understood by users, the information is unlikely to be used. This information should then be combined with known vulnerabilities to identify areas and communities at risk. This is currently not part of the process for issuing warnings in most cases. Currently the NMA and the DWRM depend on recurrent financing in a Ministry that has to juggle competing priorities, often in circumstances of reduced public expenditure.

Barrier # 2. Poor coordination of climate change adaptation initiatives. Climate change being a cross sector issue calls for adequate and effective coordination of all actions towards addressing it at all levels. The Climate Change Unit (CCU) in the overarching institution at the National level mandated to coordinate climate change adaptation and mitigation actions in all the sectors and actors. At the local government levels, the situation is even worse. For there is hardly any effort to coordinate integration climate change adaptation and mitigation actions in local government development planning process. If they exist they are adhoc actions responding to climate change impacts and disasters which have already happened and destroyed property and lives. This could partly be attributed to limited awareness on climate change issues and also lack of implementation of the national program for climate change adaptation (NAPA) and associated weak linkages between national level institutions working on climate change and local government stakeholders.

Barrier # 3. Weak institutional and coordinating mechanisms in addressing climate adaptation: Some of the Climate adaptation related policies and plans from the various governmental sectors are not aligned or coordinated. For example, the National Agriculture Policy acknowledges the effects of climate change on agriculture and highlights the significance of joint planning between the Ministry of Agriculture and Ministry of Water and Environment. However, there has not as of yet been a proposal on how specific activities can be coordinated to jointly address climate change effects on agriculture. The Ministry of

Water and Environment is also limited in its ability to mainstream climate change across different sectors. Its mandate is limited to monitoring how climate change is mainstreamed across respective sectors and coordinate national climate-related initiatives; a mandate that it is ill equipped to handle due to little technical expertise and low staffing capacity.

Barrier # 4: Inadequate understanding of climate change and its impacts, thus creating a barrier to resource allocation. Various stakeholders (such as natural resource users, political leaders at all levels and technical leaders at all levels among others) are at different levels in terms of understanding climate change issues e.g. climate change impacts, appropriate response actions to adapt to the impacts among other aspects. Yet at what ever level, they make decisions and undertake actions which may aggravate, address, prevent or maintain the impacts of climate change. It's therefore important to advance awareness on climate change. through innovative means targeting all categories of stakeholders so that they can make decisions and take actions from an informed point of view for adaption to climate change impacts. For instance due lack of access to weather information, farming communities in the project area still plan their farming systems and management in the context of two rainy seasons per year yet they are currently receiving one long rainy season throughout the year.

Barrier # 5. Climate change sensitivity, vulnerability and gender inequality. Climate change impacts affect various gender categories differently. At household level in most Ugandan societies, women are charged with fetching water, cooking food, house keeping, caring for the children, the old and the sick among other household chores. Hence, women in Uganda provide 70-80% of the agricultural household labor (Nabuumba, 2008). Impacts of climate change manifesting as drying of rivers, springs and bore holes means that they have to move longer distances to look for water. Hence they are most affected by the impacts of climate change. Therefore, climate change adaptation actions should target both men and women as part of the solutions to leave with it.

The proposed LDCF project will address these barriers that prevents the Government of Uganda to reduce the vulnerability of the Awoja catchment (the four watersheds in particular) to climate change impacts in an urgent, effective and sustainable manner. These barriers will be addressed within the context of a broader coherent programmatic approach, following priorities in the NAPA (2008).

1-2: The baseline scenario and any associated baseline projects;

The baseline intervention is the Agricultural Value Chain Development (AVCP) Program (2017-2022), to be financed by the African Development bank group. The overall goal of the Project is to contribute to poverty reduction and economic growth in Uganda through enhanced productivity and commercialization of agriculture. The project objective is to improve household incomes, food security, and climate resilience through commercial agricultural practices, sustainable natural resources management and agricultural enterprise development. The baseline project comprises the following Project components:

<p>Component 1: Production and Productivity Enhancement</p>	<ul style="list-style-type: none"> · Expression of Interest (EOI) for ICT companies interested in developing and operating an ICT platform that integrates farmers, village buyer agents, off-takers, seed and fertilizer suppliers, extension services and other service providers on a single efficient platform. · Supporting genetic improvement in Dairy and Beef cows through a robust multiplication program of using Artificial Insemination · The project will also support the purchase of Liquid Nitrogen containers to help preserve Siemen
--	--

- Strengthening Ag Verify and the Uganda Seed Traders Association to increase the quantity of certified seeds required to reach millions of farmers
- Support to research to increase production of breeder and foundation seeds in consultation with farmers
- Support the formation of Local Seed Businesses among the farmer groups that will partner with research institutes to increase the availability of quality controlled seed
- Build the capacity of farmers and farmer groups in sustainable enterprise development
- Support farmers and farmer groups to prepare seasonal action plans and Group Action plans
- Link AVCP to the Technology for African Agricultural Transformation (TAAT) for the acquisition of improved technologies
- Effective regulation of the quality of seeds and other inputs
- Strengthen the National Seed Service, technical capacity development and provision of essential equipment
- Strengthen the National Fertilizer Board and Bureau of Standards (UNBS) with the necessary support facilities,
- Synchronization of the National policy on seed and fertilizer with that of Regional Economic Communities (RECs)
- Development of leadership skills and capacity building of farmer organization
- Support the ongoing consolidation of a database for Ugandan farmers
- Deepening of efficient input distribution system based upon the ICT platform
- Increase women's participation: design strategy to integrate gender in all the activities under this component

Component 2: Infrastructure Development

- Irrigation Infrastructure Development: of Sironko gravity fed irrigation scheme with a gross command area of 1608ha. The works will include construction of head works, main canal, secondary and tertiary canals, drainage system, dykes, and on farm roads.
- Access Road: construction of a bridge over Sironko River at the intake site to connect Bukedea and Bulambuli Districts. In addition, 10 Km access road will be provided to link the irrigation schemes with the nearest existing road network on both sides of the Districts;
- Support Infrastructure: support infrastructures required within the project site for the operation of the scheme such as warehouse (500m²), grain storage (1000m²), offices buildings (800m²), workshop (400m²), rice drying yard (1320m²), essential O&M equipment will be provided
- Consultancy services: The project will engage a consulting firm; (i) to review and update the designs, and supervise the construction of the irrigation infrastructure

	<p>during implementation</p> <ul style="list-style-type: none"> · Establishment of Water Users Association: formation of water Users' Association (WUAs) with 40% women and youth representation. · Capacity Building: provision of capacity development for farmers, extension agents, and relevant government officials. · Watershed management: (i) Institutional strengthening through mobilization of local structures; (ii) Sustainable development and management of forest and tree resources in Mbale, Bududa, Bukedia, Bulambuli; and (iii) Integrated soil and water conservation technologies and measures.
<p>Component 3: Market Development and Trade Facilitation</p>	<ul style="list-style-type: none"> · Provide postharvest facilities and services and agri infrastructure to farmers · Build the capacity of farmers and farmer groups on post-harvest handling, storage and bulking of their produce · Network and link farmers to agro-processors and large traders, markets for farmers using innovative and enduring ICT platforms, that includes digital payment (see ICT platform in Component 1a) · Develop a database of processors, large off-takers of maize, rice, and dairy, their village agents and associated farmers for integration onto the ICT platform · Build capacity of the network of community based village buyer agents to provide additional services such as SPS standards, inputs, mechanization, crop insurance, market information requirements to farmers using existing country extension services · Develop a robust market information system to inform vendors and farmers on commodity prices · Link medium to large scale processors and traders to financial institutions and AfDB private sector financing windows · Trade Facilitation and Quality Infrastructure: Build capacity of stakeholders to comply and conform to quality related issues with its exportable commodities · Strengthen the Sanitary, Phytosanitary (SPS) and Quality Infrastructure to meet the export requirements · Support Uganda National Bureau of Standards (UNBS) in ensuring standardization of quality across commodities · Establishment of an appropriate food safety laboratory for conformity assessment
<p>Component 4: Program Coordination and Management</p>	<ul style="list-style-type: none"> · Coordinate activities of MAAIF and other Agencies through an appropriate Steering Committee. · Coordinate Monitoring, Evaluation and Reporting activities. · Coordinate Financial Management processes and also ensure preparations for External Audits. · Facilitate Procurement processes

· Facilitate assessment processes.

· Mainstream Gender and also facilitate HIV/AIDS Awareness raising.

The table below summarises other relevant baseline projects the proposed project will build on:

Project Title	Agencies	Objectives
Building Resilient Communities, Wetland Ecosystems and Associated Catchments	UNDP/GCF	This grant-based project will assist the Government of Uganda take climate change effects into account in managing wetlands. Climate effects include increased climate variability and extreme weather events, such as droughts, floods, high temperatures and violent storms.
Strengthening Climate Information and Early Warning Systems in Uganda to support climate resilient development	UNDP/GEF (GEF ID:4993)	Responds to priorities and actions identified in the NAPA of Uganda which articulate the need for securing, transferring and installing critical technologies, as well as developing the necessary systems for climate change-related information to permeate into decision-making processes.
Building resilience to climate change in the water and sanitation	AfDB/GEF (GEF ID:5204)	The project addresses the NAPA priorities of improved community water supply and water for production in different districts in the North eastern and Northern Uganda (Bududa, Lerima, Bukwo and Manafwa-Tororo, Otuke / Apac / Katakwi / Bududa (Nabweya).
CHAI Climate Change Adaptation and ICT	IDRC, Canada	The Climate Change Adaptation and ICT (CHAI) project uses mobile and wireless technology to strengthen the capacity of individuals, communities and institutions in the cattle corridor to adapt to the impacts of climate change.
Uganda Reducing Vulnerability of Banana Producing Communities to Climate Change	UNIDO/GEF (GEF ID:5603)	To support vulnerable communities in Western Uganda to better adapt to the effects of climate change (CC) by providing greater opportunities for income generation, poverty reduction and food security, through banana value addition activities
Enhancing the resilience of ecosystems and livelihoods through sustainable forest and land use management in Northern Uganda	IUCN/GCF	The objective of this Project is to enhance the adaptive capacities of both ecosystems and livelihoods through sustainable forest and land use management. This will in turn contribute to reduced CO ₂ emissions and increased productivity leading to the improved resilience of the livelihoods of local populations.
Enhancing resilience of communities to climate change through catchment	Adaptation Fund/ Sahara and Sahel O	The overall goal of the project is to increase the resilience of communities to the risk of floods and landslides in Awoja, Maziba and Aswa catchments through promoting catchment based int

ent-based integrated management of water and related resources in Uganda
 observatory
 egrated, equitable and sustainable management of water and related resources.

Proposed alternative Scenario (LDCF project)

In alignment with Priority Activities identified by the Uganda NAPA (2008) the proposed LDCF project will increase the resilience of the baseline projects and the livelihoods of local communities to climate change-induced hazards and long-term climatic change. Measures proposed under this project include:

- (i) Afforestation/reforestation and agroforestry aimed at increasing tree cover in vulnerable and resource-constrained communities in the upper watersheds (NAPA Project Priority 1 Community Tree Growing). As population grows, forests and trees stand at the intersection of many decisive challenges: sustaining agriculture; reducing the impact of droughts, floods, and storms; regulating water and climate; maintenance of dry season water flows, storing carbon; protecting infrastructure; providing timber, paper, and energy; and housing critical biodiversity.
- (ii) Integrated watershed management (soil and water conservation, river bank protection, conservation agriculture etc (NAPA project priority 2; Land Degradation Management)
- (iii) Enhancing the capacity of hydrometeorological networks for predicting climatic events and associated risks; developing a more effective and targeted delivery of climate information including early warnings; and supporting timely preparedness and response to forecast climate-related risks and vulnerabilities (NAPA project priority 3; Strengthening Meteorological Services).
- (iv) Community Water and Sanitation to increase access to safe water supply and improved sanitation among vulnerable communities in disaster prone areas and to strengthen community awareness on health impacts due to climate change (NAPA project priority 4) and
- (v) Improved storage for improved crop and livestock production among vulnerable communities (NAPA project priority 5; Water for Production)

Component 1: Climate-resilient infrastructure implemented for enhanced livelihood

Outcome 1.1. Climate-resilient watershed management practices reduce the vulnerability of local communities and physical assets and natural systems

- 1.1.1. Afforestation and Reforestation of an estimated 2,500 ha of forest land (assistance to farmer groups to apply forestry practices within their land and financing campaigns to plant forest trees in communal and private woodlots, schools and along roadsides)
- 1.1.2. Community support for agroforestry practices to an estimated 3000 ha (rehabilitation and erosion control at degraded sites).The activity will also support access to marketing of products
- 1.1.3. Community support for conservation agriculture for an estimated 3500 ha in selected degraded areas (actions include: contour ridging, restoration of traditional terrace systems use of vetiver grass to reinforce marker ridges)
- 1.1.4. Alternative livelihoods (fish farm integrated units, Fruit orchard, honey production) promoting sustainable wetland/watershed management, sustainable resource management and restoration implemented by the local communities, with a special focus on women and unemployed youth

Outcome 1.2: Reduced risk of river flooding results in increased resilience of local communities

- 1.2.1. River Bank protection/stabilization. An estimated 25 km, of river bank protection/restoration intervention is envisaged, including small-scale flood reduction infrastructure in selected areas (such as water diversion structures, gabions, culverts) integrated with ecological measures (such as protective vegetation, hillside terraces planted with perennial trees and shrubs, stone bunds) improve water drainage and reduce damage. This climate-resilient riverbank

protection measures will aim to reduce risk of flooding associated with increased water flows during flood events safeguarding adjacent communities and physical infrastructure.

Outcome 1. 3. Increased climate resilience through improved water access

1.3.1. Construction, of climate-resilient community water supply systems in rural areas focusing on unserved areas. It will include interventions to increase access to safe water supply to an estimated 25,000 people in rural areas in the four watersheds.

1.3.2. Climate-resilient community based water harvesting, storage and distribution systems (valley tanks/small earth dams) designed and built in the four watersheds (to a capacity of 300,000 m³), based on projected changes in rainfall patterns and intensity. The storage will provide water supply for an estimated 28,000 livestock, for a dry spell of 6 months in the watersheds. (Inv.)

1.3.3. 20 community rainwater harvesting tanks provided for communal use, and appropriate training will be required in the maintenance and use of the technology

Component 2: Strengthened capacity of communities and institutions for climate resilient planning in four watersheds

Outcome 2.1: Strengthened capacity of communities to implement measures for wetland and watershed management for increased climate resilience

2.1.1. Four Community Action Plans (CAP) at the watershed level produced that are gender balanced and climate change smart, with focus on innovative and sustainable land and water management measures.

2.1.2. Community awareness and capacity building for reforestation and forest management, Soil conservation etc (target is institutional and community capacities and information on: improved forest rehabilitation and management practices, forest governance, creation of Soil Conservation Committees, production/dissemination of technical and communication support).

2.1.3. Capacity Building undertaken for Community driven wetlands

2.1.4. Community awareness and capacity building for riverbank protection (promotion of existing laws and regulations (buffer zones 30 m in Uganda) and conducting training sessions, workshops and visits, and production and dissemination of technical and communication support)

2.1.5. Community organization and training in management, administration, O&M of RWSS systems.

Outcome 2.2: Strengthened institutional and planning capacity for wetland management

2.2.1. Mapping of three Wetlands Management Units

2.2.2. Wetlands Management Plans prepared

Component 3: Climate information integrated into development plans and early warning systems

This component is aimed at Improving and further strengthening the hydro-meteorological monitoring system to obtain timely and reliable data for the assessment and management of main risks of weather and water-related disasters., consistent with the strengthening Meteorological Services project (NAPA 2008). The hydrological (flow) stations to be installed are estimated at 10 in number, while the proposed meteorological stations are estimated 16. The high number of climate and weather stations is a result of high rainfall variability in the area. In addition, there are considerable orographic effects from surrounding Mount Elgon which is the source of the rivers draining the watershed and a need to monitor the direct precipitation and evaporation along the downstream Kyoga shorelines. Despite past projects having helped improve the coordination and exchange of hydro meteorological information, more accurate climate

risk mapping and spatial data requires the need for a denser network. Results would include: (i) Hydromet services issue timely and actionable weather, climate and hydrological information at local levels; (ii) Hydromet services help reduce the impact of disaster and climate risks on lives and livelihoods and improve the resilience of investments in the project watersheds. Indicative activities will include:

Outcome 3.1. Improved access to climate information and early-warning systems at national, watershed and local levels

3.1.1 Expansion of weather and climate observing network (installation of 10+ meteorological monitoring stations with telemetry, archiving and data processing facilities). A typical meteorological station will comprise an Automatic Weather Station, automatic rain gauge, glass measure and hook gauge to measure evaporation).

3.1.2 Expansion of hydrological network (installation of 10+ hydrological monitoring stations with telemetry, archiving and data processing facilities). A typical meteorological station will comprise station (Current meters and suspension equipment, Water Level Loggers, Staff gauges, leveling instrument and field computer).

3.1.3 Development of strategy for scaling up the climate and weather information systems, and enhancement of hydrometereological station O & M in the long term.

Outcome 3.2: Efficient and effective use of hydro-meteorological and environmental information for making early warnings

These outputs are aimed at improving climate resilience, through implementation of a Flood Early Warning and response System (FEWS), consistent with the strengthening Meteorological Services project (NAPA 2008). Early flood warning systems could serve to save lives, minimise flood damage to properties and reduce economic and social losses. The outputs will be: Functional and effective early warning system and Increased use of weather and climate information by communities (on daily to seasonal, as well as medium- to long-term timescales); Quantitative Precipitation Forecasts; Exchange of meteorological information that reduces the vulnerability of selected communities at risk through improved community disaster preparedness, increased flood warning times, and improved planning based on flood mapping and zoning. The main outputs will be:

3.2.1 Development and installation of a flood early warning and response system (the EWS will be linked to the existing Awoja catchment mike hydro model and use real time hydromet data, as well as community based information and communication systems). A Central System will be specified, procured and installed. The system will use Numerical Weather Prediction and all available data to provide cutting edge products for public weather services, for the flood early warning systems, as well as for climatology and other climate services. The system specifications will be elaborated at full proposal development stage.

3.2.2 Development, packaging and dissemination of weather and climate information for sensitizing vulnerable communities on weather and climate information use

3.2.3 Strengthen human capacity in weather observing, forecasting and information management (gauge readers and gauging assistants, hydrological assistants; meteorological observers, volunteers and technicians/engineers; professional officers (hydrologist, meteorologist, instrumentation specialists, etc.)

Component 4: M&E and Adaptation Learning

This component involves the formulation and implementation of a participatory M&E system to monitor effects of the project on the baseline investments and livelihoods; lessons drawn and disseminated through the local and national platforms (as well as used to support adaptive management). The project will be accompanied by an effective and resourced M&E framework, that will enable an on-going adaptive management of the project, ensuring that lessons are learnt, management decisions are taken based on relevant and up-to-date information, and regular progress reports are available for concerned parties.

Outcome 4.1. Lessons learned and best practices from pilot activities, capacity development initiatives and policy changes are disseminated.

4.1.1. Knowledge based M & E system in place and operational.

4.1.2 Knowledge and learning materials on climate change, rural infrastructure and ecosystem management developed and disseminated through existing networks and platforms.

Outcome 4.2 M&E aptly pursued, and lessons captured and widely disseminated. The main outputs will be:

4.2.1 M&E system designed and implemented at all levels

4.2.2 M&E project reports, briefs and other

4.2.3 Compilation of project good practices and lessons learned documented and disseminated to raise awareness on effective adaptive management options for further up-scaling

1-4: alignment with GEF focal area and/or Impact Program strategies

The project fits well with the GEF Result-Based Management Framework for Adaptation to Climate Change. In particular, the project outcomes are consistent with several intended outcomes of the LDCF Adaptation Strategy, namely developing and implementing adaptation practices to respond to climate change-induced stresses in vulnerable ecosystems; reduced absolute losses due to climate change and variability; and enhanced climate resilience of relevant development sectors and natural resources. Within the Focal Area Strategy Framework, aspects of this project address all three objectives as follows:

- CCA-1: Reducing the vulnerability of people, livelihoods, physical assets and natural systems to the adverse effects of climate change. This will be mainly through: Climate Resilient Participatory Afforestation and Reforestation ; rehabilitation of watersheds in project sites through soil and water conservation/agro forestry/conservation agriculture; Construction of Small Infrastructure for flood protection, drainage and runoff management; Improved Community based water supply and sanitation systems; effective and cost effective Community based Climate Change Adaptation measures implemented in select wetlands and improved Water Storage for agricultural production. will strengthen vulnerable natural resources in response to climate change in flood-prone areas. An effective capacity to monitor and forecast hydro-meteorological (hydromet) conditions and transfer improved knowledge into decision making and planning will also be critical to increasing Uganda's adaptive capacity in the four watersheds.
- CCA-2: Mainstream Climate Change Adaptation and Resilience for Systemic Impact. This will be mainly through development and dissemination of knowledge and learning materials on climate change, rural infrastructure and ecosystem management through existing networks and platforms.

1-5: incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing;

The project is designed to accommodate the additional adaptation costs of priority actions identified in the NAPAs and build on the AfDB financed baseline Uganda Agriculture Value Chain Project and several other projects and programmes. The co-funding for this project is also within the stated guidelines, with \$90m in prospective co-funding. The relevance of the co-financing to the proposed LDCF project is outlined below and will be further elaborated on during the project preparation phase.

The baseline project's main aim is to contribute to poverty reduction and economic growth in Uganda through increased productivity and marketing of agricultural produce. The specific objective is to build functional input and output markets, improve the agribusiness environment, especially via strengthening regulatory bodies, innovative financing mechanisms, and to encourage inclusivity, especially of youth and women. The ACVP is the baseline project to the planned GEF-LDCF supported project. The project will allow the communities in the four watersheds to improve their resilience to climate change and ability to respond to drought and floods conditions while supporting the construction of more resilient infrastructure and more sustainable natural resource management practices, particularly catchment management.

To ensure sustainability of the baseline project, there is a need to take into account the negative impacts of climate change on the water resources, infrastructure, and its subsequent contribution to water security issues. Additional funds are required to cover the costs of building the resilience of these infrastructures within the context of a changing climate. At the community level the focus will be on implementation of integrated climate change adaptation actions that (i) improve forestry cover through forestry and agroforestry (ii) improve water supply and sanitation in the target areas, and subsequently improve rural livelihoods (iii) improve water for improved agricultural production (iv) improving the resilience of the communities in the watersheds against floods and droughts through improved weather information systems, and early warning systems. This will provide consistency, integration, and synergy with the work done at the local level.

1-6: global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF);

The LDCF project will introduce weather stations and forecasting facilities. This will complement existing meteorological and hydrological support programmes being funded by the World Bank (under the Uganda Water Management and Development Project), the GIZ and the LDCF Funded UNDP Project. This project will build on the results of the previous projects through the installation of Climate Weather Stations and Hydrological stations to fill current gaps and needs, thus further strengthening and benefitting the National Meteorological Authority (NMA), the Directorate of Water Resources Management and the Climate Change Unit in the MWE (through training and technological advancement). For example, increased risk awareness and forecasting accuracy will increase agriculture productivity, through efficiency gains; for example, in knowing better when the optimal planting and harvesting period is. The information delivered to the farmers would also be typically useful for crop selection. Improved extreme weather forecast capacity and alert through Early Warning Systems (EWS) can consistently reduce flood impacts. Global experience indicates a conservative overall range of 5-8% potential reduction of impacts (WMO, 2016).

One important benefit will be the improved coordination between government departments and the sharing of information (through the MWE Water Resources Information System), which can lead to improved products and services that enhance adaptation.

At the local level early warnings and climate hazard mapping, disseminated correctly and acted on appropriately, will provide economic benefits through reducing losses of agricultural produce, infrastructure (roads and bridges) and disruption to peoples livelihoods. This has further knock-on effects on people's health and wellbeing and thus affects communities and social structures. Communities will immediately benefit through warnings related to agriculture, water and flood management, wildfires etc. Many of the beneficiaries will be women, especially within the agriculture sector where they often make up the majority of smallholder farmers, yet are most vulnerable to food insecurity. There may also be other benefits to developing the communication systems associated with early warnings - for instance radios can also be used for arranging medical evacuations.

Watershed management measures like river bank protection will contribute towards: decrease of erosion and loss of arable lands; decrease of flooding events; decreasing of sediments load in rivers and silting of river beds, and river storage and adaptation to forecast increase of extreme events and flooding. Adaptation benefits will include: stream bank stabilization and decreasing siltation in the water streams and water storage, water tower conservation, recreation and ecotourism development, spiritual and aesthetic values of plantation of native species. Agroforestry and tree crops will increase resilience of local communities by providing a diversity of fruits, nuts, medicines, fuel, timber, nitrogen-fixation services, fodder, and habitat. These economically useful trees will reduce soil erosion and maintain higher levels of biomass than annually tilled crops (through extended growth periods and root systems), also storing carbon

The afforestation sub project will play an important role in adapting the communities in the watersheds to climate change. Tree planting/afforestation, conservation agriculture and wetland management) has potential to contribute to broader adaptation to climate change. Conservation agriculture is a strong argument towards reducing the vulnerability through improvement of soil moisture during longer periods. Increased crop diversity is also a resource against climate change.

1-7: innovation, sustainability and potential for scaling up;

The project design aims at establishing a replicable model for mainstreaming climate adaptation into agricultural value chain development, that is readily amenable to scale-up at the national level through the AVCP. The project will develop innovative and integrated approaches at the watershed level. The novel aspect of this proposal is the integration between land use in the upland watersheds and in the lowlands. Dissemination and replication of good practices and successful approaches would be essential in facilitating adoption of climate smart agricultural practices Uganda. On the ground results of agroforestry techniques combined with the improved training and extension services will help farmers in planning with longer-term perspectives. This will reduce pressure on the natural resources and provide a window to actively engage in the preservation of the currently threatened natural habitats.

Sustainability is a challenge to hydromet services in the region and presents risks to both the planned LDCF investments. In the past, the GOU benefited from donor support that has not led to sustainable achievements due to a lack of investment in operation and maintenance. To mitigate these risks, attention will be given to: (i) the optimal use of hydromet equipment that can be easily maintained; (ii) a long-term plan for consolidating institutional, human and ICT capacity for forecasting and (iii) developing other solutions to ensure financial sustainability in the hydromet sector. The project will also strive for institutional sustainability by embracing the government's strategy of decentralization and contribute to capacity strengthening of local institutions. Uganda is committed to adoption of policies and practices that have adaptation co-benefits including pursuing a low carbon development pathway (NDP II, Pg 97).

[1]The Republic of Uganda.2012.Uganda National Climate Change Policy. Ministry of Water and Environment: 1-58.

[2]Ministry of Water and Environment, Uganda National Climate Change Costed Implementation Strategy, 2012

[3]Uganda climate smart agriculture programme; jointly implemented by ministry of agriculture, animal industry and fisheries and ministry of water and environment, 2015-2-25

[4]This system should be able to: Ingest raw weather data provided by other information systems, generate customized meteorological outputs such as weather alerts or business-oriented weather products and disseminate customized meteorological products in a timely manner, in the most adapted format and through the most suited channel according to the end-user targeted

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

The LDCF project will be implemented in Bukedea district, within the Awoja catchment downstream of the sub catchments of Sironko, Simu-sisi, Muyembe and Sipi (see figure 1). The upstream watersheds vary in ecological characteristics, upland use, and environmental issues that influence their overall productivity and ecological integrity. They contain some primary forest areas and wetlands which offer important hydrological services.

Geographical Coordinates: 1.3557° N, 34.1087° E

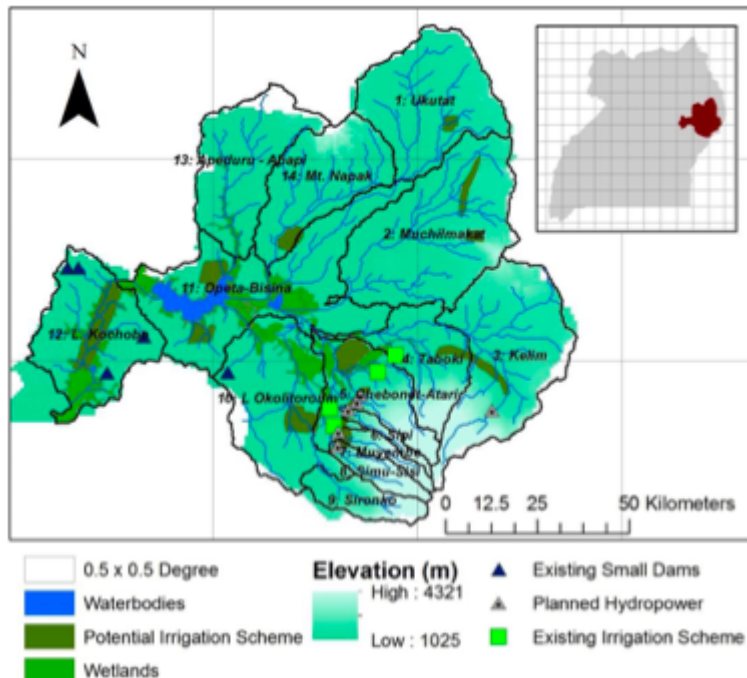


Figure 1: Sub-catchments within the Awoja Catchment (sub catchments draining into the project area include the Sironko, the Simu-sisi, Muyembe and Sipi and Muyembe), Source MWE, 2012

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Indigenous Peoples and Local Communities Yes

Civil Society Organizations Yes

Private Sector Entities Yes

If none of the above, please explain why:

In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement.

Civil society (women and farmers' associations) and the private sector will all be important stakeholders (as end users) and will be provided with the opportunity to contribute to the design of the project. The primary beneficiaries of the project will be the rural communities and local stakeholders of the watersheds. The approach taken by the project seeks for their direct involvement and to empower and develop their capacity to actively participate in the development process. Stakeholder involvement activities will be designed so as to contribute to the environmental, financial, and social sustainability of projects. The project preparation will be a participatory and inclusive process involving consultation with key stakeholders in the agricultural, water and environment sectors including the private sector, government officials, development partners and civil society representatives.

At the commencement of the PPG implementation phase, an inception workshop will be convened for all major stakeholders. During this workshop, a project steering committee will be formed to oversee. The table below shows the main interveners and their expected roles in project preparation. A project preparation and implementation. A stakeholder participation and coordination plan, will be developed as part of project preparation.

Main interveners	Expected roles in Project preparation
Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)	The MAAIF will be the executing agency of the project and responsible with the coordination of the project preparation.

	<p>aration process. Facilitate involvement of various stakeholders participation in confirmation of project activities and institutional arrangements; Facilitate organization of the validation meeting for the project document at national level and provision of technical input in the Project Document</p>
<p>Climate Change Unit, Department of Meteorology, Ministry of Water and Environment</p>	<p>The Climate Change Unit (CCU) was established in 2009 with the main objectives of: (i) Development of policy and legislation on climate change</p>

(including the proposed National Climate Change Policy) (ii) Strategy development and action planning, including mobilization for NAPA implementation (iii) National coordination of climate change activities (iv) Knowledge management and awareness raising (v) Development of sectoral guidance and (vi) Secretary to Climate Change Policy/Steering Committee (quarterly and ad hoc meetings). The CCU will also participate in m

	<p>meetings for the confirmation of project key actions; institutional arrangements and contribute technically during project preparation.</p>
<p>Directorate of Water Development (i) Rural Water, (ii) Water for Agricultural Production, MWE</p>	<p>Those operational directorates lead in terms of consideration of and adaptation response as expressed in the national strategy for adaptation to climate change from a water resources and the Joint Water and Sanitation Sector Programme, that seeks to improve the management of water resources</p>

	and delivery of water services that should contribute to a reduction in Uganda's vulnerability to climate change. This directorate would take the lead in implementing all three components
National Forestry Authority	The NFA was set up in 1998 as a devolved unit with responsibility for the sustainable management of Uganda's forests. NFA will be a key partner in planning and procuring the seedlings for catchment management
National Environment	The NEMA

Environmental Management Authority	is the environmental policy and regulation body responsible for shaping environmental policy, administration of Strategic and Environmental Impact Assessment and compliance and enforcement with environmental laws. NEMA will be a key partner in the implementation of several activities, including the community tree planting for catchment management
Community organisations, NGOs, Civil Society	Participation in stakeholder consultations Contribute in the design

	ning of Project document
Ministry of Local government (Bukedea and Sironko DLGs)	Identification of project activities and institutional arrangements Facilitate the participation of local communities, specifically women
Research institutes (National Agriculture Research Organisation, (NARO), extension services etc	Identification of best practices in Land and water management Contribute in the elaboration of project documents
Technical partners, programs and projects	Create a synergy among their ongoing programs and contribute to the project Contribute in the preparation of project documents

	Comments
Private sector and farmer groups	Contribution towards definition of requirements for training, demonstration and extension to other farmers

3. Gender Equality and Women's Empowerment

Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).

Women and children in the project area are more vulnerable to the effects of lack of food or water, and to succumb in greater proportion to natural hazards like floods, droughts and landslides, that require quick escape measures. Reducing inequalities based on gender and empowering women to participate more fully in social-economic growth is thus key to reducing poverty and achieving development goals within the project. Including women's perspectives on the adaptation needs during the planning and implementation will be a more prominent feature of Uganda AVCP.

In line with the GEF gender equality action plan, the National Gender Policy of 1999 and the Bank Group's Strategy 2013–2022, the project will ensure that the gender perspectives are reflected in the climate change risk management solutions. This will be through (i) undertaking a gender analysis in assessments of vulnerability; (ii) undertaking -sensitive budgeting, so that interventions like livelihood options etc include specific budgeted activities to address women's adaptation needs; and (iii) the inclusion of women's perspectives at project development and implementation.

A gender action plan will be prepared. Gender indicators will be included in the M&E system. Although collecting outputs such as the number of women beneficiaries or the number of women trained is important, the project will consider outcomes that enable opportunities for women's empowerment. Examples of interventions will include: targets for women's participation and/or access to project/program benefits (e.g., training programs, formation of beneficiary groups such as water user group etc); and/or for women representatives in project committees or local associations; and/or for the number or % of female staff, etc will be included as part of the project design in the gender action plan.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes

closing gender gaps in access to and control over natural resources; Yes

improving women's participation and decision-making; and/or Yes

generating socio-economic benefits or services for women. Yes

Will the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Will there be private sector engagement in the project?

Yes

Please briefly explain the rationale behind your answer.

The private sector will be an important stakeholder as end users and as beneficiaries that may take advantage of the opportunities in developing the value chains (baseline project). The baseline ACVP project already includes the provision of Business Development Support Services to SMEs actors in its activities. During the PPG phase the potential to mainstream climate adaptation considerations into this business development support activity will be explored. Additionally, they will be provided with the opportunity to contribute to the design of the project while the project preparation will be a participatory and inclusive process involving consultation with all relevant stakeholders including the private sector and will provide an opportunity to identify further opportunities to engage them in the project. Further opportunities to engage with the private sector in the agriculture value chain will be explored during the PPG phase to be informed through consultations with the private sector, particularly the Private Sector Foundation Uganda (PSFU) which convenes Uganda's micro, small and medium enterprises (MSMEs).

5. Risks

Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)

Envisaged risks to attainment of project objectives and the proposed mitigation measures are as follows:

Risk and rating	Rating	Mitigation Measure
High vulnerability to climatic extremes and associated impacts. While the project is helping to reduce vulnerability to climate variability, extreme weather events could hamper project progress in all components, not least by restricting access to rural areas.	Moderate	The project will draw on analytical activities on mapping climate related vulnerabilities and also conduct targeted risk screening for relevant activity lines to identify risk mitigating options The flood management activities are expected to provide early warning and facilitate adaptation as well as improve community response systems
Priority interventions implemented are not found to be cost-effective.	Low	Cost-effectiveness will be a core principle in the implementation of climate-resilient/multi-benefit adaptation measures. Detailed information will be recorded regarding cost effectiveness.
Lag time for receipt of benefits disorients communities. Investments in watershed management are long term by nature, and their impact is difficult to monitor and dependent on a critical mass of activity being achieved. Natural vegetation can take years to establish, and since watershed management aims to arrest degradation, some benefits may not be visible.	High	The program is designed to show demonstrable impact in selected hotspot catchment areas and other targeted areas critical for maintenance of ecological infrastructure and for flood risk management. This approach will allow local experience to be gained and lessons learned to guide scaled up operations in later phases.
Failure of communities to cooperate on watershed management approaches. This risk has three likely reasons: i) lack of interest of upland producers to protect lowland irrigated lands, ii) fear of not directly benefiting from environmental impro	Moderate	The project mitigates this risk by an integrated approach, pointing out the local benefits to upland farmers like improved pastures and rainfed productivity. Where possible, onsite improvements that produce upland and lowland benefits will be promoted. Other incentives such as support to land tenure security will be favored

vements(incentive problem) and (ii i) Incomplete property rights and the associated public goods externalities		
Low rates of adoption and adapting otherwise profitable (or economically attractive) interventions [1] due to poverty, imperfect information, market, policy, institutional and other limiting factors (low capacity in communities to adopt technologies).	Moderate	The project will minimize this risk by use of tested technologies as well as sustaining support to communities over several agricultural cycles, until the technologies start paying. In addition, the project will make provisions for building the capacity of communities.

[1] Land and water management technologies that increase variability or uncertainty of the income stream tend to be shunned by farmers. Such risks can arise from greater odds of crop failure or could be caused by insecure property rights. In addition, farmers are not likely to invest in SLM of rented private property if the length-of use right does not allow them to recoup their investments (Ahuja, 1998; Barrett et al., 2002; Shiferaw and Bantilan, 2004)

6. Coordination

Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.

The project outcomes will be implemented through national execution, led by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), responsible with implementation of the ACVP baseline project. The ACVP baseline project PIU will be responsible for implementing the GEF project to ensure coordination with baseline project activities. Moreover, strong coordination will be ensured with the Climate Change Unit (CCU) created in 2008, directly under the office of the Permanent Secretary within the MWE. The main objective for the establishment of the CCU is to strengthen Uganda's implementation of the UNFCCC and its Kyoto Protocol (KP). It is envisaged that the CCU will be promoted to the level of a governmental department under the MWE. The main functions of the new Climate Change Department (CCD) will revolve around: i) acting as an information clearing-house on climate change concerns; ii) providing policy and strategic advice on climate change; iii) supporting communication and outreach on climate change; iv) ensuring the integration of climate change concerns into overall national planning through coordination with the relevant ministries, departments and governmental agencies; v) providing secretarial services to the National Climate Change Policy Committee, the National Climate Change Advisory Committee and the CDM-Designated National Authority; vi) monitoring the implementation of the Climate Change Policy and its Implementation Strategy; and vii) serving as the National Focal Point for the United Nations Framework Convention on Climate Change (UNFCCC)^[1]. The PIF therefore outlines project management costs that will be incurred by implementing partners at the national level (below 5%). Further details on the institutional coordination will be spelt out in the project document that is prepared during the PPG phase with the full participation of key stakeholders in each country including GEF OFP, UNFCCC FP, and other key senior Government officials including private sector and civil society representations as well as donor representatives.

Uganda has 3 projects, which have been approved and have accessed resources for NAPA implementation to date^[2]. This project on "strengthening the capacity for climate change adaptation and resilience in Uganda with its AfDB financed baseline project "Agricultural Value Chain Development Programme (AVCP)" is directly complementary with the LDCF and other Climate related projects in Uganda.

None of the projects is implemented in the project area (Bukedea district, and the upstream watersheds of Simu sisi, Sironko, Sipi, and Muyembe).

The climate change and adaptation projects mentioned in this PIF are implemented both nationwide (policy and capacity building on climate adaptation), address varying themes focused on the priority projects in Uganda's NAPA and are implemented in different geographical regions (pilot districts) from the project area.

The major links to this project are through lesson learning /coordination / capacity development / replication of successful experiences and complementarity in implementing adaptation activities in the NAPA. Lessons learnt in those projects will strengthen the implementation of the planned project.

The projects include the include the following:

- o **UNDP co-financed project (GEF ID 4993) Uganda on Strengthening climate information and early warning systems in Eastern and Southern Africa for climate resilient development and adaptation to climate change –Uganda, US\$ 4,510,000.**The LDCF – UNDP project is implemented nation wide and is focused on strengthening the National Meteorological agency in climate monitoring capabilities, early warning systems and information for responding to climate shocks and planning adaptation to climate change. Outcomes include (i) Enhanced capacity of national hydro-meteorological (NHMS) and environmental institutions to

monitor extreme weather and climate change and (ii) Efficient and effective use of hydro-meteorological and environmental information for making early warnings and long-term development plans. Coordination/data sharing/lesson learning is envisaged for strengthening the hydro meteorological system and early warning system for the upstream watersheds in the rural areas.

o **AfDB co-financed project (GEF ID 5204) on Building resilience to climate change in the water and sanitation, sector AfDB Co-Financed, US\$ 9,438,900.**The project addresses the NAPA priorities of improved community water supply and water for production in different districts in the North eastern and Northern Uganda (Bududa, Lerima, Bukwo and Manafwa-Tororo, Otuke / Apac / Katakwi / Bududa (Nabweya). The focus is to build resilience to climate change through the water and sanitation sector in flood- and drought-prone regions of Uganda. Activities include: Improved availability of safe and clean water for domestic consumption in drought-prone areas; Improved crop production levels through availability of water from gravity schemes; Improved livestock farming through improved water availability; -Increased access to climate-resilient sanitation in floodprone peri-urban areas - Lower risk of flooding and landslides in the Mount Elgon region (Mt Elgon National Park);. Coordination/data sharing/lesson learning is envisaged for strengthening community water supply systems, afforestation, and community based flood management measures.

o UNIDO co-financed project (GEF ID 5603). **Uganda Reducing Vulnerability of Banana Producing Communities to Climate Change Through Banana Value Added Activities – Enhancing Food Security And Employment, US\$ 3,182,800.**The project pilots community based adaptation in selected watersheds in Banana Producing Communities in western Uganda. It aims at supporting vulnerable communities in Western Uganda to better adapt to the effects of climate change (CC) by providing greater opportunities for income generation, poverty reduction and food security, through banana value addition activities. The outcome most relevant for this project in drawing lessons on the participation by vulnerable targeted communities in resilience building activities for income diversification

o **Climate Development and Knowledge Network (CDKN) is a five-year initiative funded by the UK Department for International Development (DFID) which started in 2010, to assist developing countries respond to the challenges posed by climate change.**The project supports the central government in Strengthening the Climate Change Coordination Unit in the Ministry of water and environment. The aim is to provide policy makers and donors in Uganda with the evidence based on the economic impacts of Climate Change in order to promote increased investment for adaptation in climate-sensitive sectors. The study also aims to increase the capacity of Government officials to use the evidence on the economic impacts of climate change in development and investment planning. It is anticipated that the study will provide the economic case for prioritized interventions and investments by the Government of Uganda in climate-resilient development, as well as assist Uganda to access climate and development finance, and frame its approach to climate finance mechanisms, such as the Green Climate Fund. The capacity built in this unit will be key in strengthening oversight of measures under this project. Coordination/data sharing/lesson learning is envisaged for strengthening adaptive capacity in the rural areas within the project watersheds.

o **CHAI Climate Change Adaptation and ICT .** The project is piloted in four districts spread along the cattle corridor from the eastern to central and western Uganda (Soroti, Nakasongola, Rakai, and Sembabule) representing a range of water management zones and agro-ecological conditions. The Bukedea project area is not part of the project. The project seeks to strengthen the adaptive capacity of individuals and communities in the cattle-corridor to water-related impacts of climate change and variability by improving the quality and timeliness of climate risk and adaptation information through the utilization of ICT tools. A key aim is informing policy processes with research based evidence on the role and potentials of ICTs for improving adaptive capacity of Ugandan communities to climate induced water challenges. The project will employ ICT tools to improve the quality of climate risk and vulnerability data and support the timely generation, dissemination, and use of climate-related information. Coordination/data sharing/lesson learning is envisaged for strengthening climate risk based management, through component 3. Lessons from use of the ICT tools is expected to be replicated in strengthening climate risk based management through improved weather and climate forecasting systems.

o **The Global Climate Change Alliance- Uganda: Agriculture Adaptation to Climate Change. The FAO with funds from the EU provided by the Republic of Ireland is supporting the Global Climate Change Alliance – Uganda.**The project is implemented nationwide and is targeted at strengthening civil society in creation of awareness and building capacity for climate resilience. The support started in September 2013 aims at supporting the CCD in its mandate to strengthen Uganda's implementation of the United Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol. The overall outcome of the GCCA project at the CCD is to strengthen knowledge and capacities for climate change adaptation in Uganda through trainings and production of education material that will address: key institutions at national and district level, the Civil Societies and Uganda Communities at large. The main activities of the project are; (i) Conduct a comprehensive needs assessment at national and sub-national level (ii) Develop appropriate / specific awareness messages (iii) Develop a strategy for awareness raising at different levels and (iv) Conduct awareness raising events at national and sub-national level. Coordination/data sharing/lesson learning is envisaged for strengthening adaptive capacity in the rural areas within the project watersheds.

LDCF resources will be used to increase the number of beneficiaries of these projects across components of this project. The MAAIF will build on existing national coordination mechanisms to establish a platform, as part of a project communication and outreach strategy, to leverage partnerships and promote coordination and complementarity among all relevant programs, projects and stakeholders, with the aim to avoid overlaps and duplication, facilitate data sharing across project coordinators and institution-beneficiaries, and maximize service delivery potentialities to users, thereby enhancing adaptive capacity and sustainability. Key projects relevant for coordination, their focus, scope and are elaborated in the following paragraphs. Details will be elaborated at full scale project proposal development phase.

[1] The Republic of Uganda.2010.National Development Plan. International Monetary Fund, Washington, D.C.: 1-499.

[2] Progress Report on the Least Developed Countries Fund and The Special Climate Change Fund, May 2016

7. Consistency with National Priorities

Is the Project consistent with the National Strategies and plans or reports and assessments under relevant conventions

Yes

If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc

This project conforms to country ownership and leadership as, among other things, it is aligned to government policies and strategies as well as management systems and procedures. The Government of Uganda has ratified the UNFCCC and is classified among the non-Annex 1 parties. These countries have also developed and submitted their National Adaptation Plans of Action (NAPA) and are entitled to benefit from the LDC Fund for the implementation of priority measures identified in their respective NAPAs. By signing and ratifying both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, Uganda has committed to the adoption and implementation of policies and measures designed to adapt to climate change and to manage existing climate risks, including enhancing preparedness and response capability to likely disasters.

One of Uganda's achievements under the Hyogo Framework for Action (HFA) is the establishment of the National Disaster Risk Reduction and Management (DRRM) Policy as well as institutional structures for Disaster Risk Reduction and Management. The goal for the DRRM Policy is "to establish institutions and mechanisms to reduce Uganda's vulnerability effectively manage existing risks and enhance preparedness and response capability to likely disasters". The implementation of the DRRM policy is to a large extent being facilitated through the NDP, which also includes disaster management as an enabling sector for the country

Consistency with the NAPA

The LDCF project is consistent with the NAPA (2008). The components of this project explicitly address prioritized intervention areas in the NAPA^[1] which include: Community Tree Growing /afforestation; Land Degradation Management; Strengthening Meteorological Services; Community Water and Sanitation and water for improved agricultural production. In implementing priority interventions identified in the NAPAs, the project is consistent with the Conference of Parties (COP-9) and also satisfies criteria outlined in UNFCCC Decision 7/CP.7 and GEF/C.28/18. The project focus is aligned with the scope of expected interventions as articulated in the LDCF programming paper and decision 5/CP.9. As climate impacts fall disproportionately on the poor, the project recognizes the links between adaptation and poverty reduction (GEF/C.28/18, 1(b), 29). In line with the objective of the LDCF to fund the incremental costs of adaptation to climate change against a business-as-usual scenario, the activities in this project have been designed to climate-proof a baseline intervention in the Agriculture and rural development sector.

Consistency with National Priorities and Policies

The LDCF project is linked and aligned to national priorities and measures identified for implementation reflected in the NDP II (2015-2019), Uganda's Vision 2040; United Nations Development Assistance Framework (UNDAF), National Disaster Risk and Management (NDRM) Policy. Uganda's National Development Plan (2010/11 to 2014/15)^[2] recognizes that climate change challenges need to be addressed to enhance sustainable economic and social development. Uganda's Climate Change Policy (2012) is intended to guide all climate change activities and interventions in the country to ensure a harmonized and coordinated approach towards a climate-resilient and low-carbon development path for sustainable development in Uganda. The policy includes the following priority concerns: i) adaptation; ii) mitigation; and iii) research and observation. Adaptation has been identified as a top priority for Uganda^[3]. In the long term, Uganda intends to

follow a climate-resilient and low-carbon development path linked to green growth and broader sustainable development goals. Uganda is also a party to the implementation of the EAC Climate Change Policy, which requires member states to initiate and develop consistent and harmonized, policies and plans to address climate change (Vision 2040 pg. 61)

[1]In 2008, a National Adaptation Plan of Action (NAPA) was launched based on consultation with communities, participatory rural appraisals and a prioritization process taking into account national policies.

[2]The Republic of Uganda.2010.National Development Plan. International Monetary Fund, Washington, D.C.: 1-499.

[3]The Republic of Uganda.2012.Uganda National Climate Change Policy. Ministry of Water and Environment: 1-58.

8. Knowledge Management

Outline the Knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

Knowledge management will be an integral part of the project, enabling institutional appropriation, promoting learning and continuous improvement, generating documents for dissemination and awareness raising and up-scaling of lessons and best practices. Specific knowledge management activities are incorporated under component 4 and will be carried out in an integrated way, targeted to different audiences and in support of the various capacity building and training actions under the different components. Activities under this component will be guided by a communication strategy to be prepared at the incipient stages of the project to define a robust plan for documentation and dissemination and facilitate upscaling of project results within and beyond the project pilot areas.

As part of knowledge management, in addition to the specific adaptation interventions, the Government of Uganda plans to promote and enhance climate change education, public awareness and capacity development through communication, training, information and knowledge management. During preparation, considerable attention will be paid to developing a spatial knowledge base with the best available local, regional, and global datasets. This will in turn inform the spatial analysis on erosion modeling to help prioritize catchment areas.

Part III: Approval/Endorsement By GEF Operational Focal Point(S) And Gef Agency(ies)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).

Name	Position	Ministry	Date
Patrick Ocailap	Deputy Secretary to the Treasury & GEF OFP	Ministry of Finance, Planning and Economic Development	4/2/2019
		LDCF CCA Core Indicators and Metadata	5/1/2019

ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place

Geographical Coordinates: 1.3557° N, 34.1087° E

The LDCF project will be implemented in Bukedea district, within the Awoja catchment downstream of the sub catchments of Sironko, Simu-sisi, Muyembe and Sipi (see figure 1). The upstream watersheds vary in ecological characteristics, upland use, and environmental issues that influence their overall productivity and ecological integrity. They contain some primary forest areas and wetlands which offer important hydrological services.

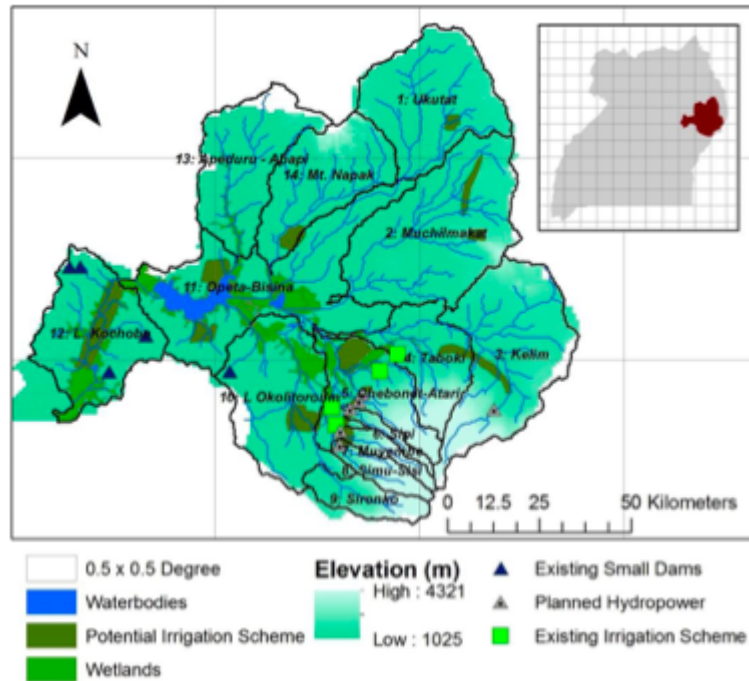


Figure 1: Sub-catchments within the Awoja Catchment (sub catchments draining into the project area include the Sironko, the Simu-sisi, Muyembe and Sipi and Muyembe), Source MWE, 2012

