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Report No: PAD3218

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 122.9 MILLION
(US\$169.2 MILLION EQUIVALENT)

TO THE

REPUBLIC OF UGANDA

FOR THE

IRRIGATION FOR CLIMATE RESILIENCE PROJECT

May 27, 2020

Water Global Practice
Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective January 31, 2020)

Currency Unit = Ugandan Shilling (UGX)

SDR 0.72624278 = US\$1

FISCAL YEAR

July 1 – June 30

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ABBREVIATIONS AND ACRONYMS

ACDP	Agriculture Cluster Development Project
AfDB	African Development Bank
AGRA	Alliance for a Green Revolution in Africa
AI&WfP	Agriculture Infrastructure and Water for Agricultural Production Department
ASSP	Agriculture Sector Strategic Plan
B/C	Benefit-cost Ratio
CAADP	Comprehensive Africa Agriculture Development Program
CCO	Certificates of Customary Ownership
CEDP	Competitiveness and Enterprise Development Project
CFR	Central Forest Reserve
CGAP	Consultative Group to Assist the Poor
COMESA	Common Market for Eastern and Southern Africa
CPF	Country Partnership Framework
CWPF	China-World Bank Partnership Facility
DAES	Directorate of Agricultural Extension Services
DTST	District Technical Support Team
LG	Local Government
DRC	Democratic Republic of Congo
DWRM	Directorate of Water Resources Management
EIRR	Economic Internal Rate of Return
ESHS	Environmental Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environment and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FIEFOC	Farm Income Enhancement and Forestry Conservation
FFS	Farmer Field School
FFSG	Farmer Field School Group
FM	Financial Management
GBV	Gender Based Violence
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
GoU	Government of Uganda
HLFOs	Higher Level Farmer Organizations
ICRP	Irrigation for Climate Resilience Project
IDA	International Development Association
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
INDC	Intended Nationally Determined Contribution
IsDB	Islamic Development Bank
IWMDP	Integrated Water Management and Development Project

JICA	Japanese International Cooperation Agency
M&E	Monitoring and Evaluation
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MLHUD	Ministry of Lands, Housing and Urban Development
MoFPED	Ministry of Finance, Planning, and Economic Development
MoGLSD	Ministry of Gender, Labor and Social Development
MoLG	Ministry of Local Governments
MoLHUD	Ministry of Lands, Housing and Urban Development
MoTIC	Ministry of Trade, Industry and Cooperatives
MoU	Memorandum of Understanding
MWE	Ministry of Water and Environment
NAADS	National Agricultural Advisory Services
NAP	National Agricultural Policy
NBI	Nile Basin Initiative
ND-GAIN	Notre Dame Global Adaptation Initiative
NDP	National Development Plan
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NFA	National Forestry Authority
NPV	Net Present Value
NWSC	National Water and Sewerage Corporation
O&M	Operation and Maintenance
PAP	Project Affected Person
PDO	Project Development Objective
PDU	Procurement and Disposal Unit
PIM	Project Implementation Manual
PP	Procurement Plan
PPDA	Public Procurement and Disposal of Public Assets Authority
PPSD	Project Procurement Strategy for Development
PS	Permanent Secretary
PSC	Project Steering Committee
PST	Project Support Team
PTC	Project Technical Committee
RAP	Resettlement Action Plan
RCP	Representative Concentration Pathway
RPF	Resettlement Policy Framework
SACCO	Savings and Credit Cooperative Organization
SDGs	Sustainable Development Goals
SDR	Special Drawing Rights
SORT	Systematic Operations Risk-Rating Tool
ToR	Terms of Reference
UGX	Ugandan Shilling
UNDP	United Nations Development Program
UNFFE	Uganda National Farmers' Federation
UNRA	Uganda National Roads Authority
VAT	Value-added Tax
VMG	Vulnerable and Marginalized Group

VMGF	Vulnerable and Marginalized Group Framework
VMGP	Vulnerable and Marginalized Groups Plan
WB	World Bank
WfP	Water for Production Department
WfPRC	Water for Production Regional Center
WMDP	Water Management and Development Project
WMZ	Water Management Zone
WSSB	Water Supply and Sewerage Board
WUA	Water Users Association



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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Uganda	Irrigation for Climate Resilience Project (ICRP)	
Project ID	Financing Instrument	Environmental Assessment Category
P163836	Investment Project Financing	A-Full Assessment

Financing & Implementation Modalities

<input type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input type="checkbox"/> Contingent Emergency Response Component (CERC)
<input type="checkbox"/> Series of Projects (SOP)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Performance-Based Conditions (PBCs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
18-Jun-2020	30-Apr-2026

Bank/IFC Collaboration

No

Proposed Development Objective(s)

To provide farmers in the project areas with access to irrigation and other agricultural services, and to establish management arrangements for irrigation service delivery

Components

Component Name	Cost (US\$, millions)
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Comp. 1 - Irrigation Services	129.80
Comp. 2 - Support Services for Agricultural Production and Value Chain Development	50.00
Comp. 3 - Institutional Strengthening and Implementation Support	10.30

Organizations

Borrower: Republic of Uganda
 Implementing Agency: Ministry of Water and Environment

PROJECT FINANCING DATA (US\$, Millions)**SUMMARY**

Total Project Cost	190.10
Total Financing	190.10
of which IBRD/IDA	169.20
Financing Gap	0.00

DETAILS**World Bank Group Financing**

International Development Association (IDA)	169.20
IDA Credit	169.20

Non-World Bank Group Financing

Counterpart Funding	20.90
Borrower/Recipient	2.40
Local Beneficiaries	18.50

IDA Resources (in US\$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Uganda	169.20	0.00	0.00	169.20
National PBA	169.20	0.00	0.00	169.20



Total	169.20	0.00	0.00	0.00	0.00	0.00	0.00	169.20
Expected Disbursements (in US\$, Millions)								
WB Fiscal Year	2020	2021	2022	2023	2024	2025	2026	
Annual	2.00	19.00	53.80	48.20	27.50	12.60	6.10	
Cumulative	2.00	21.00	74.80	123.00	150.50	163.10	169.20	

INSTITUTIONAL DATA

Practice Area (Lead)

Water

Contributing Practice Areas

Agriculture and Food

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	● Substantial
2. Macroeconomic	● Moderate
3. Sector Strategies and Policies	● Substantial
4. Technical Design of Project or Program	● Substantial
5. Institutional Capacity for Implementation and Sustainability	● Substantial
6. Fiduciary	● Substantial
7. Environment and Social	● Substantial
8. Stakeholders	● Substantial
9. Other	● Substantial
10. Overall	● Substantial



COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

Yes No

Does the project require any waivers of Bank policies?

Yes No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36	✓	
Pest Management OP 4.09	✓	
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10	✓	
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37	✓	
Projects on International Waterways OP/BP 7.50	✓	
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

Financing Agreement, Schedule 2, Section I, F.1

No later than three (3) months after the Effective Date, the Recipient shall establish and, thereafter, maintain, throughout Project implementation, an independent panel of experts (“Dam Safety Panel”), in form and with terms, composition and resources satisfactory to the Association, for the purpose of reviewing and advising the Recipient on matters related to safety and other critical aspects of the dam, its appurtenant structures, the catchment area, the area surrounding the reservoir, and downstream areas, to be designed and constructed under the Project.

Sections and Description

Financing Agreement, Schedule 2, Section I, F.5



The Recipient shall: (a) no later than twelve (12) months prior to the projected date of initial filling of the reservoir to be constructed with respect to the Dam, prepare and provide to the Dam Safety Panel and the Association the updated Dam Operation and Maintenance Plan; (b) finalize said Plan taking into account the recommendations of said Panel and the Association, and not less than six (6) months prior to the projected date of initial filling of the reservoir to be constructed with respect to the Dam; (c) maintain the organizational and other requirements of said Dam Operation and Maintenance Plan in a manner satisfactory to the Association; and (d) carry out operation and maintenance of said Dam in accordance with the provisions of said Dam Operation and Maintenance Plan.

Sections and Description

Financing Agreement, Schedule 2, Section I, F.6

The Recipient shall: (a) no later than eighteen (18) months prior to the projected filling of the reservoir to be constructed with respect to the Dam, prepare and provide to the Dam Safety Panel and the Association the updated Dam Emergency Preparedness Plan; (b) finalize said Dam Emergency Preparedness Plan taking into account the recommendations of said Panel and the Association, not later than twelve (12) months prior to the projected date of initial filling of the reservoir to be constructed with respect to the Dam; and (c) maintain the organizational and other requirements of said Dam Emergency Preparedness Plan in a manner satisfactory to the Association.

Conditions

Type	Description
Effectiveness	Financing Agreement, Article V 5.01 The Additional Condition of Effectiveness consists of the following, namely the Project Implementation Manual has been adopted by the Recipient, through MWE and MAAIF, in a form and substance satisfactory to the Association.
Disbursement	Financing Agreement, Schedule 2, Section III, B.1 (b) Under Category (2) unless and until a Matching Grants Operations Manual, in form and substance satisfactory to the Association, is approved by the Recipient.



1. STRATEGIC CONTEXT

A. Country Context

1. Uganda has seen strong economic growth over the past decades, but this is expected to slow down as COVID-19 shocks, floods and a locust invasion hit the country. Gross domestic product (GDP) expanded at an annual average rate of 6.9 percent between 1987 and 2010, one of the highest among African countries, albeit from a very low base. From 2011 to 2017, Uganda's economic growth averaged 4.5 percent due to shocks, especially prolonged drought and effects of regional conflict. Since 2017, the economy gradually rebounded, growing at above 6 percent in 2018 and 2019. However, the strong growth of the last two years has not been sustained in 2020 due to COVID-19 related domestic and external supply/demand shocks, which followed an already sizable slowdown in real output due to heavy rains and flooding and a deceleration in growth in services. Real GDP growth is projected to fall from 6.5 percent in 2019 to 3.3 percent in 2020.¹ The structure of the Ugandan economy has undergone a major transformation, with a shift from a primarily agriculture-based economy to one dominated by services. In 2015, the service sector became the largest contributor to GDP (52.8 percent), followed by agriculture (25.8 percent) and industry (21.4 percent). The most critical risk to Uganda's economic outlook is currently the COVID-19 pandemic. As of May 18, 2020, there were 227 reported cases of COVID-19. The country started a lockdown on March 22, 2020 to curb the spread of the disease, and a gradual easing of the restrictions is happening with more actions expected from June 6, 2020 when – among others – public transportation will resume. The decline in Uganda's real GDP growth and corresponding loss of jobs would depend on if the country were to face a more widespread pandemic, requiring more extended periods of mobility restrictions and/or overwhelming the health sector response. Uganda has also been invaded by locusts whose major impact is expected in April-June of 2020. Uganda's economy is also threatened by continued regional instability, particularly from the Democratic Republic of Congo (DRC) and South Sudan, which are also key export markets.

2. Rapid population growth is offsetting the benefits of economic development per capita and increasing pressure on natural resources. Uganda has one of the world's fastest population growth rates, with almost half of its people under the age of 15. The population increased from 24 to 44 million between 2002 and 2018 and it is expected to be above 80 million by 2040. This has discounted the impact of economic growth on real incomes, with per capita GDP growth averaging no more than three percent over the past two decades, falling behind Kenya and Tanzania. Pressure on land resources is increasing dramatically due to population density. Refugee communities are adding to the equation, with Uganda hosting the third-largest refugee population in the world, and with one million refugees out of the current 1.5 million having arrived over the past two years.

3. Uganda made significant progress on poverty reduction, but rural poverty remains a major challenge. Between 2002 and 2013, the share of people living below the national poverty line more than halved, from 40 percent to 19.7 percent. Nevertheless, in 2013 more than a third of Ugandans still lived below the international poverty line of US\$1.90 per day.² Moreover, the risk of Ugandans falling back into poverty remained high: for every three Ugandans that moved out of poverty, two fell back into poverty. In 2017, the national poverty rate rose again to 21.4 percent, in part due to an overall economic slowdown, but also to severe drought conditions and to the related outbreak of fall armyworms, highlighting the direct linkage between poverty and meteorological patterns. Many households suffer from food insecurity and high levels of malnutrition, with 34 percent of children under five years being stunted. High population

¹ This is in line with the IMF forecast, and lower than the government forecast of 3.9 percent real GDP growth in 2020.

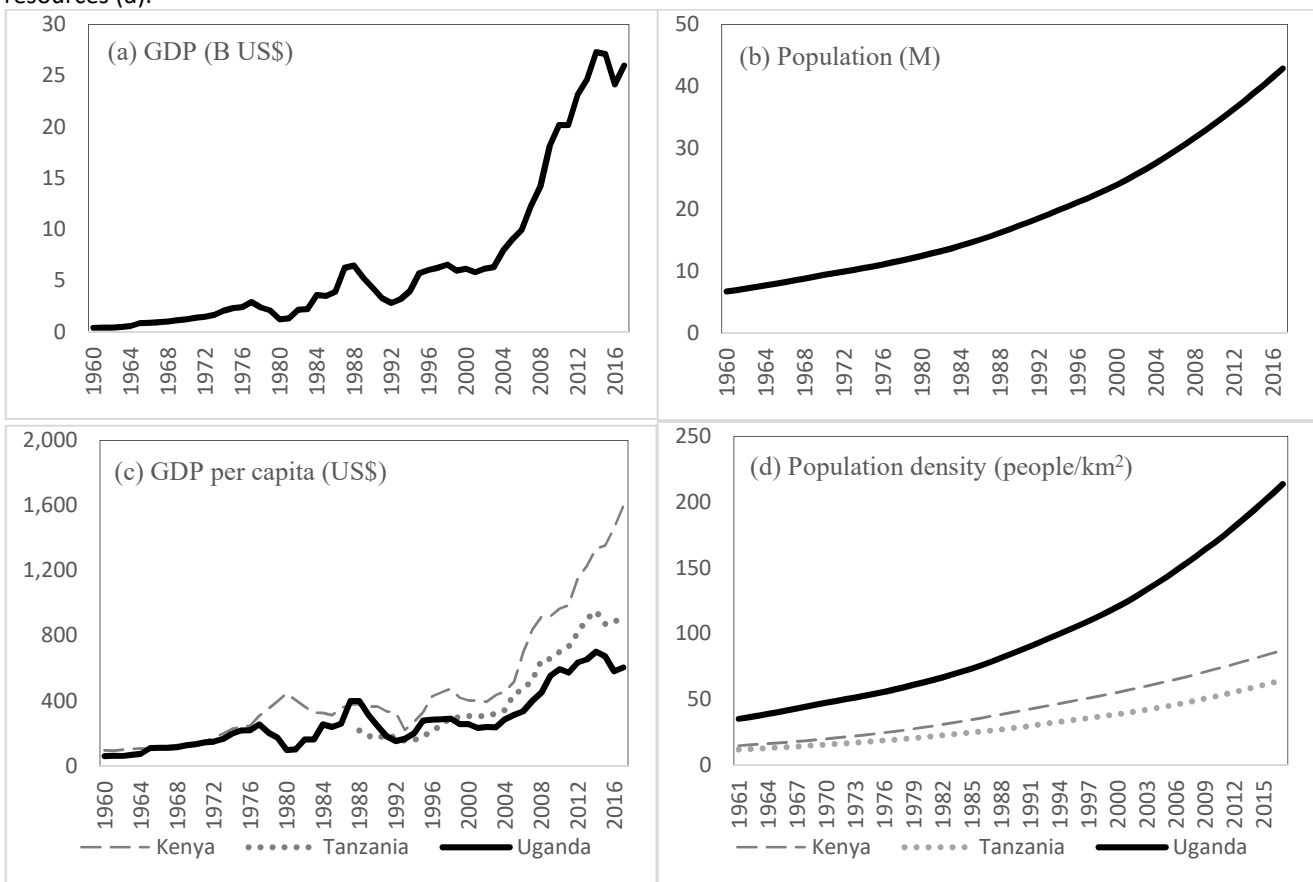
² Uganda Poverty Assessment Report, World Bank Group, 2016.



growth, increasing pressure on natural resources, and limited access to rural nonfarm income streams define the rural poverty challenge in Uganda, further exacerbated by the almost exclusive reliance on rainfed agriculture.

4. Agriculture continues to play a critical role for income generation, employment and subsistence, particularly for the bottom 40 percent of the population. The sector employs 70 percent of the population (87 percent of women and 63 percent of men), and over 80 percent of the poorest, with rural areas accounting for 94 percent of the poor and 85 percent of the population. Agriculture remains a source of employment for the younger generation, with nearly half of all heads of households engaged in agriculture under the age of 40, and one-fifth under the age of 30. Looking forward, the number of food-insecure people in Uganda is projected to rise from seven million in 2015 to 30 million by 2025.

Figure 1. Uganda recorded high GDP growth (a) becoming one of the fastest growing economies in the world. However, population growth (b) resulted in GDP per capita (c) falling behind neighboring countries like Kenya and Tanzania, with increasing pressure on land resources (d).



5. Uganda is among the world's most vulnerable countries to climate change. Historically, Uganda has been well endowed in water resources, with precipitation ranging between 750 mm/year in the northeast concentrated in one rainy season, to 1,500 mm/year in the southwest across two rainy seasons. In recent years, changes in precipitations have been observed consequent to climate change.³ While some literature reports on decrease in annual rainfall over

³ Uganda National Climate Change Policy, 2015.



the past decades,⁴ the increased variability and lower predictability of rainfall are undisputed and have emerged as a critical issue in the national press. The rainy season, traditionally lasting eight to nine months out of the year, has become shorter, averaging six to seven months a year since 2010. This phenomenon is a consequence of changes in the climate circulation and sea surface temperature, which results in the weakening of the long rains (March to June), and possibly an increase in short rains (September to November). Consequently, there are considerable variations in the timing of the onset of the rainy season, and farmers are finding it increasingly challenging to decide when to plant. While trends are uncertain in terms of total rainfall amounts,⁵ it is generally recognized that Uganda will keep recording more erratic rainfall, changes in the timing and distribution of rainfall, and an increase in the frequency and duration of droughts.⁶ In parallel, average temperatures have increased by 1.3°C since 1960, and they could rise by up to 2.5°C by 2050, with Uganda having hit the highest average monthly temperature in its history at 33.8°C in March 2016.⁷

6. Uganda is not adapting to climate change as needed. Uganda was ranked 155th out of 188 countries on the Notre Dame Global Adaptation Initiative (ND-GAIN) index⁸ in 2016, due to a combination of high vulnerability to climate change (14th most vulnerable country) and low readiness to improve resilience (48th least ready country). Two elements drive Uganda's high vulnerability: (i) strong projected decrease in rice, wheat and maize yields,⁹ and (ii) low capacity to acquire and deploy agriculture technology (irrigation, machineries, and inputs). The impacts on the economy are striking: in 2010-11, Uganda experienced production losses (38 and 36 percent loss for beans and maize, respectively) totaling Ugandan Shilling (UGX) 2.8 trillion, which translated to 7.5 percent of GDP.¹⁰ Interestingly, annual rainfall over that period did not reveal any anomalies, but an analysis of monthly data showed that more than half of the months had below average rainfall, hinting to the need for investment and innovations to cope with intra-annual variability. Indeed, a third element defining Uganda's high vulnerability to climate change is lack of storage infrastructure.

7. Uganda's per capita freshwater resources are among the highest in the world, and only 2.8 percent of its renewable water resources are currently utilized. It is estimated that water use will triple by 2035. Although this future demand would only constitute a fifth of the net water available, almost three-fourths of all districts will experience high or extreme water stress due to high climate variability and underdeveloped water resources infrastructure, particularly in the South-Western part of the country.¹¹ The country is at high risk for flooding, and at medium risk for water scarcity,

⁴ Annual rainfall is reported to having decreased by 12 percent over the past 35 years according to the Changes in Ugandan Climate Rainfall at the Village and Forest Level, Scientific Reports | (2018) 8:3551 | DOI:10.1038/s41598-018-21427-5.

⁵ According to Uganda's Intended Nationally Determined Contribution (INDC), MWE 2015 (available at <https://goo.gl/hDd9ce>), climate projections for Uganda based on models used in the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) predict a slight decrease in total annual rainfall in most of the country.

⁶ Climate-Smart Agriculture in Uganda, CIAT, CCAFS BFS/USAID, 2017 (<https://ccafs.cgiar.org/publications/csa-country-profiles>).

⁷ Uganda's National Adaptation Programme of Action (NAPA) cites an average temperature increase of 0.28 °C per decade in the country between 1960 and 2010, averaging an increase of 0.37 °C per decade. The frequency of hot days has increased significantly, while the frequency of cold days has decreased (McSweeney C; New M; Lizcano G. 2010. United Nations Development Program (UNDP) Climate Change Country Profiles: Uganda. Available at: <http://bit.ly/2fsJ3Lc>). The MWE assessment from 2015 on Uganda's INDC indicates the possibility of an increase in the country's near-surface temperature in the order of +2 °C in the next 50 years, and +2.5 °C in the next 80 years using RCP 4.5, whereas for RCP 8.5 the projected temperature increases are in the order of +2.5 °C in the next 50 years, and +4.5 °C in the next 80 years.

⁸ The ND-GAIN Country Index summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience using 20 years of data to rank 180 countries annually (<https://environmentalchange.nd.edu/resources/nd-gain/>).

⁹ Projected change is the percent decrease of the cereal yields from the baseline projection (1980-2009) to a future projection (2040-2069) using RCP 4.5. The Economic Assessment of the Impacts of Climate Change in Uganda (MWE, 2015) reports that climate-induced yield losses for coffee could be in the order of 50-75 percent by 2050.

¹⁰ The 2010–2011 Integrated Rainfall Variability Impacts, Needs Assessment and Drought Risk Management Strategy. Department of Disaster Management of the Office of the Prime Minister.

¹¹ National Water Resources Assessment, 2013.



extreme heat, and landslides.¹² If no adaptive action is taken, annual costs of the negative impact of climate change are estimated in the range of US\$273 - 437 billion over the 40 years from 2010-2050, with the biggest impacts being on water, followed by energy, agriculture, and infrastructure. Poor and vulnerable groups are mostly likely to be impacted through damages to their assets, livelihoods and their food security.

B. Sectoral and Institutional Context

8. Increased agricultural production for internal and regional markets represents a compelling growth path for Uganda. Rising demand for food and dietary shifts into higher value and more processed foods across Africa offer significant opportunities for Ugandan farmers.¹³ Agriculture already contributes 50 percent of Uganda's exports. Coffee, the main export crop historically, remains the most important income earner for rural households in addition to cotton, tea, and tobacco. Thanks to increasing diversification, several other crops, such as cut flowers, cocoa, vanilla pods, and vegetables, are emerging as key export commodities and consequently as potential sources of increased household income. Uganda's major formal exports are destined for the East African bloc markets (Kenya, Rwanda, Tanzania, and Burundi) and other Common Market for Eastern and Southern Africa (COMESA) member countries.¹⁴ In addition, Uganda is becoming a transit point for food commodities grown elsewhere destined for Sudan and the DRC. Outside the region, the prime destination of all fresh produce is the United Kingdom, followed by Holland, Switzerland, Belgium, Germany, and the United Arab Emirates. Produce for such markets tends to be dominated by high value horticultural commodities such as hot peppers, chilies, bananas (Uganda's largest crop by area and which does especially well in niche markets, particularly in the United Kingdom), beans, avocado, and pineapples. Kenya is the major market for Uganda's informal exports, mainly for maize and beans, although the opening up of the East African market has seen some farmers take advantage of new niches, especially fresh fruit and fruit juices. There are also increasing opportunities in the internal market, where income growth and urbanization are driving changes in the demand for quality of products.

9. Notwithstanding market opportunities, the agricultural sector growth rate remains far below potential. Only five percent of the farms in Uganda are commercially oriented, with 25 percent semi-commercial and 70 percent engaged in subsistence agriculture.¹⁵ Farmers face instability of prices, undeveloped relationships with prospective buyers, weak market power, high transaction costs for moving products to market, among other constraints. Market dysfunctions are exacerbated by the small size of Uganda's farms, which are 1.1 ha on average (Figure 2), with land fragmentation on the rise due to demographic pressure. The sector growth rate is stagnant at around three percent per year since 2000, and approaching close to two percent per year over the last five years, thus well behind overall annual growth in the economy and the annual population growth rate over the same period. It has also lagged behind the six percent per annum growth target for agriculture called for by the Comprehensive Africa Agriculture Development Program (CAADP) and Uganda's own National Development Plan (NDP).

¹² <http://thinkhazard.org/en/report/253-uganda>.

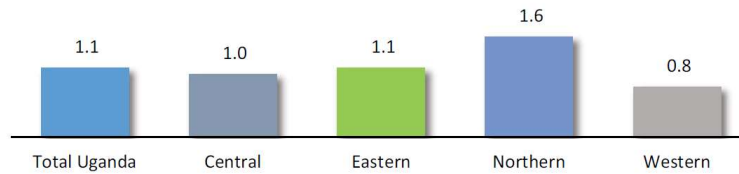
¹³ Africa's demand for food is projected to more than double by 2050. The value of the African food market is predicted to rise to US\$1 trillion by 2030, from US\$300 billion currently (AGRA, 2017).

¹⁴ Burundi, Comoros, DRC, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Sudan, Swaziland, Seychelles, Uganda, Zambia and Zimbabwe.

¹⁵ Subsistence farmers primarily grow staple crops, with banana, maize, and beans being the most common crops, followed by cassava, sweet potatoes, and groundnuts.



Figure 2. Average size of agricultural holdings in Uganda (in ha)



(National Survey and Segmentation of Smallholder Households in Uganda, Consultative Group to Assist the Poor, CGAP, 2016).

10. Ugandan smallholder farmers have still to take advantage of the green revolution technologies. Total factor productivity growth – the difference between aggregate output growth and the growth of all inputs and factors of production that produced it – in Uganda agriculture has been negative for the last two decades. This suggests that on balance the country is now getting less for equal or greater effort. Smallholder farmers have low capacity to acquire and deploy agriculture technology, which is driving the sector’s high vulnerability to climate change. The country has the lowest utilization of inorganic fertilizers in Africa, at only 1 kg/ha/year, compared to 5 kg/ha/year in Tanzania and 30 kg/ha/year in Kenya, and far less than the world average of 100 kg/ha/year.¹⁶ Only 13 percent of the cropped area was planted with commercial or improved seeds in 2009, compared to 22 percent in Sub-Saharan Africa and 80 percent in Asia. Unreliable quality of agricultural inputs is a major problem, which discourages farmers from investing their limited resources to this end.¹⁷ Most of the tilling is done by hand, with a mere 2,500 tractors nationwide, and animal traction used in only a few parts of the country. Limited access to credit among farmers is a major constraint to increased use of technologies and inputs, and is largely related to farmers’ lack of collateral as less than 20 percent of the land is registered. Alongside land size, limited land tenure security has shown to be a critical bottleneck hampering investment, agribusiness development and commercialization.¹⁸ All this demonstrates the large potential for increasing agricultural productivity under rainfed conditions. Climate change has added a further challenge: while the favorable rainfall pattern of Uganda historically allowed two rainfed cropping seasons per year in most parts of the country, the change in precipitations is creating the need for irrigation, currently practiced on a mere one percent of the potential area.¹⁹ Indeed, smallholders perceive weather to pose the greatest risk to their agricultural activities (Figure 3), and weather-related events represent the main cause affecting agricultural activities (Figure 4). When facing a shock, smallholders have little means to cope, with implications for the livelihood of a large share of the population.

¹⁶ Hundsbæk RP; Spichiger R; Alogo S; Kidoido M. 2012. Land Tenure and Economic Activities in Uganda: A Literature Review. Danish Institute for International Studies (DIIS). Working Paper 2012:13.

¹⁷ Literature shows that hybrid maize seeds on Ugandan markets were equivalent to a mix of 50 percent hybrid and 50 percent landrace varieties, while the average nitrogen content of fertilizer was 30 percent lower than it should be. The substandard quality of (inauthentic) inputs reduced yield gains from using hybrid seeds and nitrogen (alongside other plant micronutrients) to 75-87 percent of expected outcomes. In 2015, less than 10 percent of planted seed was purchased from formal sources, and 30 to 40 percent of this seed purchased from formal sources was counterfeit (Closing the Potential-Performance Divide in Ugandan Agriculture, World Bank, 2018).

¹⁸ Closing the Potential-Performance Divide in Ugandan Agriculture, World Bank, 2018.

¹⁹ Irrigation potential has been recently estimated at 3,030,000 ha (NELSAP, 2012), an increment from previous estimates of 278,000 ha (Hydromet), 476,000 ha (FAO) and 560,000 ha (MWE) and 1,100,000 ha (AICD/ International Food Policy Research Institute (IFPRI)).



Figure 3. Most significant risk to agricultural activities according to small farmers

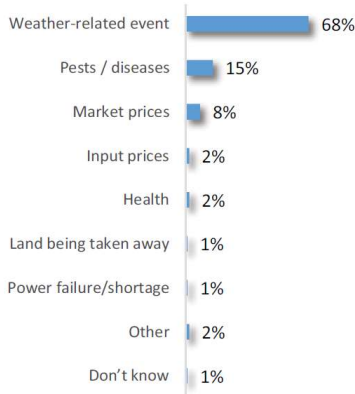
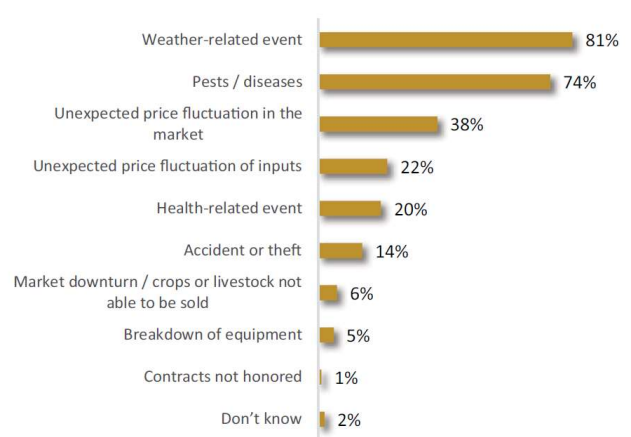


Figure 4. Main cause affecting agricultural activities of small farmers



(National Survey and Segmentation of Smallholder Households in Uganda, CGAP, 2016).

11. The Government of Uganda (GoU) recognizes the potential of the agricultural sector, and the urgency of irrigation development to sustain its growth potential in the face of climate change. The Government has defined agriculture as a key economic sector in Uganda’s transition to a middle-income country and, in this regard, has emphasized the importance of value addition, commercialization, and building resilience to climate change. Uganda’s broader agri-food system has the potential to provide significant employment opportunities for the country’s predominantly young population, with higher job creation potential than the service or industry sectors. However, these ambitious goals cannot be achieved if the agricultural sector remains almost exclusively reliant on rainfall, considering the impact of climate change on rainfall variability. The Government in its Vision 2040 and in the NDP II (2016-2020) appropriately lists irrigation investment as a high priority along with agricultural value-chain development. The National Agricultural Policy (NAP, Ministry of Agriculture, Animal Industry and Fisheries, MAAIF, 2010), which stipulates the sectoral approach to the NDP, emphasizes the need for rehabilitating public irrigation schemes, transferring the management responsibility of irrigation schemes to the lowest appropriate levels and establishing new irrigation schemes. The Agriculture Sector Strategic Plan (ASSP, MAAIF, 2016-2020) operationalizes the NAP and the Agriculture Chapter of NDP II by defining strategic interventions to increase access to water for agricultural production.

12. The National Irrigation Policy, jointly signed by Ministry of Water and Environment (MWE) and MAAIF in 2018, focuses on irrigation as a way to achieving national food security, transforming the agriculture sector and significantly increasing agricultural income. The policy broadly identifies roles and responsibilities in irrigation development, attributing to MWE the development of off-farm irrigation infrastructure for medium and large-scale irrigation schemes, while assigning to MAAIF the development of on-farm irrigation infrastructure and implementation of appropriate on-farm activities, in addition to undertaking the development of the micro and small-scale irrigation systems. To implement the policy, MWE and MAAIF are undertaking the preparation of a comprehensive irrigation masterplan, which will guide irrigation planning and provide a strategic framework for prioritized investments for development of irrigation infrastructure demonstrated to be technically feasible, economically viable, socially desirable and environmentally sustainable.

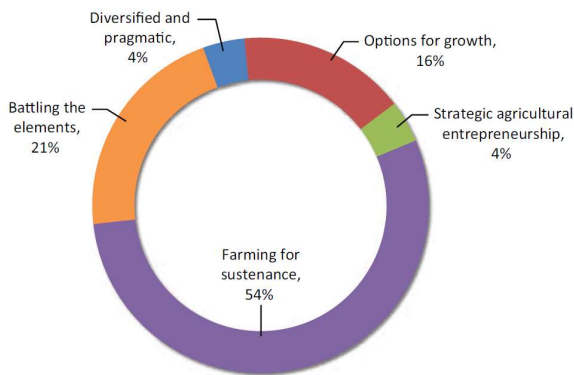
13. Investments in irrigation infrastructures are urgently needed. The urgent need for investments is demonstrated by the ambitious targets set under the National Irrigation Policy of a total irrigated area of 1,500,000 ha by 2040, compared to the current 77,000 ha. This would require creating almost 70,000 ha of newly irrigated land per year. So far, most of



the irrigation development in Uganda has been farmer-led, with farmers (individually or as a collective) being the primary drivers of the irrigation development process. Smallholders have developed informal irrigation in the fringe of swamps for rice production (61,000 ha),²⁰ while bigger farmers have developed commercial irrigation (12,000 ha), like the Kakira sugarcane estate (1,500 ha) or the flower farms in the Lake Victoria area, close to Entebbe airport (ranging from 3 to 40 ha, for a total of 230 ha). Public irrigation, the development of which is mainly driven by Government, so far covers 4,000 ha across nine public irrigation schemes.²¹ In order to build climate resilience in the agricultural sector, Uganda needs to create the conditions for quick scalability of irrigation development. MWE assesses that half of the irrigation potential is close to surface water resources and thus does not need any storage facilities, making it possible for farmers to develop micro and small-scale irrigation if the right incentives and support systems are put in place. For the remaining half of the irrigation potential, farmers alone cannot address the water challenge, as water resources are not directly accessible in space and time, requiring construction of storage facility or conveyance networks, for which the public sector can play a key role.

14. Public support to irrigation development should be targeting farmers that do not have the means to access water, and have the potential to leapfrog from subsistence to commercial agriculture. Irrigation would greatly benefit smallholders who are attempting to make a change towards more productive agricultural practices, but do not have the means to do this independently. The CGAP, 2016 assesses that this “battling the elements” segment corresponds to 21 percent of the smallholders in Uganda (Figure 5). This segment is challenged by incidence of unexpected life or farm-related events, including weather challenges, and records the highest incidence of negative farm events. This segment of smallholders, 80 percent of whom are below the poverty line, has persevered through those challenges, sometimes using financial tools, making them a group that might better understand the value of having some form of public support.

Figure 5. Uganda smallholders’ segments (CGAP, 2016)



Segment=	Farming for sustenance	Battling the elements	Diversified and pragmatic	Options for growth	Strategic agricultural entrepreneurship
Above the poverty line	14%	20%	100%	62%	100%
Below the poverty line	86%	80%	0%	38%	0%

15. Irrigation infrastructure will not be able to sustain long-term growth of the agricultural sector unless its development is accompanied by the establishment of solid institutions. Prior to the 1990s, the few formal irrigation schemes in Uganda were constructed and managed by MAAIF or MWE. Over the past three decades, farmers have been encouraged to come together under a variety of forms (i.e. cooperatives, associations) for the management of these schemes. There has been a growing tendency by MAAIF and MWE to delegate management to the relevant district local government (LG), which in turn delegated to the farmers’ organization. MAAIF, MWE, and LGs continued to provide

²⁰ Informal irrigation is carried out mainly in the districts of Tororo, Butaleja, Pallisa, Budaka, Bugiri, Kibuku, Namutumba, Lira, Dokolo, Soroti and Iganga where swamps around streams flowing into lake Kyoga have been developed for irrigation by local groups of farmers.

²¹ Of the nine public irrigation schemes, one is in the West (Mubuku), four in the East (Kiige, Labori, Odina, and Doho), and four in the North (Ongom, Atera, Agoro, and Olweny).



support by assigning technical staff to each scheme. This management model demonstrated some challenges over time, thus MWE and MAAIF are exploring avenues to improve the quality of the service delivery and the management structure of public irrigation schemes, to ensure their sustainability while reducing the role of the public which would not be able to sustain their current level of involvement as irrigated areas expand across the country. Also, the Ministries recognize the need to diversify the management models based on the size and technical complexity of each scheme, also drawing on the long-term experience for the management of water supply systems in Uganda.

C. Relevance to Higher Level Objectives

16. The project supports the GoU's Vision 2040, the NDP II and III, and the National Irrigation Policy. The overall goal of the NDP II is to attain middle income status by strengthening the country's competitiveness for sustainable wealth creation, employment and inclusive growth. One of the key objectives of the NDP II is to increase sustainable production, productivity and value addition in key growth opportunities, including agriculture. The project supports two of the key interventions to drive growth under the NDP II by constructing irrigation systems; and strengthening the institutional framework to support production, value addition and marketing of agricultural enterprises. The project is in line with the 2018 National Irrigation Policy, which supports irrigation to ensure "optimal use of land and water resources for agricultural production and productivity, to contribute effectively towards food security, wealth and employment creation, and export promotion". The project will promote efficient use of existing water resources and improve agricultural production.

17. The project is consistent with the World Bank's 2016–2021 Country Partnership Framework (CPF).²² The CPF is designed to contribute directly to achieving the Sustainable Development Goals (SDGs), focusing on three strategic areas: (A) strengthening governance, accountability and service delivery; (B) raising incomes in rural areas; and (C) boosting inclusive growth in urban areas. The project directly supports the Strategic Focus Area B, by increasing agricultural productivity, improving climate resilience of the poor and vulnerable farming communities, and contributing to food security. The project also supports Strategic Focus Area A, by supporting sustainable management of irrigation service delivery.

18. The project supports achievement of the World Bank's twin goals of eliminating extreme poverty and promoting shared prosperity. The beneficiaries are mostly subsistence and semi-subsistence farmers with small land holdings. Access to irrigation will boost land productivity, result in higher yields and lower the risk of crop failure and improve food security. Irrigation will enable farmers to switch from low value subsistence production to high value market-oriented production thereby increasing their income. The project will also improve farmers' access to inputs, finance and markets.

19. The ICRP aims to support the GoU in the shift towards more resilient agriculture through the development of sustainable irrigation services. The project intends to address Uganda's climate change vulnerabilities by: (i) promoting adoption of irrigation by smallholder farmers, in synergy with other agriculture inputs and technologies; (ii) increasing water storage capacity; (iii) promoting drainage; and (iv) promoting sustainable catchment management.²³ Through the introduction of irrigation services, combined to the provision of extension services and facilitated access to agro-inputs, farmers are expected to record more stable and higher yields, increase intensification (by cropping also during the dry season), and diversification (by introducing higher value crops). This change will be market-driven, with irrigation becoming the anchor for stronger producer organizations and development of value chains. The project recognizes the need to explore a range of irrigation models adapted to local needs. While the project is conceived as a stand-alone

²² Report No. 101173-UG, discussed by the Executive Directors on April 21, 2016.

²³ Elements driving Uganda's high vulnerability to climate change are presented in paragraph 4.



investment operation, it creates the conditions for scalability of investments, by supporting: (i) development of a credible pipeline of public irrigation schemes investments; (ii) development of sustainable management models for public irrigation schemes; and (iii) piloting of public support to incentivize farmer-led irrigation, using a value chain approach.

20. The Project will contribute to the COVID-19 response in Uganda by creating jobs for the rural communities and by improving food security. Smallholder farmers are likely to be affected by COVID-19 as demand decrease due to the economic slowdown in the country and the restrictions on movement of people and vehicles that have hindered their activities. Over the next two years, the project is poised to spend US\$4 million in watershed management activities and in the restoration of the Rwoho Central Forest Reserve, which will be implemented by rural communities with a focus on women and youth in the area. An estimated 1,800,000 workdays will be required for the watershed activities and the project is expected to employ at least 4,500 community people. In addition, over the next three years, the project will build the capacity of 63,200 farmers in the project area to carry out sustainable land management and use better farming methods and inputs. This will boost their yields and income under the rainfed agriculture and improve food security.

I. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

21. To provide farmers in the project areas with access to irrigation and other agricultural services, and to establish management arrangements for irrigation service delivery.

PDO Level Indicators

22. The PDO level indicators are the following:

- Area provided with new/improved irrigation or drainage services (disaggregated by new and improved) (ha)
- Farmers reached with agricultural assets or services, disaggregated by gender (number)
- Management contracts for irrigation services signed (number)

B. Project Components

Component 1. Irrigation Services (US\$129.8 million, of which US\$127.4 million equivalent IDA)²⁴

23. Access to irrigation is critical to allowing farmers cope with climate variability, to increase yield and intensification, and diversify towards higher value crops. Component 1 aims at providing farmers with irrigation water across various irrigation models, classified around the size of irrigation development²⁵ as per the National Irrigation Policy.²⁶

²⁴ Amounts are presented inclusive of taxes. However, it has to be noted that beginning with the 2016/17 financial year, GoU introduced fiscal measures with the aim of supporting, among others, the supply of irrigation equipment to Small scale farmers; these notably included introducing value-added tax (VAT) zero rating on the importation of irrigation equipment for agricultural purposes.

²⁵ To be noted that the classification based on the size of irrigation development is country-specific. For example, threshold for large-scale irrigation is 50 ha in Nigeria, 800 ha in Kenya, 1,000 ha in Uganda, 5,000 ha in Colombia, and 10,000 ha in Morocco (AQUASTAT).

²⁶ Irrigation schemes targeted by the project were identified under the NELSAP, an investment program under the NBI. The NBI is a partnership of



- **Western Region:** The project will support construction of two new public large-scale irrigation schemes (Kabuyanda, Isingiro District; Matanda, Kanungu District), and the related establishment of management structures. The project will also support the design of a new irrigation scheme (Enengo, Kanungu, Rukungiri Districts), with construction to be carried out under future investments. The target areas are characterized by regional market opportunities where cooperatives are present (albeit with diversified level of performance), and farmers well versed in rainfed agriculture, with unreliable rainfall presenting a key limiting factor for yield increase, crop diversification and intensification. In order to multiply the benefits of public scheme development, the project will pilot public support to farmers around the command area in Isingiro, Kanungu and Rukungiri Districts to develop farmer-led small and micro scale irrigation.
- **Northern Region:** The project will support an area (Nyimur, Lamwo District) with a population characterized by high level of food insecurity and which has been heavily affected by fragility and only recently returned to the area after years of conflicts. The project will re-engage this population in rainfed agriculture to provide quick wins in terms of increasing food security and job creation, in addition to increasing readiness for future irrigation development. The project will support the design of a new irrigation scheme, with construction to be carried out under future investments. The project will also support the establishment of management structures in two recently rehabilitated public medium-scale irrigation schemes (Olweny, Lira District; Agoro, Lamwo District).
- **Eastern Region:** The project will support the design of a new irrigation scheme (Amagoro, Tororo District), with construction to be carried out under future investments. The target area is characterized by regional market opportunities, and farmers well versed in rainfed agriculture, with unreliability of rainfall presenting a key limiting factor for yield increase, crop diversification and intensification.
- **Central Region:** The project will pilot public support to farmers in three districts (Mukono, Wakiso and Mpigi) characterized by easy access to local markets due to their proximity to Kampala, to develop farmer-led small and micro scale irrigation.

24. Component 1 comprises three sub-components.

25. *Sub-component 1.1 Large and Medium-scale Irrigation (US\$122.5 million).* Large (>1,000 ha) and medium (100 to 1,000 ha) scale irrigation schemes are established when an important water source is available in conjunction with a sizable irrigable area, offering the chance of developing economies of scale for marketing and value addition. As water might be not directly accessible across the whole irrigable area, and/or as the water source might be at a certain distance from the irrigable area and/or variable over the year, off-farm infrastructures (i.e. dams, diversions weirs, transmission pipes or canals, distribution networks) are required. The project will construct new irrigation schemes (Kabuyanda and Matanda); support the development and strengthening of management model of new (Kabuyanda and Matanda) and existing (Olweny and Agoro) irrigation schemes; and develop studies for future irrigation schemes (Nyimur, Enengo and Amagoro). Activities will include: (i) dam construction and associated head works; (ii) construction of irrigation networks (pipes, canals, hydro-mechanical equipment) up to the farm gate; (iii) construction of drainage networks; (iv) construction of access and scheme roads, scheme offices, sanitation facilities, and storage facilities; (v) construction of weather stations; (vi) development of feasibility studies, detailed designs and safeguard instruments for said schemes; (vii) monitoring and supervision of civil works; (viii) support of management of said schemes; (ix) environmental assessments and audits and implementation of the Environmental and Social Management Plan (ESMP); (x) roll out of Certificates of Customary Ownership; and (xi) start-up fund for O&M.

the riparian states effective 1999, which seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security. The NBI is based in Uganda, and it includes Burundi, DRC, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda. Eritrea is participating actively in the NBI as an observer. NELSAP promotes investments in power development and trade, river basin management and development, agricultural trade and productivity, and fisheries and watershed management.



26. *Sub-component 1.2 Small and Micro-scale Irrigation (US\$2.0 million)*. Small (5 to 100 ha) and micro (< 5 ha) scale irrigation schemes are smaller in size, relying on a nearby water source mobilized with simpler and lower-cost infrastructure, making it easier for farmers (individually or collectively) to take charge of irrigation development and management. The project will pilot public support for the construction of farmer-led small and micro scale irrigation schemes around the two new irrigation schemes (Isingiro and Kanungu Districts), future irrigation schemes (Rukungiri and Tororo Districts), and in areas close to Kampala characterized by high marketing potential (Mukono, Wakiso and Mpigi Districts),²⁷ adopting a value chain approach. Activities will include: (i) construction of small water retention facilities and associated head works; (ii) drilling of wells and boreholes; (iii) construction of small irrigation networks (pipes, canals, hydro-mechanical equipment); (iv) support for preparation of designs and monitoring and control of works; and (v) Matching Grants to facilitate access to irrigation equipment.

27. *Sub-component 1.3 Integrated Catchment Management (US\$2.9 million)*. It will develop and implement integrated catchment management interventions upstream from the two new irrigation schemes (Kabuyanda and Matanda), to improve the sustainability of the schemes, including the restoration/reforestation activity in Rwoho Central Forest Reserve (CFR) in Kabuyanda. Activities will include: (i) preparation of integrated micro-catchment management plans; (ii) implementation of identified watershed management measures from the micro-catchment management plans; and (iii) restoration and reforestation activities.

28. *Adaptation and mitigation co-benefits*. By investing in irrigation and drainage infrastructures, the project will avert the significant decrease in crop yield projected as a consequence of climate change, thereby raising farmers' resilience to water shortages and floods.²⁸ Irrigation can mitigate the effects of climate change and increase yields by two to five times for most crops.²⁹ New irrigation schemes will be pressurized, for higher transportation efficiency and flexibility, allowing for higher distribution efficiency on farm. At the same time, the schemes will be gravity-based, taking advantage of natural pressure without introducing pumps, thus producing zero emissions. The design of the Kabuyanda scheme initially envisaged inclusion of pumping stations, and the optimization of the design was focused on eliminating the pumping stations in favor of using natural pressure. In addition, by financing the planting of trees as part of the catchment management plan under the Environmental and Social Impact Assessment (ESIA), the project will contribute to net emission reduction. Under the farmer-led irrigation model, solar pumps will be used, and thus produce zero emissions.

Component 2. Support Services for Agricultural Production and Value-Chain Development (US\$50.0 million, of which US\$31.5 million equivalent IDA)

29. Component 2 aims to support farmers carrying out on-farm irrigation, accessing production and value addition knowledge and skills, and developing sustainable market access. The project will support farmers in increasing their knowledge using a farmer field school (FFS) approach, increasing access to inputs (improved seeds, fertilizers), on-farm irrigation technologies, machineries and postharvest and agro-processing infrastructures through the use of smart subsidies and consultancy services.

²⁷ The Farmer led irrigation Districts were selected on the basis of their potential for production of high value crops (coffee, horticulture and dairy), presence of off-takers in selected value chains and proximity to the market. A value chain analysis was carried out to identify potential off-takers who are already contracting smallholder suppliers and willing to purchase additional produce realized through the project-supported irrigation systems.

²⁸ According to the ND-GAIN index, Uganda will be highly vulnerable to decrease of yields of rice, wheat and maize (para. 4).

²⁹ Ugandan agricultural data for 2015 show that yields from irrigated farmlands recorded a much higher output compared to non-irrigated farms: maize production increased from 2 to 8 ton/ha; vegetables from 15 to over 30 ton/ha; and paddy from 1.8 to 4.5 ton/ha (para. 7).



30. Component 2 will comprise of two sub-components.

31. *Sub-component 2.1 On-farm Production and Productivity (US\$25.8 million)*. This sub-component will provide support to farmers and farmers' groups for production and productivity improvement at the farm level in the new irrigation schemes (Kabuyanda in Isingiro District; Matanda in Kanungu District), in existing irrigation schemes (Olweny in Lira District; Agoro in Lamwo District), in small and micro irrigation schemes (Isingiro, Kanungu, Rukungiri, Tororo, Mukono, Wakiso and Mpigi Districts) as well as in the area of the proposed future irrigation scheme (Nyimur). Activities will include: (i) creation and strengthening of farmers' groups, provide extension services, facilitate access to inputs, promote good agricultural practices, sustainable land management practices, and integrated pests and disease management; (ii) Matching Grants to facilitate access to inputs (i.e. seeds, agro-chemicals); (iii) matching grants to facilitate access to on-farm irrigation technology; and (iv) monitor and supervision of project activities.

32. *Sub-component 2.2 Value Addition and Market Linkages (US\$5.7 million)*. It will provide support to farmers' groups for value-chain development and strengthening and establishment of market linkages. Activities will include: (i) creation and strengthening linkage with value chain actors in improved post-harvest handling, agro-processing, access to financing services, access to markets and market information; (ii) Matching Grants to facilitate access to equipment; and (iii) purchase of small goods.

33. *Adaptation and mitigation co-benefits*. By investing in activities which increase farmers access to and adoption of inputs (seeds, fertilizers, agro-chemicals), good agricultural practices, sustainable land management practices, and integrated pest management, the project will avert the significant decrease in crop yields projected as a consequence of climate change. Benefits will be multiplied by the introduction of irrigation. By supporting improved soil and water conservation measures, the project will contribute to net emission reduction by allowing for some stock of CO₂ in the soil.

Component 3. Institutional Strengthening and Implementation Support (US\$10.3 million equivalent, all of which IDA credit)

34. Component 3 will comprise of two sub-components.

35. *Sub-component 3.1 Institutional Strengthening (US\$1.9 million)*. Activities will include: (i) short-term studies on management models in irrigation, tariff structures, and prerequisites for financial sustainability; and (ii) capacity building and training for irrigation development and management.

36. *Sub-component 3.2 Implementation Support (US\$8.4 million)*. This includes support to the Project Support Team (PST) for project coordination, implementation, supervision and monitoring and evaluation (M&E), including for the management, implementation and supervision of the project's fiduciary and safeguards aspects. Activities will include: (i) hiring of specialists for the PST; (ii) purchase of project implementation goods and services (ICT equipment, software, vehicles); and (iii) operational costs.

C. Project Beneficiaries

37. Primary project beneficiaries number 63,200 farmers, mainly smallholders (Table 1). The beneficiary households are typically engaged in agriculture at various levels (thus the consideration of three farmer beneficiaries per household),³⁰

³⁰ Household head, spouse and another member of the household active in farming, for example an adult child.

and earn about one dollar per day, around or below the poverty line. They produce for self-consumption and commercialization, usually do not have land tenure rights, and have limited access to credit. Beneficiary farmers mostly fall into the segment of “battling the elements” as per the National Survey and Segmentation of Smallholder Households in Uganda.

38. Of the above, 58,100 farmers will benefit from new or improved irrigation services. About 45,800 farmers will benefit from new irrigation services: 45,000 farmers will be within the command area of the new irrigation schemes of Kabuyanda and Matanda; while about 800 farmers will be provided with support for the development of farmer-led small and micro-scale irrigation.³¹ About 12,300 farmers will benefit from improved irrigation services within the command area of the existing irrigation schemes of Agoro and Olweny.

39. All 63,200 farmers will benefit from support services for agricultural production and value-chain development, including Matching Grants for facilitated access to inputs and on-farm irrigation equipment. This includes all farmers benefitting from new and improved irrigation services, plus about 5,100 farmers in Nyimur. Nyimur is an area characterized by high level of food insecurity and a population which has been heavily affected by fragility and only recently returned to the area after years of conflicts. These farmers will benefit from support services for agricultural production and value-chain development in order to re-engage in rainfed agriculture and achieve quick wins in terms of increasing food security and job creation, in addition to increasing readiness for future irrigation development.

40. Forty percent of beneficiaries are expected to be women, benefitting from irrigation services as well as from support for on-farm production and productivity and value chain development. Component 2 activities have been designed in a way to ensure proactive engagement of women and women’s group, ensuring equal benefit.

41. Regarding secondary project beneficiaries, the project will strengthen the capacity of staff from MWE, MAAIF and LGs, whose capacity to implement and to provide oversight to the project will be improved.

42. Indirectly, the project will benefit farmers in future irrigation scheme areas in Enengo, Nyimur and Amagoro. The assessment of the number of potential beneficiaries in these areas will be done during project implementation.

Table 1. Beneficiaries by Target Area

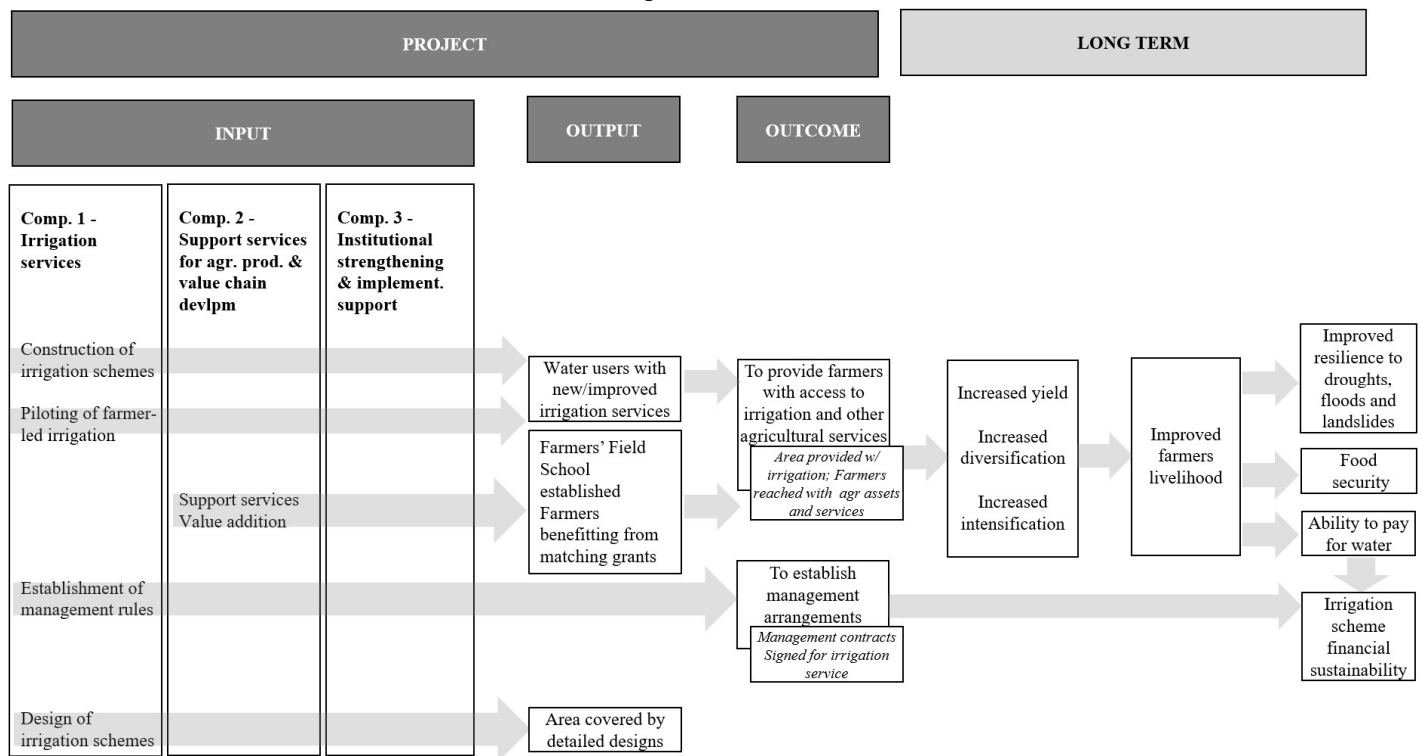
Scheme	District	Farming households	Farmers
Kabuyanda	Isingiro	10,700	32,100
Matanda	Kanungu	4,300	12,900
Olweny	Lira	1,500	4,500
Agoro	Lamwo	2,600	7,800
Nyimur		1,700	5,100
Farmer-led micro and small-scale irrigation	Mukono, Wakiso, Mpigi, Isingiro, Kanungu, Rukungiri and Tororo	800	
Total		21,600	63,200

(Population in the Command Area from Census 2014 and engaged in agriculture)

³¹ Assuming US\$2 million allocated to support to farmer-led irrigation under the project, a matching in equal share by private finances, an average farm holding of 1 ha, and a cost of 5,000 US\$/ha.

D. Results Chain

Figure 6. Results Chain



43. Uganda has been traditionally well endowed with water resources, with rainfall sustaining two rainfed agriculture productions per year in most parts of the country, thus providing little impetus for irrigation development. However, farmers are confronted with more variable and less predictable rainfall as a consequence of climate change, with yields well below their potential, crop losses, and strong projected decrease of yields of key commodities. Farmers suffer weak market linkages, and market dysfunctions are exacerbated by the small size of farms. They have low capacity to acquire and deploy agriculture technology, which is driving the sector's high vulnerability to climate change. Limited access to credit is a major constraint to increased use of technologies and inputs. More than 80 percent of the land is not registered, giving farmers no access to credit from financial institutions for lack of collaterals. Low agricultural productivity adversely affects income and employment generation, food security, and sustainable rural development.

44. In the few areas under formal irrigation (public schemes), farmers usually receive poor water service, mainly due to limited capacity of the farmers' organization to manage the system, which prevents them from fully taking advantage of water as a productive input. Farmers only seldom pay for the water, resulting in system disrepair, and periodic need for public intervention for rehabilitation. By accessing reliable irrigation services, farmers will be able to sustain production over the wet season should rainfalls fail (stabilize and increase yield), extend production into the dry season (increase intensification), and explore more profitable cropping patterns (increase diversification). Yields will further stabilize and increase through adoption of other productive inputs (improved seeds, fertilizers, mechanization). Support to value addition and access to markets (both local and regional) will allow for higher returns, and higher farmers' income. Farmers will be more inclined to pay for the irrigation equipment and the costs for water service once satisfied with water services and having higher financial resources.



45. The project will contribute to the long-term objectives of improved yields, increased diversification, and increased intensification, all leading to improved livelihoods and access to fee-based services, and resilience to climatic events and food insecurity. These long-term objectives could be achieved by providing farmers with access to irrigation through the development of public irrigation schemes, and the piloting of farmer-led irrigation. Across these irrigation models, farmers will be provided with support services for agricultural production, value addition and market access. While the project is conceived as a stand-alone investment operation, it fosters the creation of the conditions for scalability of investments, by: (i) supporting the preparation of feasibility studies and detailed designs for future irrigation schemes; (ii) piloting support to small and micro-scale irrigation, which has the potential for quick scale up considering that it is farmer-led and characterized by smaller infrastructures; and (iii) exploring avenues for bringing together public and private finances, thus reducing the burden of irrigation investments on public resources.

E. Rationale for World Bank Involvement and Role of Partners

46. The World Bank's support is justified by the public nature of irrigation development for smallholders in Uganda.

The ambitious irrigation agenda put forward by the GoU with the National Irrigation Policy responds to the urgent need to increase climate resilience of poor smallholders, promote poverty reduction, enhance food security. While the policy highlights the willingness to increase the role of private stakeholders in irrigation (in the form of farmers' contribution to investment, farmers' payment for the water service, engagement of irrigation system operators for public schemes' management, private development of irrigation schemes, etc.), the high capital cost of irrigation investments against the low income of smallholders in Uganda calls for public intervention in the sector. The World Bank offers a wide array of support, ranging from inputs to scheme design to management options, which would benefit from World Bank engagement in Uganda on potable water service delivery. Over the past decades, the World Bank has been supporting irrigation development and modernization investments worldwide, and many of the experiences and lessons from those investments are relevant to Uganda. The World Bank's support will help: (i) enable integrated project planning, design, implementation and operational management; (ii) strengthen inclusive and sustainable development focus; (iii) assure quality of project studies and designs (adoption of the most appropriate and cost-effective technologies), as well as infrastructure construction; and (iv) implement the project efficiently and manage the environmental and social impacts. There is a high expectation from the GoU that the World Bank support will enable irrigation institutional development for sustainability of the proposed investments.

47. The World Bank has a long-standing involvement in Uganda, and the project builds upon and complements ongoing operations. In particular:

- **Irrigation development:** ICRP complements the *Agriculture Cluster Development Project* (P145037, ACDP, under implementation). Both projects support the design of new public schemes, with ACDP focusing on medium-scale rice schemes under MAAIF, and ICRP on large-scale schemes for diversified production under MWE.
- **Other agricultural services:** ICRP builds upon ACDP, which was strategic in defining MAAIF's approach for the provision of support to farmers to raise on-farm productivity, production, and marketable volumes of selected agricultural commodities.
- **Land tenure:** ICRP recognizes the importance of land tenure security for irrigation development. The project builds upon the achievements of the *Competitiveness and Enterprise Development Project* (CEDP, P130471, under implementation) under the Ministry of Lands, Housing and Urban Development (MoLHUD) which piloted the systematic registration of communal and individually owned land through the provision of Certificates of Customary Ownership (CCOs). Under CEDP, an assessment of the cost and action plan for provision of CCOs in Isingiro District, where Kabuyanda irrigation scheme will be located, has been carried out. Similarly, the *Support to Municipal Infrastructure Development Program* (P163515, under implementation) is increasing land tenure security in refugees



hosting districts (including Isingiro) to the benefit of both host communities and refugees through CCOs.

- **Safeguard compliance:** ICRP builds upon the lessons learned of past investment operations, particularly in the road sector, through exchanges of experiences between the Uganda National Roads Authority (UNRA) and MWE.

48. The International Finance Corporation (IFC) provides support to increase private sector participation in irrigated agriculture in Uganda. IFC's support will facilitate attracting private investments to complement the World Bank and GoU investments, notably in relation to value chain development and access to finance for smallholder farmers, cooperatives and farmer groups, both directly (through anchor stakeholders) and indirectly (through financial intermediaries, such as commercial banks, microfinance institutions, insurance, savings and credit cooperative societies). IFC was instrumental in the design of the pilot for farmer-led small and micro-scale development (Sub-component 1.2), in an effort to attract private capital. IFC supported MAAIF in the creation of a sustainable implementation modality that combines a subsidy scheme, farmers own contribution and a credit facility from a financial institution, so as to crowd in private sector players and increase scale and reach of beneficiaries. IFC will actively engage the private sector to make investments that will leverage the government investment with a goal of at least bringing in the same amount of private capital as the government funding within ten years after the infrastructure is commissioned.

49. The World Bank is coordinating with other development partners involved in irrigation in Uganda. These partners include African Development Bank (AfDB), Islamic Development Bank (IsDB), European Union (EU), Japanese International Cooperation Agency (JICA), and the Food and Agriculture Organization of the United Nations (FAO). The project targets two existing schemes (Olweny and Agoro) rehabilitated under AfDB financing (Farm Income Enhancement and Forestry Conservation (FIEFOC 1)). Component 2 of the project builds upon the FAO concept of the FFS, which has been adapted for irrigated context. Also, the approach adopted to increase land tenure security through CCOs is inspired by the success story of the MoLHUD in Kasese District with support from FAO. The project was reviewed by the Water Sector Development Partners Group,³² and feedback incorporated to the extent possible. Coordination with the Alliance for a Green Revolution in Africa (AGRA) was also established, in particular with reference to the support to farmer-led irrigation.

F. Lessons Learned and Reflected in the Project Design

50. Several lessons were derived from irrigation operations supported by the World Bank and other development partners in Uganda and elsewhere, and incorporated in the project design.

51. Irrigation is not a one-size fits all proposition. In line with the National Irrigation Policy, the project recognizes that different irrigation models are to be developed in parallel to respond to local needs and opportunities, building upon their comparative advantages. To this end, the project supports various sizes of irrigation development (micro, < 5 ha; small, 5 to 100 ha; medium, 100 to 1,000 ha; and large, > 1,000 ha), both public and farmer-led irrigation development, and a variety of water sources (surface and groundwater).

52. Support to smallholder farmers in the first seasons following the introduction of irrigation is fundamental to ensure that potential benefits materialize, thus requiring adjustment of project duration. Experience in Africa and elsewhere indicates that construction of large-scale irrigation schemes can take between three to five years. As a result, in many circumstances, projects close around the time irrigation services start, translating into very limited support to farmers as they go through the transition from rainfed to irrigated agriculture. Consequently, yield increase, intensification and

³² Presentation in May 2019.



diversification do not occur at the expected rate, and failure to use the new technology can sometimes result in farmers reverting to rainfed agriculture. To this end, the project duration is proposed to be six years.

53. Integrated irrigation and agricultural investments are a crucial prerequisite for the success of the project. Water is only one of the many factors required to increase total factor productivity, together with inputs (seeds, agro-chemicals), equipment (machineries), and knowledge. International experience teaches that irrigation investments sometimes do not yield the intended increases in production and productivity, and thus the expected economic and financial return on investment, due to lack of synergy between activities, with infrastructure development being prioritized over the softer activities (i.e. community mobilization and engagement, creation and strengthening of farmers' organization, provision of extension services). Under ICRP, Components 1 and 2 will run in parallel. ICRP includes the provision of other agricultural services, based on the consideration that the existing World Bank portfolio does not overlap geographically.

54. Development of infrastructure needs to go hand in hand with development of institutions. Too often the focus during project implementation is on the day-to-day challenges of infrastructure development. Incorporating management related activities in the project design will keep the project focused on sustainability issues both during and after the life of the project. Attention will be given to the design of infrastructure with O&M requirements in line with local capacity (i.e. in Kabuyanda, the optimization of the design eliminated pumping stations, which reduced O&M costs and energy requirements for pumping).

55. Clear land tenure rights are a prerequisite to irrigation investments. In Uganda, less than 20 percent of the land is registered. Alongside land size, limited land tenure security has shown to be a critical bottleneck hampering investment in agriculture. In Uganda, CCOs are a unique tool for customary land registration at scale, including recognition of women's right over land. Financial institutions increasingly recognize CCOs as a collateral to access credit. The project will build synergies with ongoing operations with MoLHUD in order to facilitate prioritization of the areas targeted under the project for the roll out of the CCOs. Should this not be possible, the project includes provision for supporting the CCOs process (Sub-component 1.1).

56. Farmers' financial contribution is key to ensure ownership and sustainability of irrigation development, and leverage public funds to speed up irrigation scale up, but equity of treatment of farmers across irrigation models needs to be ensured. In some schemes, the GoU has sometimes taken over the responsibility and costs of the on-farm investments (mainly in the form of land levelling). This reduced farmers' ownership of the investment, made it more challenging to raise water fees, and undermined sustainability of the system. Based on this experience and the National Irrigation Policy, for the schemes to be constructed under the project, a connection fee will be required in order to access the water service at the farm gate, and a volumetric water fee will be charged, both possible thanks to the choice of constructing a piped network rather than an open canal scheme as has been usually the case in Uganda so far. For on-farm equipment, farmers will be required to contribute to its purchase, considering that the equipment is privately owned. Similarly, in small and micro-scale irrigation scheme, farmers will be asked to contribute at a similar rate in order to access the equipment, ensuring equity of treatment across models.

II. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

57. MWE is the implementing agency for the project. MWE will be responsible for planning, budgeting, procurement, financial management (FM), safeguard, M&E and reporting for the whole project. The Permanent Secretary (PS) of MWE



will be the accounting officer for all project funds. MAAIF will be a technical implementation partner for activities which fall under MAAIF's mandate under Sub-component 1.2 and Component 2. National Forestry Authority (NFA) will be a technical implementation partner for activities which fall under NFA's mandate, namely the reforestation activities in Rwoho CFR under Sub-component 1.3.

58. The project will be implemented through existing government structures, relying mainly on government staff. Specialists – where necessary - will be recruited where either ministry has inadequate capacity. A PST will be recruited by MWE to provide backstopping in the areas of – among others – management, finance, procurement, safeguards and M&E. This set-up strengthens and is aligned with government structures and ensures sustainability. It also promotes cooperation between two ministries (MWE and MAAIF) which have to keep working in close alignment when it comes to irrigation development, building on their respective mandates.

59. District Technical Support Teams (DTSTs) designated from the relevant implementing departments will be established at local level.

60. At National level, the Project Technical Committee (PTC) will be comprised of the Commissioner Water for Production Department (WfP), Commissioner WRRD, Assistant Commissioner WfP and Project Coordinator in MWE; Commissioner for Agriculture Infrastructure and Water for Agricultural Production Department (AI&WfP), Commissioner Crop Production, Commissioner Agricultural Investment and Enterprise Development, Commissioner Agricultural Extension and Skills Management, Commissioner Crop Inspection and Certification and Project Coordinator in MAAIF and Executive Director of NFA, who shall provide technical oversight of project activities under their mandate. The PTC will be chaired by the Commissioner WfP in MWE.

61. MWE will establish a multi-sectoral Project Steering Committee (PSC) to provide high-level operational and policy guidance and oversight. The PSC will meet at least twice a year to approve work plans and budgets, review progress of implementation, and ensure adherence to relevant government policies and strategies. The PSC will be co-chaired by the PS of MWE and the PS of MAAIF, and will comprise PSs (or their representatives) of the Ministry of Finance, Planning and Economic Development (MoFPED); Ministry of Gender, Labor and Social Development (MoGLSD); Ministry of Trade, Industry and Cooperatives (MoTIC); Ministry of Local Governments (MoLG); MoLHUD; Executive Secretaries of Uganda National Farmers' Federation (UNFFE); Executive Director of NFA; and the Chief Administrative Officers (CAOs) of the Districts where the project is implemented.

B. Results Monitoring and Evaluation Arrangements

62. MWE will have overall responsibility for project monitoring and reporting. Both MWE and MAAIF will be responsible for collecting data and analysis in relation to their respective components. Project M&E will draw upon lessons from the implementation of the World Bank Water Management and Development Project (WMDP, P123204) under MWE, to have in place a robust and simplified system that tracks progress and captures results over the lifetime of the project. An integrated M&E system will be developed and implemented as part of the project to support implementation and reporting. Monitoring and reporting will focus on key performance indicators from specific project activities that contribute to the project's intermediate results and PDO-level outcomes. The MWE will submit progress reports on a quarterly basis to the World Bank. A mid-term review will be carried out to evaluate progress on implementation and in achieving expected outcomes, and to identify potential issues in need of attention and resolution. An end-of-project evaluation will also be conducted two months before project closing to assess whether the intermediate results and PDO-level indicators have been achieved in an efficient manner, the sustainability of the results, and lessons learned.



63. In addition to the indicators included in the results framework, the following elements will be monitored:

- On a sample of farms, yield levels will be monitored twice a year for the whole duration of the project (before and after introduction of irrigation), together with agro-economic elements to track change in margins at farm level; and
- Changes in the land tenure situation, in year 1, 3, 5 and 6.

C. Sustainability

64. Sustainability of irrigation investments, and of the benefits that can be derived from those, will depend upon: (i) identification of a suitable management model for each scheme; and (ii) implementation support, capacity development, availability of the farmers and their readiness to demand and pay for the water service.

65. Management model. Currently, management of public irrigation schemes in Uganda is delegated from MWE and MAAIF to the district where the scheme is located, and then to a farmers' organization (i.e. cooperative, association), which presents challenges. The project will support the strengthening of the management arrangements in two existing irrigation schemes (Olweny and Agoro), in the form of consultancy services to strengthen the capacity of the WUA in charge of the management of the schemes or to accompany the WUA to establish contractual arrangements with an irrigation system operator. In addition, the project will support the establishment of the management arrangements for the two new irrigation schemes (Kabuyanda and Matanda), along the following roles and responsibilities:

- MWE is responsible for water regulation, management, allocation and monitoring functions. MWE will delegate the management function once the scheme is constructed, in line with the approach taken so far for existing schemes. Given the size of the schemes and the technical complexity, the management will not be entrusted to a WUA, but rather delegated to a newly created water board (or other authority designated by the Minister) which will then engage an irrigation system operator, drawing lessons from the management of water supply systems.
- MAAIF is responsible for the agricultural production function.
- WUAs will play an advocacy role so that voice and needs of the farmers are heard and conflicts are resolved.
- An irrigation system operator will be assigned the management of the irrigation scheme, with the objective of having a specialized entity with adequate technical skills and clear mandate.
- Cooperatives will be refocused on their original role in relation to value addition and market linkages, which should facilitate their better performance.

66. Payment for water services. Ideally, collection of farmers' fees should cover O&M costs of the irrigation scheme. An initial comparison between the O&M costs in Kabuyanda and farmers' capacity to pay has been carried out which demonstrates that in principle farmers will be able to sustain the provision of water service. In order to account for the time required for farmers to start accessing the irrigation service over the first few seasons for project implementation, the project includes a startup fund for O&M for the new schemes (Annex 4).

III. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

Technical

67. Irrigation in Uganda is and will remain supplemental. The country is generally well endowed in precipitation, with a bimodal pattern over large part of the country, which suggests that irrigation has a supplemental nature, aiming at



complementing water availability during dry spells occurring over the rainy season, and allowing a further cropping cycle during the dry season. However, international experience in similar contexts suggests that farmers will as much as possible try to rely on rainfall to avoid paying for the water fee, unless market opportunities are identified to allow farmers to take advantage of the higher price for off-season product. This aspect needs to be taken in due consideration when implementing market support activities under Component 2. Also, farmers' preference in terms of preferred period of irrigation needs to be accounted for when conceiving the contractual arrangements for the management of the scheme (i.e., decision whether to provide irrigation over the whole year, or during certain months only).

68. The project will finance the first large-scale piped irrigation schemes country-wide. Public schemes in Uganda are currently in the range of 600 ha to 1,000 ha. As irrigation expands across the country, it is only natural that larger schemes are constructed, to take advantage of economies of scales also in terms of value chain development and market opportunities. The schemes to be constructed under the project will be in the order of 3,000 ha, thus design strategies and management options need to be adapted as a consequence. Whenever natural pressure allows, the project will opt for a piped network (with no pumping stations), considering the opportunity to offer a higher quality service to individual farmers coupled with the possibility of easier management of the water service (including possibility to cut the service to farmers who do not pay for the water bill).

69. Irrigation scheme design needs to be based on a realistic farm layout. This represents a major challenge in the Ugandan context, where there are no cadastral maps and there might be sensitivities in the surveyance of the land due to widespread fears of land grabbing. In Kabuyanda, MWE carried out the farm survey in November 2018, based on which the final irrigation network design could be developed. Fearing risk of conflicts over land, MWE has taken the upfront decision not to undertake any land consolidation / redistribution in the areas where public schemes will be developed. This brings challenges from a technical standpoint, as the hydraulic infrastructure will need to conform to a farm layout which evolved under rainfed conditions, and can be thus sub-optimal for the development of irrigation. Collective management of a hydrant among a few farmers can provide an easy way out at design stage, but can also result in complications for the management of the system.

70. Readiness for implementation. Under Component 1, detailed designs for Kabuyanda are completed, and bidding documents are at an advanced stage of preparation (total estimated amount of US\$51 million). Bidding of works in Kabuyanda could be launched at the beginning of project implementation, with contracts signed following effectiveness, pending progress in compensation (on GoU budget). Feasibility study for Matanda is ongoing, and designs are to be completed by project effectiveness. Bidding of works in Matanda could be launched during the first year of project implementation. Under Component 2, terms of references (ToR) for consultancy services to be launched over the first year of project implementation will be cleared at the beginning of project implementation, and bidding documents will be cleared prior to Effectiveness (total estimated amount of US\$5 million). Under Component 3, ToRs for PST personnel are at advanced stage of preparation, and bidding documents will be cleared and contracts signed soon after project effectiveness (total estimated amount of US\$3 million). It is expected that overall, 40 percent of the loan amount will be ready for advance procurement prior to effectiveness.

Economic and Financial Analysis

71. An economic and financial analysis was carried out for Kabuyanda and Matanda, the two irrigation schemes to be constructed under the project, using information from feasibility studies, detailed designs and secondary data (see Annex 4). The data were verified on sample basis through expert-level field visits and stakeholder consultations.



72. **The economic analysis** concludes that, for Kabuyanda, the net present value of the project over a 30-year period at a discount rate of 5 percent is estimated at US\$106.4 million with the economic internal rate of return (EIRR) of 16.8 percent and a benefit-cost ratio (B/C) of 2.79. For Matanda, the net present value (NPV) of the project over a 30-year period at a discount rate of 5 percent is estimated at US\$178.6 million with the EIRR of 19.6 percent and a B/C of 3.46. Overall, the project is expected to generate a NPV of US\$285 million over 30 years period with EIRR of 18.4 percent and B/C of 3.16.

73. **The financial analysis** indicates that irrigation significantly enhances the production and productivity of the crop enterprises, which leads to significant increases in farm income. Depending on the farm typology, an average farm (0.4 78 ha) can see the annual income increase by three to four times. The analysis of the O&M costs in Kabuyanda indicates that these would represent only one to five percent of new farm income with project, thus potentially affordable by farmers.

B. Fiduciary

(i) Financial Management (FM)

74. **The World Bank carried out an assessment of the proposed FM arrangements to be implemented by MWE.** The assessment focused mainly on the FM arrangements at MWE since it will be responsible for managing the project funds. The objective of the assessment was to determine: (i) whether MWE has adequate FM arrangements to ensure that project funds will be used for purposes intended in an efficient and economical way; (ii) financial reports will be prepared in an accurate, reliable and timely manner; and (iii) the project assets will be safeguarded. The assessment was carried out in accordance with the World Bank Directive: Financial Management Manual for World Bank Investment Project Financing Operations issued February 4, 2015 and effective from March 1, 2010; and the World Bank Guidance: Financial Management in World Bank Investment Project Financing Operations effective November 10, 2017. The conclusion of the assessment is that the FM arrangements for the project have an overall risk rating of Substantial which satisfies the World Bank's minimum requirements. The FM arrangements are adequate to provide, with reasonable assurance, accurate and timely information on the status of the project required by IDA. The residual risk after implementation of the recommended mitigation measures will be moderate.

75. **The assessment identified key risks that include:** (i) failure to carry out internal audit reviews. This is a high risk given the number of ongoing activities and spread of operations where such reviews give management needed assurance of fiduciary status; and (ii) frequent movement from the project of qualified and experienced staff.

76. **Actions outlined in the FM action plan will be undertaken by MWE to strengthen the FM system.** These actions include the recruitment of a project accountant, setting up of the reporting systems and agreeing on the audit ToR. To ensure that the project is effectively implemented, MWE will need to ensure that appropriate staffing arrangements are maintained throughout the life of the project.

(ii) Procurement

77. **Applicable procurement procedures.** The Government will carry out procurement under the proposed project in accordance with the World Bank's "Procurement Regulations for IPF Borrowers" (Procurement Regulations), dated July 2016 and revised August 2018 under the "New Procurement Framework (NPF)", and the "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated July 1, 2016,



and other provisions stipulated in the Financing Agreement.

78. Procurement Capacity Risk Assessment summary. A procurement capacity and risk assessment was carried out by the World Bank in February 2019. It concluded that PST staff have limited proficiency in IDA procurement management. The storage of records is inadequate but there is an ongoing procurement process for shelves and cabinets, with delivery expected by October 2019. The works under the project involve irrigation schemes that cover a much wider area than those previously handled by the Government. MWE will enhance its technical capacity by hiring staff to fill the skills gap to ensure adequate in-house capacity to supervise the contractors and consultants. MWE only recently got new members of the Contracts Committee who are not familiar with IDA procedures and have already caused some delays under the Integrated Water Management and Development Project (IWMDP). Based on this assessment and in the context of the project, the procurement risk rating is “High”. The residual risks after the implementation of the mitigation measures is “Substantial”.

79. Key issues and risks. The noted risks at MWE are: (i) the value of the contracts under the proposed project is substantially higher than those previously handled by the Wfp, there is thus no previous experience in MWE in contracts of this size; (ii) gaps in technical expertise in numbers and skills sets affecting inhouse technical capacity; (iii) underestimation of the cost of works attributed to gaps in review during feasibility studies and the preparation of designs for works leading to multiple design changes/variations at implementation stage; (iv) limited domestic contracting capacity to conduct projects of this nature, complexity and scope; (v) The MWE Procurement and Disposal Unit (PDU) and Contracts Committee have limited knowledge in using World Bank procurement procedures exacerbated by a heavy workload on PDU resulting in delays in procurement processing; (vi) gaps in contract management skills resulting in time and cost overruns during contract implementation; (vii) inadequate storage arrangements for procurement records; (viii) delays in paying vendors due to prolonged internal approving processes; and (ix) delays in preparing environmental and social safeguard studies and resettlement action plans, and thereafter in compensating Project Affected Persons (PAPs) resulting in delays in procurement processing and contract execution respectively.

80. Preliminary risk mitigation measures. These include: (i) costed designs for up to US\$50 million for works under the project completed at the beginning of project implementation for one of the two schemes to be financed; (ii) thorough and diligent review by the Government of feasibility study and detailed design reports to ensure that any gaps are identified and addressed at design stage; (iii) packaging to consider contracting capacity of the potential contractors; (iv) market sounding was done and in addition wider dissemination of bidding opportunities to elicit participation from the capable providers; (v) training and hand holding for capacity building of MWE staff on IDA funded procurement management; (vi) training on FIDIC contracts and contract management in general; (vii) preparation of contract management plans to demonstrate among others deployment of adequate staff for the contract management stage including on site presence; (viii) contracting allowing for adequate mobilisation time and at least 18 months as construction duration; (ix) hiring of specialists including a dam specialist, a resident supervisor, a resident sociologist to ensure sufficient inhouse technical capacity (in skills and numbers) to supervise the contractors and consultants; (x) initially monthly project team meetings to track progress to identify and timely address bottlenecks, and regular senior management monitoring and follow up of implementation; (xi) preparing environmental and social safeguard studies timely for inclusion in bidding document; (xii) timely provision of funds for compensating PAPs; (xiii) hiring of procurement specialist with ToR acceptable to IDA to support the project procurement processing; and (xiv) conclude ongoing procurement of shelves and cabinets for storage of records in the 50m² room to ensure adequate lockable space for storage of active files and for archiving.



C. Safeguards

(i) Environmental Safeguards

81. The project contributes to overall environmental and social sustainability by developing climate resilience in the face of a changing climate among poor smallholder farmers, and by including activities like catchment management.

As the project involves dam and irrigation system construction, anticipated significant impacts during construction and operation may include: (i) alteration of river hydrology, which lead to impacts on aquatic and riparian habitats, and water quality; (ii) health and safety impacts (both public/community and occupational); (iii) flooding risks; (iv) degradation of natural habitats such as forests, wetlands and rivers; (v) hydrological impacts and land pollution arising from inappropriate waste management practices; and (vi) labor influx impacts including risks of GBV and disease outbreaks.

82. The project triggers the following Environmental Safeguards Policies: OP 4.01 Environmental Assessment because of the likely adverse environmental and social impacts associated with the proposed project investments; OP 4.04 Natural Habitats because of implementation of the project in natural habitats (rivers, wetlands, forests); OP 4.36 Forests because some of the project activities will be implemented in a forest reserve and also involve tree planting as part of catchment management; OP 4.11 Physical Cultural Resources because of excavation works which may impact on Physical Cultural Resources; OP 4.09 Pest Management because of the likely use of pesticides as part of agricultural intensification activities; and OP 4.37 Safety of Dams because of construction and operation of the dams and the World Bank Group Environmental Health and Safety Guidelines. Because of the likely adverse environmental and social impacts, the project has been assigned EA Category A, requiring full environmental and social assessments. Environmental instruments prepared prior to appraisal included: (i) an ESIA and ESMP, including dam safety reports and a pest management plan, for the Kabuyanda irrigation scheme; and (ii) an Environment and Social Management Framework (ESMF) for other project activities under Component 1 and 2, of which the exact locations have not been identified, and feasibility studies/designs will be conducted during the project implementation.

83. The ESIA for Kabuyanda irrigation scheme has been completed, cleared and disclosed by MWE on October 2, 2019 and on the World Bank's website on October 3, 2019. The activity will lead to impoundment of a moderate-sized reservoir of around 100 ha on the non-permanent Mishuba River, located at the border of Rwoho CFR. Biodiversity studies indicate the inundated area is a modified habitat; the project area and the CFR have been significantly disturbed by human activities, notably subsistence farming. Based on biodiversity impact assessment and consultations with stakeholders, the ESIA concluded that no significant conversion or degradation of natural habitats and no unacceptable impacts on fauna and flora are anticipated as a result of the project. To mitigate the impacts, a set of mitigation measures including minimum environmental flow, construction management and catchment management plan have been incorporated into the project design and ESMP. Additional surveys and assessment will be undertaken by MWE during project implementation and prior to dam construction to confirm some of the initial findings described in the ESIA, in particular, with respect to biodiversity surveys (with more focus on fish), cumulative impacts, groundwater and environmental flow assessment and monitoring. If needed, appropriate adjustments to dam design and/or operation will be introduced prior to dam construction in a manner satisfactory to the World Bank.

84. The ESMF establishes procedures and methodologies for environmental and social screening, assessment, review and approval, and implementation of investments in compliance with the Ugandan and World Bank environmental and social safeguards policies. The ESMF also provides guidance on stakeholder consultations, engagement and disclosure of the safeguards document, institutional arrangements for project implementation, and guidance on siting, assessment and management of auxiliary facilities such as workers camps, equipment storage yards, stone quarries,



gravel areas, etc. The ESMF was prepared in a consultative manner and disclosed by MWE and on the World Bank's website on January 29, 2019.

85. The Matanda scheme (to be constructed under the project) and Enengo, Nyimur and Amagoro schemes (to be designed under the project but to be constructed under future investments) shall be subjected to separate ESIA/ESMPs following the project ESMF during implementation by MWE and reviewed and cleared by the World Bank. All supporting/auxiliary facilities (such as workers' camps, equipment storage yards, stone quarries, borrow/gravel areas, waste dumpsites) that may be acquired and managed/operated by contractors shall be required to obtain relevant statutory approvals including ESIA. MWE shall supervise acquisition and obtaining of required statutory clearances before establishment and operation of such facilities. Environmental screening and development of ESMPs shall be undertaken by MWE for small and micro-scale irrigation that will be constructed around the two new irrigation schemes (Isingiro District around Kabuyanda; Kanungu District around Matanda), future irrigation schemes (Tororo and Rukungiri Districts) and in an area close to Kampala characterized by high marketing potential (Mukono, Wakiso and Mpigi Districts). Likewise, integrated catchment management activities shall be subjected to environmental screening and development of specific instruments (ESIA/ESMP) before implementation by MWE (under Sub-component 1.3 as part of the preparation of the catchment management plans). All Component 2 activities shall be subjected to environmental and social screening and ESIA/ESMPs developed as appropriate and accordingly incorporated in the engineering designs, contracts, and bid documents to ensure their implementation by MWE. In addition, the following site specific assessments and instruments shall be prepared by MWE as appropriate following the guidance provided in the ESMF during implementation (with the exception of Kabuyanda scheme for which they have been already prepared): Biodiversity Management Plan (OP 4.04, OP 4.36), Chance Finds Procedure including undertaking a PCRs inventory (OP 4.11), Pest Management Plan (OP 4.09), Health and Safety Management Plan (EHS Guidelines). GoU has a dam safety panel in place, established under the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) and NCORE funding. Dam safety reports and PMP have been prepared following OP 4.37 and OP 4.09 by MWE for the Kabuyanda irrigation scheme and cleared by the World Bank prior to appraisal, while they will be prepared for Matanda and for Enengo, Nyimur and Amagoro schemes (under Sub-component 1.1) during project implementation. All safeguards documents have been (ESMF and Kabuyanda ESIA) and others listed will be prepared during implementation in a highly consultative manner involving all relevant stakeholders, and will be completed, cleared and disclosed (in country and by the World Bank).

86. Arrangements for monitoring implementation of the ESMPs shall be put in place including development and operationalization of an environmental and social management system at the Directorate of Water Development at the MWE. MWE will hire an environmental specialist to support the implementation of environmental activities/aspects of the project in collaboration with existing MWE safeguards staff. With respect to Component 2 activities, they will be overseen through existing environmental and social safeguards management unit under the agricultural Cluster Development Project (ACDP, P145037) in the Crop Resources Directorate. Though it is a project operated unit, for now it doubles as a main entity overseeing environmental and social safeguards issues in MAAIF. The unit is staffed with an environmental specialist and a social scientist. At district LG level, there are district environment and community development officers whose safeguards capacity will be enhanced as appropriate. The safeguards specialists shall undertake environmental screening of all project activities in line with guidance provided in the ESMF, ensuring development of site specific instruments as deemed appropriate. They will ensure day to day management and implementation (planning, monitoring/supervision and reporting) of all environmental aspects of the project. For the works to be contracted out, all supervision consultants and contractors shall hire environmental specialists on a full-time basis. The project shall ensure use of a code of conduct to manage and discipline the project labor force.

87. Forest Restoration activities in Rwoho CFR under Kabuyanda Scheme. For Kabuyanda irrigation scheme that has



been subjected to ESIA, it envisages to inundate (reservoir area) about 100 ha (1.1 percent) of Rwoho CFR, for which a memorandum of understanding (MoU) will be signed by NFA and MWE. Rwoho CFR is a 9,000 ha plantation development forest that is largely degraded with bare hilltops, having sparse woody plant cover, and partially restored with *Pinus caribaea*, *Pinus ocarpa* and *Eucalyptus sp.* Of the 100 ha to be inundated in Rwoho CFR, 15.1 ha of the pine and eucalyptus plantation was planted with support of carbon financing under the clean development mechanism (CDM) arrangement whose emissions reduction purchase agreement (ERPA) shall terminate on December 31, 2019, ahead of the commencement of works for the Kabuyanda irrigation project. The ESIA study proposed restoring/reforesting 500 ha within Rwoho CFR with indigenous tree species to ecologically mitigate for the lost vegetation cover in the 1.1 percent reservoir area. The restoration/reforestation area has been mapped out in Rwoho CFR, and the TOR to guide implementation of restoration activities prepared. The restoration/reforestation which shall be through assisted natural regeneration and/or enrichment planting shall be financed by the project to the tune of US\$1 million as part of Sub-component 1.3 on integrated catchment management. MWE shall work in very close collaboration with NFA to update the Rwoho CFR management plan, to establish and maintain the restored/reforested area for the first three years after planting, following which it will be NFA responsibility.

(ii) Social Safeguards

88. The project triggers the following Social Safeguards Policies: OP 4.10 Indigenous Peoples because some activities in Matanda might impact Batwa communities; and OP 4.12 Involuntary Resettlement because some activities will require resettlement. Specific safeguards instruments have been prepared to guide the mitigation of anticipated social impacts, which include resettlement, potential impacts on members of vulnerable and marginalized groups, social exclusion (gender, youth and members of other vulnerable groups), impacts inadequate citizen engagement/consultation and grievance redress mechanism (GRM), and those related to influx of labor. These instruments include a resettlement action plan (RAP) for the Kabuyanda site (consulted upon, cleared and disclosed on February 18, 2019 and on the World Bank's website on February 26, 2019), a resettlement policy framework (RPF) (consulted upon, cleared and disclosed on February 18, 2019 and on the World Bank's website on February 20, 2019), and a vulnerable and marginalized group framework (VMGF) (consulted upon, cleared and disclosed by MWE on August 1, 2019 and on the World Bank's website on August 2, 2019). The RPF and the ESMF were prepared because feasibility study and detailed designs for Matanda will be ready only at the initial stage of implementation. Site-specific RAP for Matanda will be prepared during project implementation; it will be reviewed, approved and disclosed in-country and at the World Bank's website prior to the commencement of civil works. The VMGF was prepared because construction activities in Matanda might potentially affect Batwa communities; the scope of these impacts will be known once the feasibility study and detailed designs will be finalized. A vulnerable and marginalized groups plan (VMGP) will be drafted accordingly during implementation. Extensive consultations with a wide range of stakeholders at the national, district and sub-county levels were an integral part of the ESMF, RPF, VMGF and Kabuyanda RAP preparation and included discussions about proposed mitigation measures for different types of impacts, mechanisms for establishment of farmers' organization, implementation arrangements for resettlement, GRM, etc.

89. Vulnerable and Marginalized Groups (Batwas). If the feasibility study and detailed designs (to be completed by project effectiveness) for the Matanda irrigation scheme establish that the Batwa will be impacted, the project will take a number of steps to avoid or minimize adverse impacts and, at the same time, ensure benefits for these communities, as part of the VMGP. Those would include, among others: (i) ensuring that vulnerable and marginalized groups' (VMGs) communities in general and their organizations/local leaders are included of selection, design, and implementation processes; (ii) carrying out a thorough assessment of potential sites to provide an understanding of the nature and magnitude of potential impacts, and explore alternatives to avoid or minimize any adverse impacts; and (iii) providing



the Batwas with opportunities to directly benefit from the project's activities. Sustained consultations with the affected communities, their elders/leaders, CSOs/NGOs and others who have experience in working with VMGs will be critical in achieving these objectives.

90. Labor Influx. The project will apply due diligence in the management and monitoring of labor influx induced risks, and particularly those related to gender-based violence (GBV) and sexual exploitation and Abuse (SEA). The GBV Assessment Tool returned a "moderate" risk rating and as such, the project will apply mitigation risk recommended in the GBV Guidance Note to address the issue. They include: (i) a requirement for project workers to sign enforceable Codes of Conduct outlining contractors' responsibilities on workplace culture; (ii) the recruitment of nominated GBV service providers to carry out prevention activities and to establish referral pathways for eventual cases; and (iii) the involvement of mandated authorities at both national and local levels (Ministry of Gender, Labor and Social Development, Probation Officers, Community Development Officers, etc.). The amount of labor influx will vary by site, with Kabuyanda and Matanda being the two locations where works are expected to involve labor from outside of the areas, while in the other locations labor influx will be minimal, given the type of activities planned. The ESMF includes procedures, institutional responsibilities, and mitigation measures for screening, assessing, and managing issues related to labor influx that will be applied to all site-specific ESIA's. Additional potential preventive measures include: (i) sourcing local workforce as much as possible, provided skill sets are met; (ii) actively engaging the communities, especially vulnerable groups on the potential arrival of external workers, social conducts and behaviors, and GRMs; (iii) including particular conditions in works contract, such as a code of conduct outlining contractors' responsibilities on workplace culture, labor influx management plan, and worker's camp management plan; (iv) conducting mandatory training for all employees on legal conduct in local communities and legal consequences for non-compliance and on ethical behavior as well as on issues relating to sexual exploitation and abuse, HIV/AIDS, and sexually transmitted diseases (STDs); (v) maximizing the distance of the camp sites from the communities and providing services and entertainments within the camps; (vi) providing opportunities for workers to regularly return to their families; (vii) strengthening MWE's capacity on labor influx management; and (viii) liaising with the Ministry of Gender on community sensitization initiatives and trainings.

91. Social inclusion. The farmers benefitting from the project are mainly smallholders, with income levels around or below the poverty line. They generally do not have land tenure rights and have limited access to credit. By focusing on this segment of farmers, the project has social inclusion at the core of its design. Selection of sites for public irrigation schemes under the project allowed to target farmers who do not have the opportunity and means to access irrigation: these farmers tend to be located in areas (i) far from water sources; (ii) without reliable water source during the dry seasons; and (iii) lacking the necessary public infrastructure to carry water to their plots. Under Component 2 (on-farm activities), provisions will be put in place to ensure community-wide participation, and particularly that of women, youth, and other members from vulnerable groups. The project's target of having three beneficiaries per household will indeed ensure that whole households (rather than only the household head) benefit from promoted activities. Farmers will be supported in associating under farmer field school groups (FFSGs) for the purposes of learning improved on-farm production and productivity practices while fostering equal participation and collaboration amongst of all members. They will also be key in ensuring that voices of the smallest farmers are heard, especially those with smaller plots and who are unable to host individual hydrants/meters. Moreover, all farmers, regardless of their land tenure status (land owners, long/short term renters, etc.) will be included in project's activities. The project will facilitate the obtention of CCOs as the preferred instrument to this end as it fosters inclusion of women and youth in their recognition of land rights. The following will be closely monitored over the project's lifetime to take any necessary corrective action to ensure that the project does not promote or exacerbate exclusion of certain groups: (i) trends in farmer's land tenure/ownership status; (ii) FFSG membership/leadership; (iii) activities carried out in favor of members of vulnerable



groups, including the Batwa; and (iv) overall breakdown of project beneficiaries. Finally, catchment management activities under Sub-component 1.3 will be identified in collaboration with local communities and carried out in close collaboration and with the involvement of local communities - particular attention will be given to vulnerable and disadvantaged groups.

92. Citizen Engagement. Engagement of communities is key in ensuring that project benefits concretize, and that potentially negative impacts are mitigated. To this end, a communication strategy, GRM, and the establishment of other engagement channels will be established:

- *Communication:* A full time communication specialist will be recruited in the PST for the length of the project. MWE has also developed a comprehensive communication strategy under the FIEFOC project, which will provide building blocks for that of the ICRP.
- *GRM for project affected people (resettlement and construction related complaints):* MWE has established such a system, in collaboration with district and sub-counties structures, and considering local cultural and social norms. It has been established ensuring that it is accessible to all, and particularly women and other members of vulnerable groups, including the Batwa and provides details on the following: (i) the easiest and acceptable ways to have open communications with the affected people and communities throughout the life of the project; (ii) how to inform them about all aspects of the project stages of construction and establishment of irrigation perimeters, (iii) how to receive their feedback; and (iv) the ways in which individuals can have a voice and express their concerns, as well as ways in which these concerns will be addressed and monitored.
- *GRM for project beneficiaries related to provision of the irrigation service:* A functioning GRM is a prerequisite for the provision of a service responsive to clients' needs and preferences. The selected service provider to manage the scheme will be responsible for the development of such a system. A combination of formal and informal channels for complaints intake is envisaged, as it can be expected that the vast majority of complaints will be received verbally. The use of logbooks and other means of recording and monitoring potential complaints will be encouraged.
- *Water Users Associations (WUAs):* In addition to the creation of channels to allow citizens and project affected individuals to express their grievances, it is important to ensure that the voice of farmers as a collective is heard. In public irrigation schemes where an irrigation system operator will be hired for the management, WUAs will be created with an advocacy mandate purely related to water management. The WUA will make sure that farmers' interests in relation to water management, including conflict resolution facilitation and water tariff collection remains primordial in its mandate. In new schemes, WUAs will be created using a bottom up approach, building on the FFSGs and their aggregation at a block level.

93. Gender gap analysis. There is a vast literature on the role of women in agriculture in Sub-Saharan Africa and Uganda, in particular. In addition, a gender assessment and a gender disaggregated socio-economical survey was carried out in Kabuyanda as part of the scheme design in the course of the project preparation. All these resources highlight the following gender gaps, which are related to the PDO:

- *Access to productive resources.* Women in Uganda have limited land ownership and lease rights.³³ More than 70 percent of land in Uganda is held under customary law, which for most tribes stipulates that land is inherited only by sons. Although 83 percent of the female working population is engaged in agriculture, women own only 27 percent of registered land. And if women own land, an average size of their plots is much smaller than of men, being in Uganda in average by 0.23 ha smaller.³⁴ The results of the socio-economic survey showed that even if women have access to land, they in general do not control use of it. This concerns other productive resources as well (Table

³³ Scow, 2015.

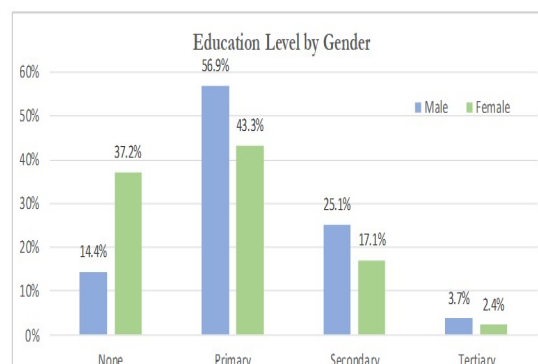
³⁴ The Cost of the Gender Gap in Agricultural Productivity in Malawi, Tanzania, and Uganda, 2015 UN Women, UNDP, UNEP, and the World Bank Group.

- 2). Women’s access to education, knowledge and skills due to dominated in country patriarchal norms is also limited, and they are more likely than men to be in low-paid jobs and “non-standard” work, such as part-time, temporary, or home-based. Limited access to land ownership, low level of education and limited access to knowledge affect men but more women’s ability to access other assets and resources, and hamper overall investments, agribusiness development and commercialization in Uganda.³⁵ Rural men and women are highly underserved by microfinance institutions, and therefore are unable to expand their livelihood opportunities. More than 68 percent of women were unserved with access to credit in 2013, compared to 62 percent of men, with men more than twice as likely to save at formal institutions as were women.³⁶ With lack of access to formal financial products, women have to rely on informal financial services in Uganda to a greater extent than do men, which is associated with higher risks and cost.
- **Decision making and leadership.** Women in Uganda have still limited participation in decision making, especially in a leadership role in local institutions and organizations. They made only 33 percent in the public service and 35 percent of members of parliament.³⁷ Although women participate in political and local affairs and can even play an active role in the management of local institutions, rural producer groups and faith based organizations including the local councils, this is mostly due to enforcement of affirmative actions. But the proportion of women in such groups and organizations is still relatively lower than that of men and thus decision making and leadership in Uganda is largely male-dominated. At the same time, women bear the biggest burden in agricultural production, accounting for 60-70 percent of production, about 90 percent of post-harvest handling and processing, and almost 100 percent of household food provision. These tasks not only add to women’s workload but also aoften create an obstacle for them to engage in political action or expand economic activities. Women have low power in decision making also at the household level, where their ability to manage and control assets is limited, with men traditionally controlling cash crop farming and revenues, while women providing most of the labor of food crops produced for home consumption.
 - **Health.** Women are more prone to health issues, malnutrition, and labor shortage: poverty, food insecurity, and environmental degradation have a disproportionate impact on rural women, not only due to their inferior socio-economic, legal and political status, but also due to their critical roles as both producers and household managers. Women are also normally worst hit by generally low and sometimes worsening health and nutrition conditions and by growing labor shortages due to male out-migration.

Table 2. Gender Gap in Kabuyanda

Key Assets	Ownership		Access		Control	
	Women	Men	Women	Men	Women	Men
Land		✓	✓	✓		✓
Annual Crops	✓		✓	✓	✓	✓
Perennial crops		✓		✓		✓
Buildings		✓	✓	✓		✓
Livestock		✓	✓	✓		✓
Tools & Equipment		✓	✓	✓		✓
Cash		✓	✓	✓	✓	✓
Utensils	✓		✓	✓	✓	✓
Furniture		✓	✓	✓	✓	✓
Means of transport		✓	✓	✓		✓

Figure 7. Education Level in Kabuyanda by Gender



³⁵ Closing the Potential-Performance Divide in Ugandan Agriculture, World Bank, 2018.

³⁶ Step by step Let’s solve the finance puzzle to accelerate growth and shared prosperity, World Bank, 2017

³⁷ Uganda Case Study, UNDP, 2011.



94. Gender-targeted project activities. Gender dynamics can be influenced (positively or negatively) by the introduction of irrigation, thus a gender analysis was an integral part of feasibility studies and safeguard documentation preparation. Gender-targeted project activities have been tailored to address identified relevant gender gaps.

- The project will foster the roll out of the CCOs in the district targeted by the newly developed schemes to increase land tenure rights, including for women. Under the CCOs pilot in Kasese District supported by FAO, women headed households declared they enjoy increased tenure security, and the number and intensity of recorded land conflicts is diminishing. The project will build synergies with ongoing operations with MoLHUD in order to facilitate prioritization of the areas targeted under the project for the roll out of the CCOs. Should this not be possible, the project includes provision for supporting the CCOs process (Sub-component 1.1).
- Under Sub-component 1.1 on large and medium-scale irrigation, the project will construct gender disaggregated sanitation facilities in the newly developed irrigation schemes. Improvement of road network within the scheme could indirectly facilitate women access to markets and health facilities. The project will also include community sensitization and GBV prevention.
- Under Sub-component 1.3 on integrated catchment management, the project will support women and women's group participation and empowerment in the definition and implementation of catchment management interventions.
- Under Sub-component 2.1 on support farmers to increase production and productivity on-farm, the project will purposely target women to facilitate their access to knowledge and inputs. For the purpose of provision of extension services, farmers will be organized in FFSGs of about 25 members, with representation of men, women and youth. For each group, two skillful farmers, one female and one male, will be selected to become lead farmers responsible for facilitating the extension services to the members in their group. In addition, as FFSG will be the basis for the establishment of WUAs at block, village and scheme level, ensuring women representation in the FFSGs will also ensure their representation in the WUAs.
- Under Sub-component 2.2 on support marketing' groups for value addition and market linkages, the project will include measures aimed at empowering women and women's group through targeted training on income generation, record keeping and savings which could promote women empowerment. Meetings will be organized in locations and time appropriate to foster women participation. The project will ensure that services are provided in a fair manner to women and men, for example providing targeted support to women's group to access matching grants.

95. The project M&E will include gender disaggregated indicators at PDO and intermediate levels.

(iii) Other Safeguards Policies

96. **OP 7.50 Projects on International Waterways.** This policy is triggered since the project will contribute to building infrastructure and enhancing the environment for irrigated agriculture at sites located on rivers in the Nile Basin. Riparian notification was issued by GoU through the Nile Basin Initiative (NBI) on November 13, 2018. Only Tanzania responded to give a no objection, while the rest of the countries did not respond. The following Riparian States were notified: Burundi, DRC, Egypt, Ethiopia, Kenya, Rwanda, South Sudan, Sudan and Tanzania. The riparian notification process was completed per the Policy and it was approved by the regional management on July 16, 2019.

Grievance Redress Mechanisms

97. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service



(GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

IV. KEY RISKS

98. The overall project risk is rated Substantial. Out of nine risk categories, eight (Political and Governance, Sector Strategies and Policies, Technical Design of Project, Institutional Capacity for Implementation and Sustainability, Fiduciary, Environment and Social, Stakeholders, and Other in relation to Security of Land Rights) are rated Substantial under the Systematic Operations Risk-Rating Tool (SORT). This widespread Substantial risk reflects the transformative nature of the project in supporting the nascent irrigation sector in Uganda. The project builds on a relatively solid Macroeconomic environment, which has a Moderate rating.

99. Political and Governance risk. Governance and effective public-sector management present Substantial risks. The political economy for agricultural development in Uganda is complex. Political advocacy for subsidies and free goods are some of the challenges the project would likely face. The project will mitigate this risk through proper targeting, community awareness raising and capacity development for all key stakeholders at all levels.

100. Sector Strategies and Policies risk. The joint signature of the 2018 National Irrigation Policy by MWE and MAAIF represents a solid base for the development of the irrigation sector in the country. However, the implementation details of the Policy remain to be defined. Roles and responsibilities of the different actors involved in irrigation development are oftentimes overlapping. The ongoing preparation of an Irrigation Masterplan by MWE and MAAIF, expected to be completed in 2020, will mitigate this risk.

101. Technical Design risk. Irrigation is still at an initial stage in Uganda, and the project will develop public schemes over a large area (about 3,000 ha) compared to existing ones (in the range of 600 ha to 1,000 ha). Learning from the management challenges of existing schemes characterized by open canals, the project will develop the first piped schemes country-wide (gravity fed), which could represent a breakthrough from a management perspective and for facilitating raising water tariff. At the same time, the innovative nature of the project calls for appropriate support to MWE and MAAIF at the design stage. Due to the limited irrigation development, MWE and MAAIF still need to build adequate skills to ensure high quality technical designs and adequate supervision of feasibility and design consultants. The project will mitigate this risk through: (i) enhanced support from the World Bank for the review of the designs, for which Trust Funds (from the China-World Bank Partnership Facility (CWPF); and from the United Kingdom Department for International Development (DFID)) have been mobilized during project preparation and implementation; and (ii) training on FIDIC contracts and contract management.

102. Institutional Capacity for Implementation and Sustainability risk. MWE is experienced in implementing World Bank projects, even if the WfP has not been directly involved. MWE also has experience with irrigation projects with other donors (i.e. AfDB, IsDB, JICA). Implementation capacity has been generally good. As investments in irrigation



increase in line with the ambitious goals of the National Irrigation Policy, it is expected that decentralization of some responsibilities will be key. The project will mitigate these risks through increased attention to the involvement of Regional structures of MWE, in particularly by including key staff in the contract supervision committee. Sustainability in existing schemes is usually low, with limited contribution of the farmers to O&M costs and limited capacity of the farmers' organization to ensure proper management of the system. The irrigation management institution development poses additional challenges for the implementing agency. Also, the project will come to an end shortly after the provision of the service, thus providing little opportunity to support the first challenges of O&M. The project will mitigate these risks through: (i) a capacity assessment to identify the specific skills gaps and engage experts to support the project teams during implementation; (ii) institutional support for the identification of the appropriate management model; and (iii) establishment of a startup fund for O&M.

103. **Fiduciary risk.** FM and procurements risks are described in detail in the Fiduciary section of the Project Appraisal Summary. The project will mitigate the fiduciary risk through: (i) the recruitment of dedicated staff in the PST; (ii) training of relevant ministerial staff; and (iii) setting up of the reporting systems and agreeing on the audit ToR. There are additional procurement risks due to COVID-19, including (i) limited competition due to some competent bidders refraining from participating in the bidding process; (ii) challenges of bid submission due to COVID-19 movement restrictions imposed by many countries worldwide; and (iii) constraints in institutional and implementing capacity due to restrictions on congregating, social distancing etc. that impact on public administration. These will be mitigated by enhanced engagement of bidders through: (i) online meetings; (ii) organizing travel clearances for contractors to visit the site, and (iii) permitting submission of bids by third party agents, through embassies etc. – with risk of delayed delivery of bids borne by Contractor.

104. **Environment and Social risk.** Construction of irrigation schemes will involve dams and sizable intake structures and irrigation network. The construction works will involve some resettlement and attract international contractors with large labor influx. The project will mitigate these risks through: (i) optimization of technical designs to minimize need for land acquisition and resettlement; and (ii) detailed safeguards and risk management plans developed with monitoring system to mitigate construction works related risks. In addition, COVID-19 presents an emerging risk which was not taken into consideration during preparation of the ESIA. The risks relating to COVID-19 include high health risks to the laborers and the host community, including the contractors and project staff. Specific guidance on how to handle and manage project implementation in the “immediate” post COVID-19 period, will be included in the Project Implementation Manual in the Labor Management Procedures, and contractors shall be required to develop COVID-19 Standard Operating Procedures as part of Contractors' ESMP following available guidance from the national government, World Health Organization (WHO) and the World Bank.

105. **Stakeholders risk.** The consultations with the local communities indicate general support for the project. However, financial capacity and willingness of smallholder farmers to invest in on-farm irrigation equipment remain to be assessed. Experience in existing irrigation schemes across the country suggests that charging for irrigation services is a challenge in Uganda, considering that irrigation is supplemental as rainfall usually allows for at least one cropping season per year. The project will mitigate these risks through community awareness raising and engagement, and through the adoption of a value chain and marketing approach. In order to mitigate the risk of COVID-19, the project will use communication channels that do not necessitate the congregation of stakeholders, and where meetings are necessary standard operating procedures, including social distancing, will be applied. MWE is fully aware of the stakeholder risk, and it is commendable that – notwithstanding general budget constraints – consultancy services (on GoU funds) have been mobilized in Kabuyanda to strengthen the capacity of social staff at the District level for community engagement.



106. **Other risk (Security of land tenure rights).** In Uganda, less than 20 percent of the land is registered. Limited tenure security and unregistered tenure rights represent a risk on three levels: (i) Limited access to credit by farmers due to their lack of collateral; indeed, alongside land size, limited tenure security has shown to be a critical bottleneck hampering investment, agribusiness development and commercialization in Uganda;³⁸ (ii) Expected challenges in the identification of the irrigation water user, and consequent difficulty in raising the water tariff, with implication for the financial viability of the scheme; and (iii) Widespread fear among small farmers of land grabbing, which can be accentuated in case of investment (like those for irrigation) which increase land value. The project will mitigate these risks through: (i) extensive community mobilization; (ii) synergies with other projects supporting land registration through CCOs, in order to prioritize the area targeted under the ICRP; and (iii) monitoring of the changes in the tenure situation every two years as part of the project monitoring plan. Regarding land registration, the 1995 Constitution and the 1998 Land Act provide two options to record customary tenure rights: (i) customary right holders can turn their customary claim into formal through the acquisition of a freehold or a leasehold, but the process is difficult and expensive and managed at the zonal level; and (ii) requesting a CCOs, which are primarily demarcated freehold titles, devised to strengthen tenure security and make titling more accessible at the community level, particularly to vulnerable groups. The process to acquire a CCO is highly participatory and community driven, decision-making is decentralized at the Sub-county and District level, while the technical verification is responsibility of the District Land Office. The Land Act considers CCOs as conclusive evidence of the customary rights and interests specified in it. A CCO holder has the right to undertake any transaction, subject to the conditions, restrictions and limitations contained in the certificate. All information on customary tenure is in the process of being included in the National Land Information System, thus increasing, among others, tenure security for customary owners and national and local planning capacity. Since 2012 the MoLHUD piloted the issuance of CCOs in Kasese District with support from the FAO. The exercise has later been replicated in other districts with support from several partners. These pilots are demonstrating CCOs' flexibility and potential as an accessible tool for customary land registration at scale, and how it can directly contribute to achieving development objectives and securing tenure rights. In Kasese beneficiaries, particularly women headed households, declare they enjoy increased tenure security, and the number and intensity of recorded land conflicts is diminishing. Financial Institutions have been piloting in Kasese the use of CCOs as a collateral to access credit, at rates comparable to those applied to title deeds. The Kasese District Council is increasing revenue collection through registration fees and service provision. The pilot also indicates that CCOs can be implemented quickly with limited human and financial resources.

³⁸ Closing the Potential-Performance Divide in Ugandan Agriculture, World Bank, 2018.



V. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Uganda

Irrigation for Climate Resilience Project (ICRP)

Project Development Objectives(s)

To provide farmers in the project areas with access to irrigation and other agricultural services, and to establish management arrangements for irrigation service delivery

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets	End Target
			1	
To provide farmers in the project area with access to irrigation and other agricultural services				
Area provided with new/improved irrigation or drainage services (CRI, Hectare(Ha))		0.00	2,125.00	8,425.00
Area provided with new irrigation or drainage services (CRI, Hectare(Ha))		0.00	800.00	7,100.00
Area provided with improved irrigation or drainage services (CRI, Hectare(Ha))		0.00	1,325.00	1,325.00
Farmers reached with agricultural assets or services (CRI, Number)		0.00	30,000.00	63,200.00
Farmers reached with agricultural assets or services - Female (CRI, Number)		0.00	12,000.00	25,280.00
To establish management arrangements for irrigation service delivery				
Management contract signed for irrigation services (Number)		0.00	0.00	2.00



Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	Intermediate Targets	End Target
			1	
Component 1: Irrigation Services				
Physical progress in the construction of irrigation schemes (Percentage)		0.00	70.00	100.00
Volume of water storage created (Cubic Meter(m3))		0.00	8,800,000.00	13,000,000.00
Water users with new/improved irrigation services (Number)		0.00	13,100.00	58,100.00
Water users with new/improved irrigation and drainage services - Female (Number)		0.00	5,240.00	23,240.00
Area covered by detailed designs (Hectare(Ha))		0.00	9,000.00	9,000.00
Forest area brought under management plans (CRI, Hectare(Ha))		0.00	1,000.00	1,000.00
Component 2: Support services for agricultural production and value-chain development				
Farmers' Field School Groups (FFSG) established (Number)		0.00	660.00	830.00
Farmers benefitting from matching grants for inputs (Number)		0.00	18,200.00	63,200.00
Farmers benefitting from matching grants for inputs - female (Number)		0.00	7,280.00	25,280.00
Area in new public irrigation schemes equipped with on-farm irrigation equipment (Percentage)		0.00	0.00	60.00
Farmers who are members of functional farmer organizations (Number)		0.00	6,000.00	18,960.00
Farmers who are members of functional farmer organizations - Female (Number)		0.00	2,400.00	7,584.00



Indicator Name	PBC	Baseline	Intermediate Targets	End Target
			1	
Farmers benefitting from matching grants for value addition (Number)		0.00	0.00	9,460.00
Farmers benefitting from matching grants - Female (Number)		0.00	0.00	3,742.00
Farmers' contribution to farmer-led irrigation equipment (Amount(USD))		0.00	1,000,000.00	1,000,000.00
Component 3: Institutional Strengthening and Implementation Support				
MWE / MAAIF staff trained (Number)		0.00	100.00	100.00
MWE / MAAIF staff trained - Female (Number)		0.00	40.00	40.00
Studies (Number)		0.00	1.00	2.00
Average time for treating grievances related to irrigation service (Days)		0.00	20.00	20.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Area provided with new/improved irrigation or drainage services	This indicator measures the total area of land provided with irrigation and drainage services under the project, including in (i) the area provided with new irrigation and drainage services, and (ii) the area provided with	Bi annually (starting Year 1)	Supervision consultant progress report	Payment installments	MWE



	improved irrigation and drainage services, expressed in hectare (ha).				
Area provided with new irrigation or drainage services	Measures in hectares the total area of land provided with new or improved irrigation or drainage services in operations supported by the World Bank.	Bi annually (starting Year 1 for farmer-led irrigation, starting Year 4 for public schemes)	Kabuyanda (3,300 ha) Matanda (3,000 ha) Farmer-led irrigation (800 ha)	Payment installments	MWE
Area provided with improved irrigation or drainage services	Measures in hectares the total area of land provided with new or improved irrigation or drainage services in operations supported by the World Bank.	Bi annually (starting Year 1)	Agoro (675 ha) Olweny (650 ha)	Payment installments	MWE
Farmers reached with agricultural assets or services	This indicator measures the number of farmers who were provided with agricultural assets or services as a result of World Bank project support. "Agriculture" or "Agricultural" includes: crops, livestock, capture fisheries, aquaculture, agroforestry, timber, and non-timber forest products. Assets include property, biological assets, and farm	Bi annually (starting Year 1)	Kabuyanda (32,100 farmers) Matanda (12,900 farmers) Olweny (4,500 farmers) Agoro (7,800 farmers) Nyimur (5,100 farmers)	Consolidated progress reports	MAAIF



	<p>and processing equipment. Biological assets may include animal agriculture breeds (e.g., livestock, fisheries) and genetic material of livestock, crops, trees, and shrubs (including fiber and fuel crops). Services include research, extension, training, education, ICTs, inputs (e.g., fertilizers, pesticides, labor), production-related services (e.g., soil testing, animal health/veterinary services), phyto-sanitary and food safety services, agricultural marketing support services (e.g., price monitoring, export promotion), access to farm and post-harvest machinery and storage facilities, employment, irrigation and drainage, and finance. Farmers are people engaged in agricultural activities or members of an agriculture-related business (disaggregated by men and women) targeted by the project.</p>		Farmer-led irrigation (800 farmers)		
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Farmers reached with agricultural assets or services - Female		Bi annually (starting Year 1)	40% of target farmers	Consolidated progress reports	MAAIF
Management contract signed for irrigation services		Bi annually (starting Year 4)	Kabuyanda Matanda	Signed contract	MWE

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Physical progress in the construction of irrigation schemes	Indicator refers to public irrigation schemes constructed under sub-component 1.1	Quarterly (starting Year 1)	Supervision consultant progress report	Payment installments	MWE
Volume of water storage created	Storage capacity created by the embankments constructed to serve the scheme	Quarterly (starting Year 4)	Kabuyanda (8.8 Mm3) Matanda (4.2 Mm3)	Supervision consultant progress report	MWE
Water users with new/improved irrigation services	Farmers benefitting from new or improved irrigation services	Quarterly (starting Year 1 for farmer-led irrigation, starting Year 4 for public	Kabuyanda (32,100 farmers) Matanda (12,900 farmers) Olweny (4,500	Supervision consultant progress report	MWE



		schemes)	farmers) Agoro (7,800 farmers) Farmer-led irrigation (800 farmers)		
Water users with new/improved irrigation and drainage services - Female		Quarterly (starting Year 1 for farmer-led irrigation; starting Year 4 for public schemes)	40% of target farmers	Supervision consultant progress report	MWE
Area covered by detailed designs		Quarterly (starting Year 1)	Enengo (3,000 ha) Amagoro (3,000 ha) Nyimur (3,000 ha)	Final deliverable of designs	MWE
Forest area brought under management plans		Quarterly (starting Year 1)	Kabuyanda (1,000 ha)	Supervision consultant progress report	MWE (with technical input from NFA)
Farmers' Field School Groups (FFSG) established	Groups established for extension purposes to increase the production and productivity on-farm	Quarterly (starting Year 1)	Kabuyanda (430 FFSG) Matanda (170 FFSG)	Supervision consultant progress report	MAAIF



			Agoro (100 FFSG) Olweny (60 FFSG) Nyimur (70 FFSG)		
Farmers benefitting from matching grants for inputs		Quarterly (starting Year 4)	Kabuyanda (32,100 farmers) Matanda (12,900 farmers) Olweny (4,500 farmers) Agoro (7,800 farmers) Nyimur (5,100 farmers) Farmer-led irrigation (800 farmers)	Supervision consultant progress report	MAAIF
Farmers benefitting from matching grants for inputs - female		Quarterly (starting Year 1)	40% of target farmers	Supervision consultant progress report	MAAIF
Area in new public irrigation schemes equipped with on-farm irrigation equipment	Area equipped with sprinkler, drip or hose irrigation. The indicator	Quarterly (starting Year 4)	Supervision consultant progress		MAAIF



	does not account for farmers benefitting from the water service and distributing water with jerry cans or other manual methods.		report		
Farmers who are members of functional farmer organizations		Quarterly (starting Year 3)	30% of total target farmers		MAAIF
Farmers who are members of functional farmer organizations - Female		Quarterly (starting Year 3)	40% of target farmers		
Farmers benefitting from matching grants for value addition		Quarterly (starting Year 4)	50% of farmers in marketing groups		MAAIF
Farmers benefitting from matching grants - Female		Quarterly (starting Year 4)	40% of target farmers		MAAIF
Farmers' contribution to farmer-led irrigation equipment		Quarterly (starting Year 1)	Assuming 33% contribution to small and micro-scale irrigation investment		MAAIF



MWE / MAAIF staff trained		Quarterly (starting Year 1)			MWE
MWE / MAAIF staff trained - Female		Quarterly (starting Year 1)	40% of target staff		MWE
Studies		Quarterly (starting Year 1)			MWE
Average time for treating grievances related to irrigation service	Baseline and target to be assessed	Bi annually (starting Year 4)			MWE



ANNEX 1: Detailed Project Description

Concept

1. **The ICRP aims to support the GoU in the shift towards more resilient agriculture through the development of sustainable irrigation services.** Through the introduction of irrigation services, combined to the provision of extension services and facilitated access to agri-inputs, farmers are expected to record more stable and higher yields, increase intensification (by cropping also during the dry season), and diversification (by introducing higher value crops). This change will be pulled by the market, with irrigation becoming the anchor for stronger producer organizations and development of value chains. To ensure sustainability, the project will provide institutional support through the development and strengthening of appropriate management models, while higher incomes will increase farmers' capacity to sustain the related costs.

2. **Learning-by-doing and potential for scale-up.** Irrigated agriculture is largely underdeveloped in Uganda compared to its potential, as the country has traditionally benefitted from high and well distributed rainfalls which allowed for two cropping seasons per year in most part of the country. Over the past couple of decades, rainy season has become shorter and less predictable, rapidly creating the conditions for irrigation development and justifying the ambitious target set under the National Irrigation Policy in terms of irrigation development. While the project is conceived as a stand-alone investment operation, it will adopt a learning-by-doing approach, and it will ensure that models and approaches used under this operation – if proved successful – could be easily replicated and quickly scaled up. In particular:

- **Credible pipeline of public irrigation schemes:** MWE and MAAIF have limited financial resources for studies. The project will finance scheme designs (Component 1) and develop skills of the WfP Department in MWE as well as in MAAIF in irrigation scheme design (Component 3), resulting in the creation of credible pipeline of investments which MWE can use to quickly mobilize internal resources and/or donor finances.
- **Sustainability of public irrigation schemes:** MWE and MAAIF are using part of their resources to support management of public schemes, which face a continuous cycle of neglect and disrepair. Drawing lessons from the water supply sector, the project will pilot management models for public schemes which – if successful – would free up public resources. Also, the project will carry out studies on tariff structures and prerequisites for financial sustainability, as need be.
- **Incentivize farmer-led irrigation:** Small and micro-scale irrigation has huge potential in Uganda, but lack of resources and knowledge by small farmers is hindering its development. Pilots by MWE and MAAIF are carried out at a unit cost which is much higher than international standards. The project will pilot public support to farmers, using a value chain approach (Component 1) which – if successful – will create opportunity for quick scale up considering the limited time required for the construction of small and micro scale development.

3. This annex describes the project locations, followed by a detailed presentation of components and related activities.

Location description

4. **Geographical focus.** Targeted Districts were selected based on design readiness,³⁹ economic and financial viability, and regional balance.

³⁹ Irrigation schemes targeted by the project were identified under the NELSAP, an investment program under the NBI. The NBI is a partnership of the riparian states effective 1999, which seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote



- **Western Region:** The project will support construction of two new public large-scale irrigation schemes (Kabuyanda, Isingiro District; Matanda, Kanungu District), and the related establishment of management structures. The project will also support the design of a new irrigation scheme (Enengo, Kanungu and Rukungiri Districts), with construction to be carried out under future investments. The target areas are characterized by regional market opportunities where cooperatives are present (albeit with diversified level of performance), and farmers well versed in rainfed agriculture, with unreliable rainfall presenting a key limiting factor for yield increase, crop diversification and intensification. In order to multiply the benefits of public scheme development, the project will pilot public support to farmers around the command area in Isingiro, Kanungu and Rukungiri Districts who want to develop farmer-led small and micro scale irrigation.
- **Northern Region:** The project will support an area (Nyimur, Lamwo District) with a population characterized by high level of food insecurity and which has been heavily affected by fragility and only recently returned to the area after years of conflicts. The project will re-engage this population in rainfed agriculture to provide quick wins in terms of increasing food security and job creation, in addition to increasing readiness for future irrigation development. The project will support the design of a new irrigation scheme, with construction to be carried out under future investments. The project will also support the establishment of management structures in two recently rehabilitated public medium-scale irrigation schemes (Olweny, Lira District; Agoro, Lamwo District).
- **Eastern Region:** The project will support the feasibility studies and design of a new irrigation scheme (Amagoro, Tororo District), with construction to be carried out under future investments. The target area is characterized by regional market opportunities, and farmers well versed in rainfed agriculture, with unreliability of rainfall presenting a key limiting factor for yield increase, crop diversification and intensification.
- **Central Region:** The project will pilot public support to farmers in three Districts (Mukono, Wakiso and Mpigi) characterized by easy access to local markets due to their proximity to Kampala, to develop farmer-led small and micro scale irrigation.

Across all Districts, the project will support farmers in increasing their knowledge using a FFS approach, increased access to inputs (improved seeds, fertilizers), on-farm irrigation technologies, machineries and postharvest and agro-processing infrastructures through the use of smart subsidies and consultancy services.

Western Region

Isingiro District

5. **Location.** Isingiro District is located near the border with Tanzania. Mean annual rainfall is 931 mm, with a bimodal distribution: rains occur from March to May, and then from September to December. June - July is the driest period. Recently, both seasons have become unreliable and unpredictable: rainfall is increasingly becoming erratic and destructive, bringing floods and soil erosion, and drought is rampant.

6. **Economy.** The economy is largely informal, with more than 80 percent of the people employed in subsistence agriculture (predominantly crop farmers, with a minor presence of cattle keepers), and the rest active in trading, selling casual labor, and artisan activities (masonry, handicraft, metal works and carpentry). Banana is the main crop, produced both as cash crop and for family consumption; coffee is also common as cash crop; maize and bean are mainly produced for the purpose of self-subsistence. Frequent intercropping (banana/coffee, banana/bean, maize/bean, ...) indicates scarcity of cultivable land. The incomes from agricultural related activities are characterized by fluctuations with incomes

regional peace and security. The NBI is based in Uganda, and it includes Burundi, DRC, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda. Eritrea is participating actively in the NBI as an observer. NELSAP promotes investments in power development and trade, river basin management and development, agricultural trade and productivity, and fisheries and watershed management.



increasing during harvesting period and declining during the hunger season, making the majority of people vulnerable to poverty. Because of the urgent need for cash, farmers are usually forced to sell their products right after the harvest with no chance of waiting for the best price. Unemployment and underemployment are high, especially among the youth and women, yet they form the biggest percentage of the labor force. Household poverty remains high with over 45 percent of the people unable to afford the basic basket of goods. Half of the population earn less than 150,000 UGX per month, around one dollar a day. The safe water coverage remains low at 35 percent and this exposes the majority of the people to diseases from unsafe water sources. There are limited commercial activities in the District mainly due to absence of hydroelectric power and poorly developed road infrastructure (no tarmac roads in the whole District).

7. *Land tenure.* Land ownerships is mainly informal, protected by the community and sub-county authorities. Due to population density, land is highly fragmented with family plots subdivided among siblings who live on the land with their families. In general, the South West Region is characterized by a high population density for rural Ugandan standards (above 200 inhabitants per km², Census 2014). Rural urban migration is very limited with most people opting for remaining on an assigned portion of the family land to settle and farm if given an option. Informal short and long-term lease agreements are common, while land sales exist but are less frequent. While most of the land is customary, traditional customary structures such as clans and sub-clans are not in place. Land disputes are common within and between families, have low intensity and are mostly addressed informally at the local level. Thanks to the cohesive social structure land grabbing from elite capture has not been experienced to date. The presence of protected areas, private forests, and Nakivale refugees' settlement in Isingiro, further increase pressure on the remaining land.

8. *Market opportunities.* The District counts producer groups and cooperatives which are getting farmers organized to save, market collectively, and access agro-inputs. For instance, Kabuyanda Agricultural Savings and Credit Cooperative Organization (SACCO) boasts of a membership of 2,500 persons and a loan portfolio of UGX 900 million which is an indication of strong farmers' institution. A few other SACCOs exist and are performing relatively well (e.g. Ankole Diocese Millennium SACCO, Kabuyanda Dairy Coop Society...), while requiring some strengthening for good corporate governance as well as linking them to other value chain actors (e.g. financial institutions, agro-input suppliers, processors, commodity buyers, extension service providers and researchers) for better chain integration. The area could take better advantage of its vicinity to Tanzania and Rwanda, and an Export Zone at the Kikagati border is under development with support from EU and COMESA. This zone shall constitute space equipped with ample commodity handling and storage facilities, vehicle parking and premises for business support services (e.g. banks, forwarding and clearing services, ...) all aimed at facilitating the bulking and eventual export of commodities to neighboring countries. Another envisaged opportunity is the high refugee population which inhabits Isingiro district in the settlements of Nakivale and Oruchinga. At approximately 134,000 persons in need to be fed, opportunities have been created by humanitarian agencies (mostly the World Food Program, WFP) to prioritize purchasing of food locally. This implies that grain and pulses produced within the district can have a ready market estimated at about 75,000 ton/year.

Kanungu District

9. *Location.* Kanungu District is located near the border with DRC. Mean annual rainfall is 1,200 mm, with a bimodal distribution: rains occur from February to May, and then from September to December.

10. *Economy.* More than 90 percent of the population depends on agriculture, directly or indirectly. A few traders are engaged in wholesale of hardware and some agents of manufacturing industries like breweries, soft drinks, tobacco, mattresses and other merchandise from local and expatriate investors. There is also cross-border trade in agricultural produce and livestock to and from neighboring districts of Bushenyi, Kabale, Ntungamo or even neighboring counties of



DRC and Rwanda. Besides trading and crop cultivation, people engage in animal husbandry. In the area there are also some of the best dairy farms in the country, with 3.5 million liters of milk produced in the Rukungiri District annually. A number of people also derive their livelihood from fishing, particularly from Lake Edward. Fish farming is also practiced by some families.

11. Farming system. Production is mainly subsistence although the soils are very fertile and with potential for intensive commercial farming. The two main cash crops are coffee and bananas. Due to the altitude, the area is ideal for cultivation of all crops including temperate fruits. Indeed, there are few successful farmers engaged in the production of grapes, apples, pears and peaches. Land is held in customary ownership although there some leasehold titles exist. Land fragmentation is a common feature due to high population density.

12. Land tenure. The majority of the land in the project area is held under customary tenure. Title deeds are rare and relate to larger properties engaging in commercial agriculture. For the most part the land is unregistered and ownership is protected by the community and sub-county authorities. Population density is high for Ugandan rural areas standards and comparable to Kabuyanda (215 inhabitants per km², Census 2014), with 80 percent of the population residing in rural areas. Land is highly fragmented. Informal short and long-term lease agreements are common, while land sales exist but are less frequent. Traditional customary tenure governance structures are not in place. Inter and intra-family land disputes have low intensity and are mostly addressed informally at the local level. The presence of Bwindi Forest, Ishasha National Park and Nakivale refugees' settlement, further increase competition on the remaining land.

13. Market opportunities. Local markets for the agricultural produce exist from the residents and Kihiihi Farmers' market. Other opportunities are offered by the refugee transit center; and the big numbers of tourists visiting Bwindi Impenetrable Forest; Queen Elizabeth National Park; Lake Edward and Kigezi Game Reserve. Market opportunities are envisaged in neighboring DR Congo and Kabale, one of the neighboring districts. The three airstrips: Kayonza Tea Factory, Savannah Airstrip near Kihiihi, and the Ishasha River Camp Airport in the Ishasha Sector of Queen Elizabeth National Park used mainly by tourists; well distributed feeder road network and; and community access roads also enhance marketability of the farmers' produce. On the other hand, the remoteness of the district and the mountainous terrain make access to input and agricultural produce markets are challenges optimal improvement of livelihoods through increased production. There are a number of farmers' cooperatives: Nyamirama Cooperative Society, Kihiihi Farmers' Cooperative Society, Kibimbiri Rice Farmers' Cooperative (KIRIFACO), Kibimbiri Rice Brokers and Dealers' Association and Kanungu Coffee Farmers' Cooperative, among others, through which farmers receive inputs and collectively market their produce. The district is home for three tea processing factories;⁴⁰ 18 coffee hullers and several rice mills. The Kayonza Tea Factory and Kigezi Development Tea Factories purchase and process the tea grown locally. CHIFCOD Coffee Factory supports 1,000 farmers providing a market for their coffee.

Northern Region

Lamwo District

14. Location. Lamwo District is located near the border of South Sudan.

15. Economy. About 92 percent of the households are involved in agriculture. The area is also home to refugees escaping from instability in South Sudan, estimated at 37,000 persons. Majority of Lamwo's population comprises of persons who were victims of the political instability that prevailed in Northern Uganda for a couple of decades since the late 1980s.

⁴⁰ Kayonza Tea Factory and two Kigezi Development Tea Factories, one in Butogota Town Council and the other in Rugyeyo Sub-county.



This state of affairs could be attributed to the historical occurrences of instability which disenfranchised this community making it very dependent on food handouts.

16. Farming system. Crops mostly grown include simsim, maize, cassava, beans, rice, cotton, groundnut, sunflower as well as some food staples such as finger millet and sorghum. Some livestock is also kept, and it includes cattle, goats and sheep. However, in the area of the proposed Nyimur scheme, hardly 20 percent of arable land is being cultivated and there is a general lethargy towards engaging in productive activities.

17. Existing irrigation. The Agoro medium-scale irrigation scheme started as a community initiative in 1966 with 150 ha under irrigation for rice production. MWE undertook reconstruction in 2011 to bring a total of 675 ha under irrigation, and the scheme was handed over to Agoro Self Help Irrigation Scheme Cooperative Society (ASHICO) in 2013. During reconstruction, it was envisaged that levelling of the fields would be done to facilitate surface irrigation and rice growing, but it was met with to strong resistance from farmers over fear this would lead to land grabbing. Due to this difficulty in irrigating their fields, some farmers reverted to rainfed agriculture. In addition, part of the scheme seldomly receives water, due to high competition for water with upstream horticultural farmers, particularly in the dry season, when the low flow in the Okura River can be completely diverted. Some farmers have resorted to planting rice in the wet season and drought tolerant crops in the dry season. Farmers who practice irrigation have low capacity, employ poor agronomic techniques leading to wastage and low yields, and complain about limited access to market opportunities. Underutilization of the scheme coupled with low attitude for payment of user fees has led to irregular maintenance of the infrastructure (i.e. drains overgrown by bush; diversion weir, settling tank, sections of canals silted; etc). Under AfDB financed FIEFOC 2, MWE is currently undertaking hydraulic works to improve access of water to the areas of the scheme poorly served.

18. Land tenure. Land in Lamwo District is for the most part held communally under traditional customary tenure. Clan, sub-clan and extended family structures retain decision-making power over the land and natural resources, establish and enforce the rules by which owners or secondary right holders can dispose of, use and access it, and take primary responsibility for enforcing those rules and resolving disputes when they emerge. Customary tenure rights are unregistered and transmitted orally. Though population density is much lower than in other project areas (25 inhabitants per km², Census 2014), the recent history of the insurgency and the subsequent displacement and return have caused a high level of perceived tenure insecurity. Farmers' fear of land grabbing resulted in their opposition to land leveling during reconstruction of Agoro medium-scale irrigation scheme in 2013, and in impossibility for a prolonged period of time for consultants to access the area of the large-scale scheme of Nyimur due to the strong opposition of the population. Tenure insecurity is one of the main sources of disputes. Due to the lower population and availability of virgin land, these areas have a great potential for development and increased tenure security can greatly reduce investment risks.

19. Market opportunities. Humanitarian agencies gravitating towards local food purchases as well as supporting their beneficiaries with cash-based assistance is likely to create a good market opportunity for food commodities produced in Nyimur. Food demand generated by refugees is estimated at about 20,000 metric tons of grain/pulses annually. Lamwo district is also capable of becoming a food basket region between Northern Uganda and South Sudan. However, several value chain support services and structures have to be strengthened in order for this opportunity to materialize. These include extension and advisory services, produce storage facilities and processing infrastructure to add value to raw commodities for better gains.



Lira District

20. *Location.* Average annual rainfall is 1,200 to 1,600 mm, with one rainy season from March to November, and distinct dry season from December to February.

21. *Economy.* About 96 percent of the population is found in rural areas. There is a diversified economy including mining, agriculture, agro-processing, tourism, and industry, among others. The district previously experienced a massive return of Internally Displaced Persons following an insurgency in the district and in neighboring districts of Kitgum and Pader. Over 310,000 of the estimated 350,000 have returned to their home villages and have resumed carrying out their economic activities. The district is served by Commercial banks, SACCOs and microfinance institutions.

22. *Farming system.* A predominantly rural district, the livelihoods reflect the Lango farming system, which is an agro-pastoral system, based on crop production and livestock rearing. Subsistence agriculture plays an important part in people's livelihoods and approximately 60 percent of households own livestock (cattle, goats, sheep, pigs and poultry). Because of the relatively low annual average rainfall, farmers tend to grow drought-resistant crops like simsim, finger millet, maize, simsim (sesame), groundnuts, soyabeans, cassava, sweet potatoes, sorghum, sunflower and fruits such as oranges, pineapples and passion fruits. Cotton and tobacco also do well in the region while livestock is important as well. Lake fishing is also common on Lake Kyoga.

23. *Existing irrigation development.* The Olweny medium-scale irrigation scheme is located in the sub-counties of Bar and Amach in Lira District, receiving water from Okile and Itek Swamps. The idea of growing rice at Olweny started to be developed in the early '80s,⁴¹ but it was only in 1994 that a 50 ha nucleus farm was started at Agwata. The farm was irrigated by pumping and drained by pumping and was all bounded by dyke; 40 out of the 50 ha was given to individual farmers in the form of small farms, while 10 ha remained for research experiment and seed multiplication. The production was good but could not yield results because the expenses were high and the land was over fragmented. In 1999, construction works for the remaining 600 ha in Itek and Okile were carried out, benefitting 500 families who received about 1 ha each. The scheme faces the following challenges: (i) Itek and Okile swamp gets over-flooded and very difficult to drain during the rainy season due to the inadequate flood control structures; (ii) Siltation of irrigation and drainage infrastructure; (iii) Insufficient water for paddy rice irrigation during the dry season due to nonretentive nature of the dams; (iv) General dilapidation of the irrigation scheme infrastructure; (v) Lack of clear management framework to manage the scheme; (vi) Encroachment on preserved swamp areas; and (vii) Absence of livestock and household watering points. These challenges were mainly the result of fundamental issues of the original design, which was mainly around flood control, which was not combined with water storage to allow for irrigation during the dry season. Given the above, upgrade of the scheme was carried out in 2014 under FIEFOC.

24. *Land tenure.* Land in Lira District is customary. Internal displacement and return induced by the war and the insurgency have weakened traditional community governance, separating communities and undermining their sense of belonging, their shared values and their beliefs. Furthermore, population pressure (350 inhabitants per km², Census 2014), increased levels of education, shift in livelihood patterns, land conflicts, land grabbing and increasing land values, have contributed to challenge traditional customary structures' legitimacy. Customary land is now managed under Clans, Sub-clans, extended families or individuals depending on the community. Customary tenure rights are for the most part unregistered and transmitted orally, incidence of land disputes and perceived tenure insecurity are high. In

⁴¹ In 1982, the idea of growing rice at Olweny started concretizing, and pre-feasibility study was commissioned by UNDP. In 1986, funding from the ADB, IsDB and GoU were identified, but political insurgency and insecurity in the area prevented any progress until 1989, when feasibility studies were commissioned.



the absence of land registration, local legitimacy and buy-in are necessary for any development project to succeed.

25. Market opportunities. The district has a fairly good network of community feeder roads and air transport. Much of the agricultural produce in Lira is traded in the local market, at farm gate, in community markets as well as town markets. Other markets are in neighboring districts and Kampala, (and to some extent Kenya – through Mbale and Tororo), are important destinations for food commodities. South Sudan and Kenya are the most important external regional for agricultural produce. There is presence of Uganda Oil Seeds Processor Association, World Food Program (WFP), grain millers several other agro-processors. Among seed factories in Lira are; A. K Oils and Fats (U) Ltd, a subsidiary of Mukwano, Al Safa Agro Ltd, IK Investment (U) Ltd, producer of sunflower vegetable cooking oil, Mt. Meru Millers also dealing in oil seed and processing of edible oils, Ngetta Tropical Holdings (NTH), producer of Virgin Oil Cooking oil, Guru Nanak, among others. A few marketing cooperatives have been formed to improve farmers' access to inputs and markets.

Eastern Region

Tororo District

26. Location. Tororo District is bordered by Mbale District to the north, Manafwa District to the north-east, Kenya to the east, Busia District to the south, Bugiri District to the south-west, and Butaleja District to the north-west. Tororo, the largest town in the district and the location of the district headquarters, is approximately 230 km east of Kampala. The average annual precipitation is 1,494 mm.

27. Economy. The total district population is estimated at 518,080 (Census 2014). About 86 percent of the households are involved in agriculture.

28. Farming system. Main crops grown are millet, cassava, peas, beans, sweet potatoes, simsim, sunflower, cotton, onions, rice and maize. Cotton and horticultural crops (fruits and vegetables such as onions) are the main cash crops. Most of the agricultural produce is consumed within the district and towns in surrounding districts.

29. Land tenure. Land in Tororo is customary and for the greatest majority unregistered. Population pressure is very high (488 inhabitants per km², Census 2014). Like in the case of Lamwo and Lira District, tenure governance structures are facing the effects of the prolonged insecurity, displacement and return. Land is owned by Clans, Sub-clans, extended families or individuals depending on the community. Customary tenure rights are for the most part unregistered. Perceived tenure insecurity associated to subsistence farming is low, but increases when the land is developed for commercial farming.⁴² Disputes are common and mainly related to boundaries.

30. Market opportunities. A well-developed road network traverses the district connecting it to neighboring Kenya through the border posts of Busia and Malaba. Most of the agricultural produce is consumed within the district and towns in surrounding districts. Given Tororo's location, sharing a border with Kenya promotes cross-border trade. Tourists attracted to Tororo Rock and traders from South Sudan also offer a market opportunity for the tradable agricultural produce. A few cooperatives are operational for handling rice and maize. Doho Rice Irrigation Scheme Cooperative and Eastern Rice Group Companies own large scale mills while other small and medium scale mills are located all over the district. The district hosts commercial banks, Micro-credit Finance institutions and several SACCOs.

⁴² Land Tenure and its Impacts on Food Security in Uganda: Empirical Evidence from Ten Districts, Makerere University, United Nations-Habitat, 2017.



Central Region

Mukono, Wakiso and Mpigi Districts

31. Location. Mukono is one of the Districts in the Central Region of Uganda, bordered by Kayunga District along River Sezibwa to the north; Buikwe District to the east; Kalangala District to the south-west; Kampala and Wakiso District to the south-west; Luweero District to the north-west and Tanzania - Lake Victoria in the South with the Islands of Buvuma District. The mean annual rainfall is 1,000 mm. Mpigi is one of the districts in the Central Region of Uganda, bordered by bordered by Wakiso District to the north and east, Kalangala District to the south, Kalungu District to the southwest, Butambala District to the west and Mityana District to the northwest. The average annual rainfall is 1,320 mm. Both districts experience two rainy seasons with the main season in March to May with peak in April and secondary season August to November with a modest peak in October/November. The main dry season is in December to February and the secondary dry season is in June to September.

32. Economy. The total population of Mukono District is 596,804 of which 27 percent are rural dwellers. Mpigi District population is 250,548 of which 83 percent are rural dwellers. The main economic activities are agriculture, fishing & fish farming, mining, tourism and industry. Investment opportunities exist in financial services, tourism, transport, agro-based processing industries, poultry production, afforestation, fish farming, rice growing, and industrialization due to availability of industrial parks. The districts are home to several commercial banks, micro-financial institutions and savings cooperatives.

33. Farming system. The districts fall in the Lake Victoria Crescent Agro-ecological Zone also referred to as the Intensive Banana Coffee Lake shore system. The major economic activity is Agriculture with food crops like sweet potatoes, beans, cassava, maize, bananas, ground nuts, soya and yams. Widely grown fruits and vegetables are tomatoes, onions, pineapples, passion fruits and cabbage. Cash crops include coffee, cotton, sugarcane and tea. The zone is characterized by small, medium and large-scale urban, intensive and extensive farming with potential for commercial production. It is stable and mostly cosmopolitan with high potential for peri-urban farming.

34. Land tenure. Mukono District has a mix of mailo and customary land. Population pressure is high, (367 inhabitants per km², Census 2014) and the urbanization rate is at 37 percent. Due to the proximity to the country capital, Kampala, Mukono is a natural area of expansion for peri-urban settlements. Though many of the land users remain without formal documentation of their rights, a much higher percentage of the land is registered as compared to the other project areas. Mpigi District has similar characteristics to Mukono, though with a lower population density (230 inhabitants per km², Census 2014).

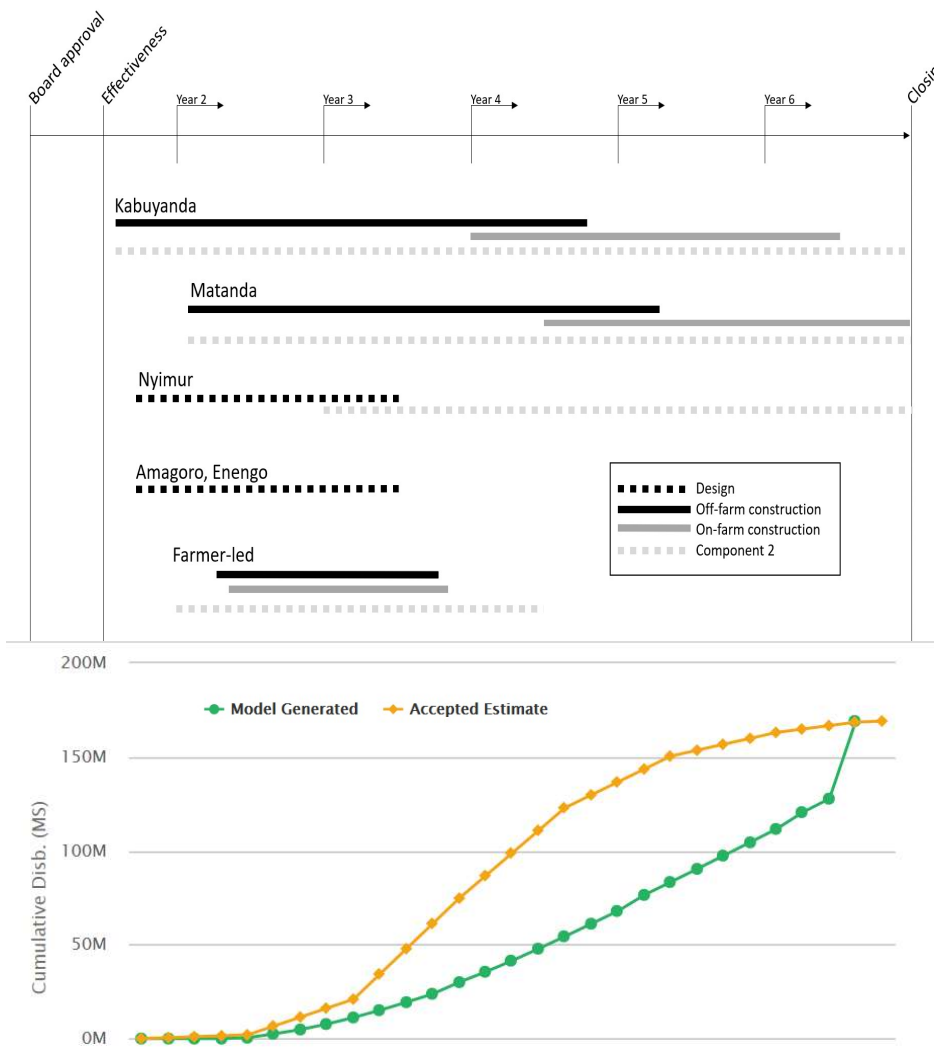
35. Market opportunities. Much of the agricultural produce in the districts is consumed by the large urban population in Kampala City, within and in the neighboring districts. The farmers access regional markets in Kenya, South Sudan, DRC and Rwanda. The districts are endowed with generally good infrastructure. An extensive tarmac and murram road network provides easy access to all areas. Mukono District is also served with a Railway service, industrial park and good storage capacity, some which are warehouses. Access to the international airport offers an opportunity for international trade of mainly fruits and vegetables. The districts host several tourist sites, including cultural sites, biodiversity reserves, religious sites and water spots, namely Lake Victoria, the largest lake in Africa and the second largest fresh-water lake in the world and the attendant leisure activities. Visitors to these sites also comprise a good market for the produce in these districts. The concentration of agro-processing facilities in and outside the industrial park in the Central region enhances the marketing of agricultural produce.



Components description

36. The three components will be implemented in parallel. Works in Kabuyanda will last three years. In parallel to the works, farmers will receive other agricultural services (agricultural extension; access to input and mechanization, value chain development and market access), thus tackling comprehensively the challenges farmers are facing. A few months before completion of off-farm works, farmers will be supported in the access to, and establishment of, on-farm irrigation equipment, which is expected to be completed over three cropping seasons for the whole command area. Matanda scheme will follow the same timeline but with a six months lag. The six-year project duration is key in order to ensure that farmers have adequate support once irrigation service starts, as well as that management model is adequately established and supported. The project will strengthen the management of two existing schemes (Olweny and Agoro) and train the farmers for increased production, productivity, post-harvest handling and market linkages. Design of Nyimur, Amagoro, and Enengo schemes will be carried out in the first 18 months of implementation, while support to farmers in Nyimur is expected to start before the scheme design is completed, and for the remaining duration of the project. Support to farmer-led irrigation is to be carried out over the first part of project implementation.

Figure 1.1. Timeline for implementation of project activities and disbursement profile





Component 1. Irrigation Services

(US\$129.8 million, of which US\$127.4 million on IDA credit and US\$2.4 million on the Borrower)

37.Scope. Access to irrigation is critical to allowing farmers cope with climate variability, to increase yield and intensification, and diversify towards higher value crops. Component 1 aims at providing farmers with irrigation water across various irrigation models. Water service is intended to be provided at the farm gate, thus this component has a focus on the off-farm infrastructure.

Table 1.1. Costs for Component 1. Costs are in US\$, including taxes and contingencies

Financing	Activities	Kabuyanda	Matanda	Enengo	Nyimur	Amagoro	Olweny	Agoro	FLI
IDA	1.1 Works for Dam construction	20.2	14.7						
	1.1 Works for Network construction	24.4	36.0						
	1.1 ESMP implementation	1.0	1.0						
	1.1 Consultancy services for supervision of works	3.6	3.0						
	1.1 Consultancy services for supervision of safeguard	0.8	0.8						
	1.1 Consultancy services for Environmental audit	0.4	0.4						
	1.1 Consultancy services for Vulnerable Groups		0.3						
	1.1 Consultancy services for Panel of Dam Safety Experts	0.8	0.8	0.1	0.1	0.1			
	1.1 Consultancy services for support to sustainable mangm	2.0	2.2				1.0	1.0	
	1.1 Start-up fund for O&M	0.4	0.4						
	1.1 Consultancy services for feasibility and design			0.8	0.8	1.0			
	1.1 Consultancy services for safeguard documents			0.8	0.8	0.8			
	1.1 Consultancy services for CCOs roll out	0.1	0.1						
	1.2 Support to small and micro scale irrigation	0.5	0.5						0.5
	1.2 Consultancy services for support to small and micro scale	0.1	0.1						0.3
1.3 Catchment management interventions	1.0	1.0							
1.3 Reforestation	1.0								
1.3 Consultancy services for catchment mangm interventions	0.4	0.4							
Borrower	1.1 Compensation	1.2	1.2						

Sub-component 1.1 - Large and Medium-scale Irrigation (US\$122.5 million)

Construction of new irrigation schemes

38.Scope. The project will support the construction of two irrigation schemes: Kabuyanda (Isingiro District) and Matanda



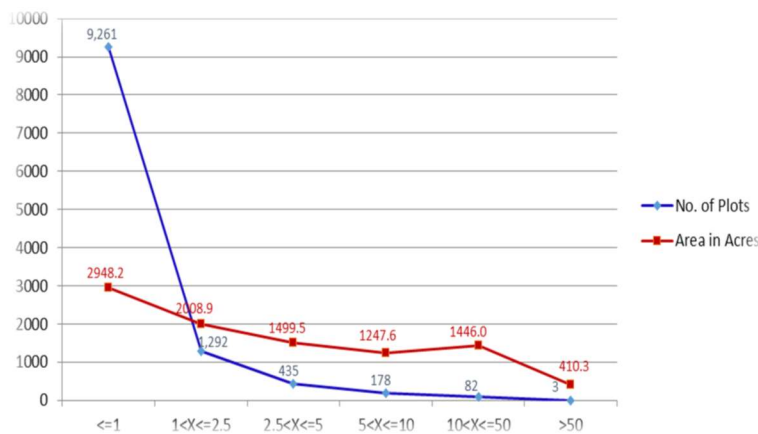
(Kanungu District).

Kabuyanda irrigation scheme

39. *Location.* The proposed scheme is located in the sub-counties of Kabuyanda and Kikagati, in Isingiro District, Western region, near the border with Tanzania. The command area is located in a basin with a plain at 1,300 m elevation, circled by hills reaching 1,400 m. The Mishumba River flows through it from north to south. The Mishumba River drains an area of 90 Km², partly located in the Rwoho CFR under NFA, and later joins the Kagera River along the Uganda-Tanzania border. Water flow has been estimated at 16 Mm³/yr, with strong variability across years (10 to 24 Mm³/yr) as well as strong variability during the year (0.3 Mm³ in July vs. 2.3 Mm³ in November).

40. *Land tenure.* In November 2018, MWE carried out a survey in the proposed command area to inform scheme design. The survey identified 11,251 plots. It is to be noted that the survey was carried out with reference to physical boundary between plots, without any formal recording of plot ownership, thus making not possible to link plots and farms. Of the 11,251 plots surveyed, more than 80 percent are below 0.4 ha, 11 percent are between 0.4 and 1 ha, and the remaining are above 1 ha. The three properties above 50 ha include Iryango Kaiho Farm of the Kaiho Farm School Leavers Cooperative Programme, 235 ha; and two private properties of 116 ha and 59 ha, respectively.

Figure 1.2. Kabuyanda, plot survey



41. *Scheme design (off-farm infrastructure).* The design consists in a zoned earthfill dam on the Mishumba River, of 33 m high, 314 m of maximum crest length, and creating a 8.8 Mm³ reservoir. The dam will feed a piped irrigation network serving a command area of 3,300 ha. The minimum operational level of the dam is at 1,347 m, which allows to feed the system with natural pressure (from few meters up to 45 m across the command area).⁴³ The boundaries of the command area have been defined based on topography (elevation and slope), pedology (land suitability) and availability of water resources (simulation of water availability in the reservoir to guarantee satisfaction of irrigation and environmental needs). Out of the 3,300 ha, 1,756 ha have a natural pressure higher than 25 m, 922 ha between 15 and 25 m, and the remaining 775 ha lower than 15 m. The irrigation network has been designed to mirror to the extent possible the existing social structure, so to facilitate the management of the system: the main pipe cuts across the command area from north

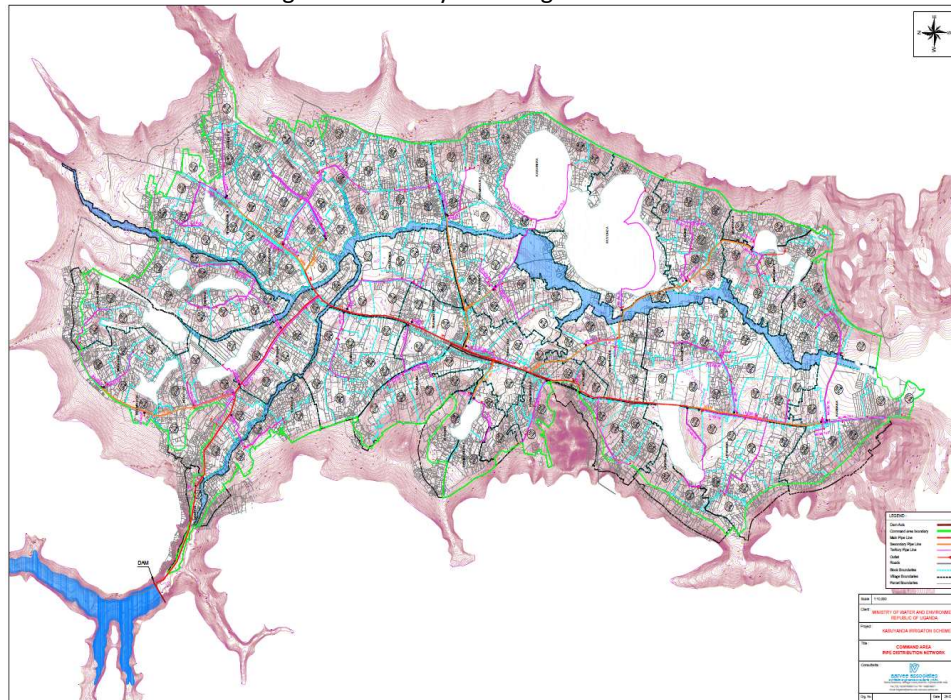
⁴³ A first version of the detailed design included two pumping stations and five storage reservoirs serving the lower part of the scheme. The optimization study carried out between September 2018 and March 2019 allowed eliminating the pumping stations and reservoirs, reducing unit costs by about 5,000 US\$/ha.



to south, mainly along the river; secondary pipes feed groups of villages, and then each tertiary pipe feed each of the 35 villages. Within each village, the network feeds blocks of 20 ha each through a block hydrant, and of which the boundaries have been defined taking into consideration the farm limit. From the block hydrant, a network within the block provides water to each farm (or to a group of farms when they are of less than 1 ha) through an intake equipped with a hydrant, a flow control valve and a meter. The network has been designed for a flow of 0.6 l/s/ha, defined based on the irrigation requirements of the projected cropping pattern for the month of peak demand, corresponding to 725 m³/ha/month at the plot level, using an overall efficiency of 70 percent and a duration of irrigation of 16 hours per day. The design does not include the development of a surface or subsurface drainage system, considering: (i) rainfall intensity is relatively low (maximum of 80mm/day); (ii) irrigation technologies suggested do not induce excess of water; (iii) existence of natural drains; and (iv) soil characteristics not requiring a deep drainage if adequate agricultural technologies are practices in 5he lowlands.

42. *On-farm infrastructure.* Considering the availability of natural pressure and the irregular land topography, it is expected that pressurized irrigation technologies requiring average or low pressure will be used (i.e. hose-move sprinklers, drip/low-cost drip, drag hose). To avoid obstruction of the irrigation equipment, a filtering station downstream the dam is included. Each farm of 1 ha or more will be equipped with a hydrant, a flow control valve and a meter at the farm gate, while farmers of less than 1 ha will be grouped and shared the hydrant and meter, and they will be sharing the water bill based on respective irrigated area or other criteria defined by the farmers. The choice of the irrigation technology will be done based on the available pressure at the block level, and as much as possible will be the same within the block. Under Component 2, farmers will be exposed to the various irrigation technologies through establishment of demonstration plots, and they will also be informed of the cost of each technology, considering that farmers will be contributing to the cost of the on-farm equipment (see Component 2). Considering that water flow at the block hydrant is 0.6l/s/ha, it will not be possible to irrigate all the farms within the block at the same time, thus requiring a rotation within the block.

Figure 1.3. Kabuyanda irrigation network





Matanda irrigation scheme

43. *Location.* The proposed scheme is located in the sub-counties of Kihhi and Nyakini, in Kanungu District, Western region, near the border with DRC. Water will be derived from the Kiruruma River.

44. *Proposed scheme design.* From the initial assessment, it seems that an area between 3,300 ha and 4,750 ha could be irrigated with a dam of 17.5 m to 23.5 m high. The opportunity of having a dam has been confirmed by a rapid economic analysis compared to the option of no dam (6 m weir), for which an area of about 1,000 ha could be irrigated.

Support to the development of sustainable management model for public irrigation schemes

45. *Scope.* The project will support the development of sustainable management models for the two existing irrigation schemes (Olweny, Lira District; Agoro, Lamwo District)⁴⁴ and for the two irrigation schemes to be constructed under the project (Kabuyanda and Matanda).

46. *Current situation.* GoU is keen to re-define/re-structure and establish effective organisational structures and systems to ensure efficient irrigation water use and management, O&M of scheme facilities, FM and cost recovery, control and enforcement – water service delivery mechanism. Furthermore, measures for supervision, monitoring and regulation of water resource use, rights, allocation and conflict management should be defined and instituted – water service regulation mechanism. It is also important that such structures differentiate the functions, roles, responsibilities and interests of the various stakeholders/institutions for better and improved agriculture productivity and sustainable, equitable water resource management. The management model currently adopted in existing schemes has been analyzed, and found not suitable for the schemes to be constructed under the project. A preliminary management model has been proposed based on the experience in the water supply sector in Uganda. However, firming up the management model will only be possible during project implementation, in parallel with the schemes' construction.

47. *Current management model.* Presently, management of irrigation schemes in Uganda is delegated from MWE or MAAIF to the District, and then to a farmers' organization which plays the role of WUA. This management style presents challenges, including: (i) membership in the farmers' organization is voluntary, and only a fraction (sometimes small) of farmers in the command area is part of it, while the group cannot force the remaining ones to contribute to the O&M of the scheme; (ii) the farmers' organization does not usually have the technical skills or experience to ensure O&M of the scheme; and (iii) in the case of cooperatives, they originally have other mandates, in relation to access to inputs and machineries, value chain development, etc., and adding water management to their tasks often demonstrated not to be feasible. These issues result in underperformances, with unsatisfactory service for the farmers and periodical need for public intervention to upgrade the scheme as a consequence of poor maintenance. In addition, schemes to be developed under the project have some critical differences compared to existing ones, which might require specific management set-up:

- All existing irrigation schemes in Uganda have open canals, contrary to pipes in Kabuyanda and Matanda: this results in requirement of higher level of technical skills for O&M;
- All existing irrigation schemes are of medium size (i.e. Doho is 1,000 ha), contrary to 3,000 ha plus in Kabuyanda and Matanda: this results in higher complexity of the infrastructure (possibly including a dam), and in a higher number of stakeholders to engage.
- Several existing irrigation schemes are for rice production only (i.e. Doho), contrary to the crop diversification in

⁴⁴ For Olweny, MWE has an ongoing contract up to 2021, while for Agoro in the process of procurement for four years.

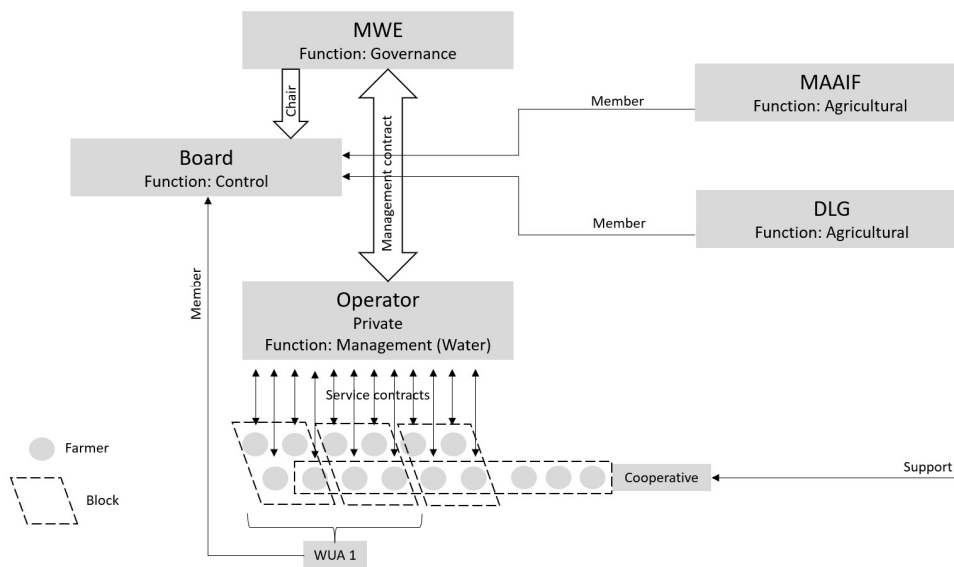


Kabuyanda and Matanda: this multiplicity of crops suggests even more so the benefit of detangling the water service from the commercialization services.

48. *Proposed water management model.* Preliminary analysis and discussions during project preparation suggested the following management model to be adopted for the two large-scale irrigation schemes to be financed under the project:

- MWE is responsible for management, regulation, water allocation, monitoring) and the Investment function (decision to invest, scheme financing, scheme design). MWE will delegate the management function once the scheme is constructed, in line with the approach taken so far for existing schemes. Given the size of the schemes and the technical complexity, the management will not be entrusted to a WUA, but rather delegated to a Water Board (or other body as shall be determined in the approved management model) which will then engage an irrigation system operator, drawing lessons from the management of water supply systems.
- The irrigation system operator will be given the management function for the whole off-farm irrigation infrastructure (including the dam), and up to the farm gate. This will allow having a specialized entity with adequate technical skills and clear mandate. The operator will have no role in the provision of other agricultural services besides water provision. The roles and responsibilities of the operator will be specified in the Water Service Agreement.
- WUAs will be created with an advocacy mandate purely related to water management (with no role in value addition and market linkages). The WUA will make sure that interest of farmers in relation to water management is taken in due consideration by the operator, facilitating conflict resolution for water management and water tariff collection. Farmers within the command area can decide whether to join or not the WUA; however, joining the WUA is a prerequisite to sign a service contract with the operator and receive the water service. Based on the size of the scheme, several WUAs may be created (i.e. in Kabuyanda, one WUAs per village or per group of villages is proposed). A federation of WUAs may later be created at scheme level.
- MAAIF (through its central departments and the LG) is responsible for the Agricultural production function, in line with its current approach and mandate. The District will retain the support role for other agricultural services, including provision of extension services (including on-farm water management).
- Existing cooperatives will be refocused on their original mandate in relation to value addition and market linkages (with no role in water management). The cooperative can serve farmers within and outside the command area.

Figure 1.4 Proposed management model for Kabuyanda irrigation scheme





49. *Irrigation Systems Operator.* The management of the schemes is expected to be outsourced to an irrigation system operator. Regarding the Public Private Partnership (PPP) model, MWE has made the upfront decision of keeping capital investment and ownership fully public for the two irrigation schemes constructed under the project. Among the outsourcing options, a management contract is likely to be preferred, as it allows devolving the whole of the operation of the system while keeping the risks assumed by the private sector relatively low, considering also the relative short duration of the contract (generally, one to five years). For the schemes to be designed (but not constructed) under the project, different models (BOT, BOO, DBO, concession, privatization, ...) with some private participation in capital investment and/or asset ownership will be explored.

50. *Experience in the water supply sector.* While the choice of an irrigation system operator would be new in the irrigation sector in Uganda, it remains a familiar approach for MWE, considering the experience in the water supply sector over the past 20 years in the country. As per the Water Act (1997), the Minister of Water can “gazette” a water supply area and appoint a Water Authority, which is either the National Water and Sewerage Corporation (NWSC) or the Town Council. The relationship between the Water Authority and the Ministry is governed by a performance contract, which specifies the ToR and service targets of the Water Authority.⁴⁵ The Water Authority sets up a Water Supply and Sewerage Board (WSSB). While some WSSB choose to run the water supply directly, usually an irrigation system operator is employed. The Water Authority remains the owner of the assets, it negotiates a tariff with the operator (which has to be cleared by MWE) and oversees the operation of water services. The National Water Policy (1999) operationalized the private sector participation framework of small town water supply. Operators are chosen through a competitive tendering process administered by the WSSB and sign a renewable management contract, usually of three years. The management contract between the WSSB and the operator must be in line with the service obligations specified in the performance contract between the Water Authority and MWE. The management fee of the operator is set as a percentage of revenue and is arrived at through the tendering process. The management fee includes agreed expenses necessary for running the scheme such as staff costs, minor repairs and energy costs. Operators bidding for a system must also submit business plans including planned investments (primarily new customer connections). To complement the executive and regulatory authority of the MWE, a Regulation Department has been established within the Directorate of Water Development (DWD) in MWE. Its purpose is to oversee the urban water and sanitation sector, and with respect to small towns, to supervise the performance contracts with WSSB, to review and approve tariffs in small towns, impose penalties and suggest solutions to substandard performance, review business plans and promote pro-poor service delivery. Significant challenges remain, including inadequate LG capacity to supervise the operators, inefficient single-scheme contracts without economies of scale, revenue erosion, profit maximization at expense of infrastructure deterioration. The quality of services offered by POs has declined over the years resulting into a policy decision to gazette the 6 Umbrellas of Water and Sanitation Organizations into Water Authorities, similar to NWSC, to manage piped systems as of June 2018. Under the new model the Umbrella Authorities (UA) directly contract and supervise the local scheme operators. Payments of most operation costs (scheme operators’ remuneration, energy costs etc.) as well as investments are directly made by the UA. A local Water and Sanitation Committee, where the water users and LG are represented, monitors the operational performance and suggests improvements to the system. Following sector reforms, the number of systems managed by PO reduced from nearly one hundred in 2011, to nine in 2018. It should be noted that UAs still engage POs for some of the systems under their management.

51. *Payment for the irrigation service.* There is keen interest by MWE and MoFPED to ensure that the irrigation schemes financed under the project are financially sustainable, and able to cover the O&M costs in full from water tariffs raised by the farmers. A financial assessment has been developed for Kabuyanda (Annex 4). It is expected that farmers will be

⁴⁵ Key performance indicators include; number of active connections, water sales, non-revenue water, continuity of supply, revenue collection, collection efficiency, and operating cost coverage ratio.



asked to pay a one-off connection fee in order to subscribe to the irrigation service. The amount of this fee remains to be assessed, as well as details for the subscription process. It is expected that a bank account will be opened and connection fees collected, and a matching contribution provided by the project, creating a startup fund for maintenance. The tariff is expected to be volumetric. Further analyses will be carried out during project implementation in parallel to the construction works. The consultancy services will include capacity building for farmers towards positive attitude change towards payment of water user fees.

52. Activities during project implementation. A final decision in relation to the management model will be taken during project implementation. The project will finance consultancy services which will accompany MWE in the thinking process for the finalization of the management model. In 2020, MWE will pilot the recruitment of irrigation system operators for the medium-scale schemes of Agoro and Olweny; results of the bidding process will inform decisions for the management model for Kabuyanda and Matanda.

Development of studies for future irrigation schemes

53. Scope. The project will carry out feasibility studies, detailed designs and related safeguard studies for new irrigation schemes.

54. Nyimur irrigation scheme. The proposed scheme is located in Palabek Ogili and Palabek Kal sub-counties in Lamwo District, Northern region, near the border of South Sudan. The site is of high priority for MWE considering the level of food insecurity of a population which has been heavily affected by fragility and only recently returned to the area after years of conflicts. Feasibility study was completed under NELSAP, however local population has still to resume practicing agriculture, with currently 2/3 of the site not being farmed. The project will carry out an optimization of the existing feasibility study, in an attempt to reduce costs, prior to the detailed designs. In parallel, Component 2 activities will focus on re-engaging the local population in rainfed farming, to provide quick wins in terms of increasing food security and job creation, in addition to increasing readiness of the population to take advantage of future irrigation development.

55. Enengo irrigation scheme. The proposed scheme is located next to the Matanda irrigation scheme. It is located in two sub-counties of Nyamirama and Bugangari, in Kanugu and Rukungiri Districts, Western region, near the border with DRC. Water will be derived the Mitano River. The feasibility study is ongoing, to be completed by effectiveness. The project will carry out detailed designs and related safeguard studies.

56. Amagoro irrigation scheme. The proposed scheme is located at the border between Magola Sub-county in Tororo District and Busitema sub-county in Busia District, Eastern Uganda, near the border of Kenya. The scheme is to be served by water from the Malaba River which forms the border between the two Districts. The river is perennial, with flow highly fluctuating with season with the base flow inadequate to meet irrigation and other water requirements.

Sub-component 1.2 on Small and Micro-scale irrigation (US\$2.0 million)

57. Concept. Farmers (individually or as a group) can drive irrigation development and management by acquiring technologies for agricultural water use. For this reason, this model is also referred to as farmer-led irrigation,⁴⁶ as

⁴⁶ Synonymous include: informal irrigation (which connotes the fact that such irrigation are usually not captured in the official agricultural statistics), traditional or means indigenous irrigation (meaning that the system is an age old practice but occurring at a very low scale), private or communal irrigation (which refers to the ownership of the assets or equipment, and maintenance and operation responsibilities), and smallholder irrigation (which denotes the scale of production).



opposed to public-led or formal irrigation. High cost of irrigation equipment and limited access to finance, coupled with missing markets or market failure and low scale of operation, impede the private sector-driven irrigation investments. Thus, incentives or subsidies are needed to create economies of scale and scope. Once sufficient economies of scale and scope is created, competitions in the private sector results in efficiency and cost reductions, decreasing the role of the public sector. This pilot intends to proof the farmer-led model for smaller infrastructures that would allow fast implementation and easy scale-up.

58. *Value-chain approach.* International experience suggests that investments in micro and small-scale irrigation can increase farming household income only if they are combined with other critical elements such as high-quality inputs, extension services, access to finance, and access to markets. The pilot intends to fulfill these requirements by working with off-takers in selected value chains (i.e. coffee, horticulture and dairy). During project preparation, IFC Advisory has carried out a value chain analysis which identified off-takers who are already contracting smallholder suppliers and willing to purchase additional produce realized through the project-supported irrigation systems. The beneficiaries of the pilot will be selected from the groups of current suppliers (both individual smallholder farmers and farmer groups) of these off-takers based on the selection criteria including access to surface water, sound track-record with off-takers, and size of the farm.

59. *Technologies.* A list of irrigation technologies eligible for farmer-led small and micro-scale irrigation has been identified. The list offers several complete packages of irrigation systems (including pumping equipment, transmission equipment, and a variety of on-farm equipment such as movable rain-gun sprinkler, fixed sprinkler, drip, drag-hose with nozzle) at different costs with some flexibility to allow adjustments according to different local conditions, farmers preferences, users (individuals or groups), and land size.

60. *Financing modalities.* The project will finance part of the irrigation investment. The eligible investment per beneficiary is limited to certain value and land area which will be defined in the Project Implementation Manual (PIM) and in consultation with MAAIF prior to effectiveness. The farmer will finance the remaining part, plus any other irrigation development beyond the ceilings. If the farmer doesn't have the financial availability to do so, s/he can borrow from a partner financing institution (or institutions).⁴⁷ The farmer will be required to provide at least 10 percent of the irrigation investment cost as cash contribution should they opt to take a loan. Based on a recent assessment of agriculture finance by the World Bank, leading banks in agriculture in Uganda can manage short-term liquidity. Their current product offerings and lending activities suggest that some of them would be willing to work with the pilot which would build a pipeline of creditworthy borrowers with pre-identified markets and viable investment plans. The on-going value chain analysis will further assess the capacity and network of these financial institutions and interest to partner on the farmer-led irrigation.

61. *Implementation modality.* This model stems from the principle that existing market linkages with off-takers are key in order to ensure that farmers take advantage from the irrigation investment and attract additional private sector players such as banks, equipment suppliers, and installers. To cater for the increased productivity and maintaining the price levels, there is an important role that must be played by the off-takers to ensure access to attractive markets with the capacity to absorb the resulting increase in production. This will also require associated value chain investments (i.e. cleaning and handling, transportation, cold and dry storage, processing, etc.). The implementation partners (off-takers, equipment suppliers, financial institutions and the MAAIF will sign a service agreement (or contract) that defines the roles and responsibilities of each party. An overview of the implementation modality is as follows:

⁴⁷ The project interventions do not include any financial intermediation (i.e. credit lines and risk sharing). Thus, OP 10 is not triggered.



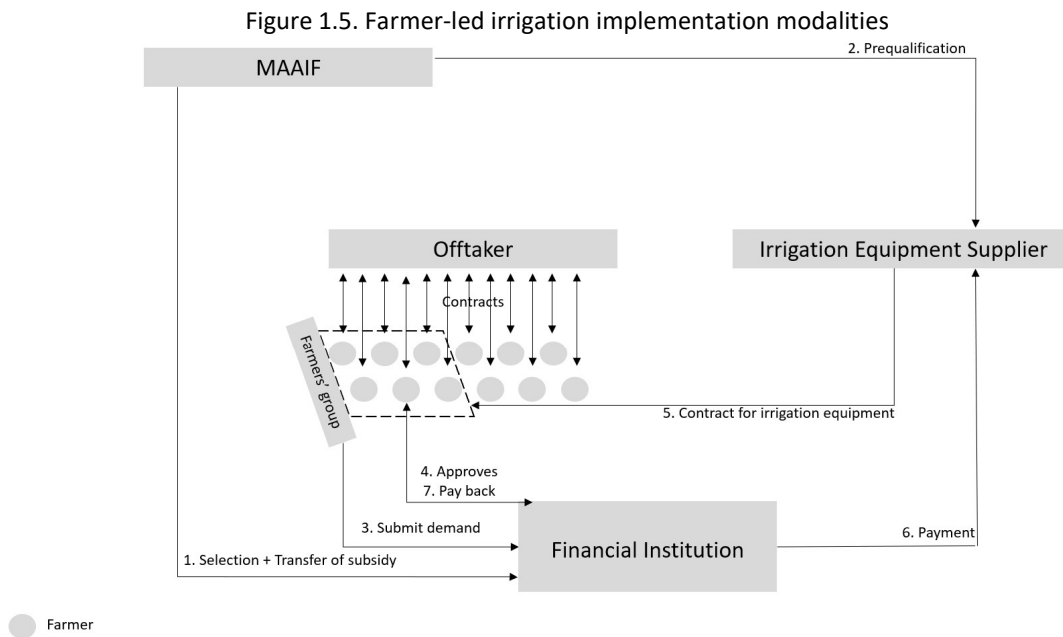
- Step 1: Informed by the value chain analysis, MAAIF will competitively select financial institution(s) interested in working with small farmers for access to irrigation equipment. The financial institution(s) will manage and disburse the grant to farmers based on access criteria agreed upon by MAAIF. Also, they are expected to appraise the loan applications from the farmers through their normal procedures and conditions and provide loans to partially cover the irrigation investment. Multiple financial institutions can be assigned to carry out this role, considering also that the pilot will be carried out in several Districts.
- Step 2: MAAIF will prequalify irrigation equipment suppliers according to the selection criteria including sound track records in the country, and capacity and willingness to supply comprehensive services etc. MAAIF and the selected suppliers will define a list of eligible irrigation technologies considering the usage, cost of equipment and payment capacity of the target farmers.
- Step 3: MAAIF will prequalify off-takers based on selection criteria (engagement with farmers in the target districts, capacity to absorb the increased production etc.). The off-takers will be required to provide a list of farmers from their networks with effective irrigation demand and credible water sources. The identified farmers (in case of individual request) or farmer groups (in case of a collective request) will submit grant applications to the financial institution for the irrigation equipment.
- Step 4: The Financial Institution will assess the applicant's assets, cashflows and other features and suggest the maximum costs of the irrigation investments that they can initiate. At the same time, potential loan conditions (price, volume and duration) will be indicated for consideration if requested by the applicants. In case of a lending to groups, financial institutions apply their standard appraisal procedures and conditions that may require a registration of groups, borrowing on individual bases with co-guarantees etc. Farmers will have access to technical support by the project irrigation engineers to identify most suitable irrigation systems according to their needs. For farmers who opt to fund the 50 percent using own funds, they will be required to deposit the money on their savings account in the financial institution for the choice of equipment selected as advised by the equipment supplier.
- Step 5: Following the assessment, the farmers or the farmer groups will select an irrigation investment option from the eligible list, sign a grant contract with the project, sign a loan contract with the financing institution, deposit their contributions, and submit all the other required documents to the financial institution. The list of the farmers and the selected irrigation investment option will be shared by the financing institution with the equipment suppliers and the MAAIF. The financial institution would disburse the first tranche of the grant (up to 20 percent) and loans to the equipment supplier upon the receipt of an invoice from the supplier. The second tranche for the whole remaining amount will be disbursed after a field visit by the project engineer and MAAIF designated staff to confirm that the system has been installed and is properly operating and meets the required specification.
- Step 6: The Financial Institution will monitor the performance of the farmers agricultural activities for those that took loans. This will ensure to detect any significant issues related to their farming businesses or the irrigation equipment that should be addressed by the off-takers and the irrigation equipment suppliers if required. The borrowers will repay as the agreed terms of the loans. Any non-compliance with the grant and loan agreements will be reported to the MAAIF immediately.

62.Reporting. The financial institutions will submit loan performance reports to the project coordinator on the performance of borrowing clients and those that access the grants, on a quarterly basis. The quarterly reports will include the number and value of grant and loans disbursed, loan portfolio quality, and major issues in the performance of the grantees. In addition, the grant completion report will comprise a complete list of grantees, the purchased and installed irrigation equipment. In addition, MAAIF shall devise strategy for monitoring impact and documenting implementation process in order to capture lessons, which may be used for scaling up the pilot and formulating irrigation development plans and strategies specifically at LG level.

63. The project will provide technical support to the LG in term of strengthening the capacity of staff in irrigation project planning, budgeting, and implementation.

64. IFC will provide advisory services to the participating financial institutions to improve product structuring and align processes to meet the needs and capabilities of farmers under this project. These advisory services will be based on a thorough needs assessment and will include but not limited to product development and refinement, strengthening capacity of lending staff in agricultural lending and risk management. IFC will equally work with the other private sector players involved in this pilot (Off-takers, equipment suppliers) to develop processes that ensure efficient functioning of the eco-system for the success of this project and sustainability in the future. This support may include but not limited to designing a functional model, clarity of roles for each party and a proper working partnership framework.

65. Any other details on the pilot will be defined in the grant operational manual. The above implementation modalities and roles and responsibilities of the implementation partners, and the grant conditions will be reviewed by the project steering committee during the project mid-term review.



Sub-component 1.3 on Integrated Catchment management (US\$2.9 million)

Integrated catchment management plans

66. *Scope.* The project will support the identification and implementation of catchment management interventions in the basins for the two irrigation schemes to be constructed under the project (Kabuyanda and Matanda).

67. *Integrated catchment management.* In Kabuyanda and Matanda, efforts will be made to ensure that the water catchments are protected. Scheme specific micro-catchment management plans will be prepared highlighting the key issues, their causes and measures to be undertaken to sustainably manage and develop the resource while protecting the source of the water. Each micro-catchment will establish a micro-catchment management committee, involving all



the key stakeholders in the project area. The committee will be responsible for ensuring active stakeholders' engagement and participation in the preparation and implementation of the plans. The plans will be prepared through a bottom-up participatory approach to ensure ownership and sustainable impact. The development of the plans and the formation of the committees will follow the MWE Catchment Planning Guidelines and will take into consideration other existing relevant plans and findings from the ESIA, feasibility and design reports. The micro-catchment plans will identify priority watershed management measures to be implemented by the project. The measures are expected to include soil and water conservation measures such as construction of stone bunds, soil bunds, infiltration pits, gully plugs, terracing of steep slopes, check dams; environment management measures that include tree planting, conservation and demarcation of wetland systems, and restoration of river banks using trees, control of water pollution; and livelihood improvement activities including apiary, natural resources based businesses such as mat and basket making, growing of fruit trees etc. The work will be done in such a way as to minimize interference with current community livelihoods while giving maximum benefits to the community. Particular attention will be given to the participation and empowerment of women and women groups in the definition and implementation of catchment management interventions.

68. Restoration/Reforestation in Rwoho CFR. The micro catchment for Kabuyanda irrigation scheme includes Rwoho CFR which is heavily degraded. In collaboration with NFA, the project will restore/reforest an area (500 ha) five time larger than the one which will be inundated (100 ha), using indigenous species. The micro-catchment management committees will spearhead the actual implementation as well as monitoring and supervision of interventions. The benefits of these interventions will be reduction of the extensive runoff and erosion in the micro-catchments and increase in the quality and quantity of water in streams feeding the various irrigation schemes. The additional benefits include awareness of mobilized and sensitized community members about good practices in soil and water conservation management measures. The proposed interventions in catchment management will also lead to improvement of community livelihoods, ensuring that gender aspects are considered.

***Component 2. Support services for agricultural production and value-chain development
(US\$50.0 million, of which US\$31.5 million on IDA credit and US\$18.5 million on beneficiaries' contribution)***

69. Scope. Access to the irrigation service needs to be accompanied by adoption of on-farm irrigation technologies, increased access to other agricultural inputs, and farmers' increased knowledge in the new agricultural practices in order to translate into increased yield and intensification, and diversification towards high value crops. In addition, there is the need to develop sustainable market access in order to increase farmers' income and viability of the irrigation investments. Component 2 aims to support farmers with increase agricultural production and productivity on-farm, and at supporting Marketing Groups for value addition and market linkages.

70. Timing of activities. For Kabuyanda and Matanda schemes, extension activities will commence in parallel with the launch of the construction works. For Nyimur, extension activities will be initiated to support the agricultural development in the area including demonstration of irrigated farming activities, as currently very limited rainfed farming is practiced in the area due to a recent history of conflict. For Agoro and Olweny, the schemes are existing and will undergo only rehabilitation from the project. Irrigated farming is therefore widespread, and extension services will be initiated immediately. Value addition and market linkages services will be initiated in the third year of project implementation.



Figure 1.6. Flow-chart of activities of Sub-components 2.1 and 2.2, per scheme -Example for Kabuyanda

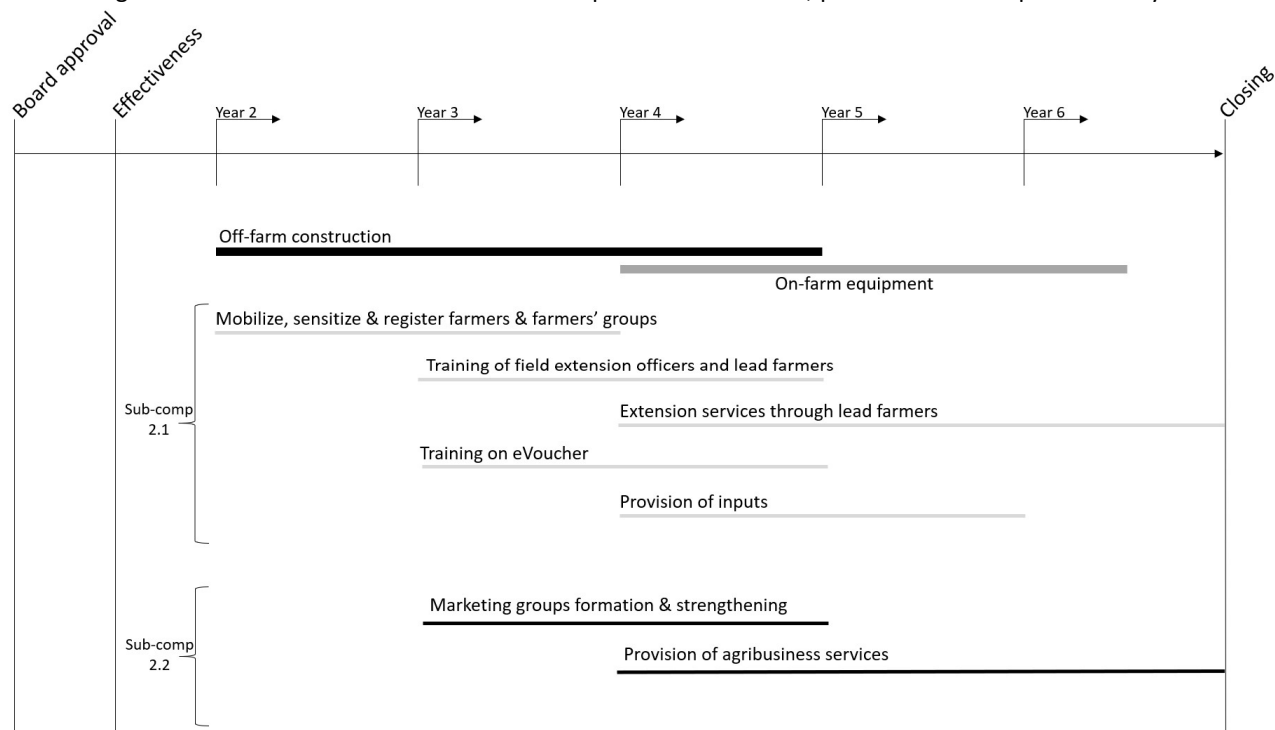


Table 1.2. Costs for Component 2. In US\$ inclusive of taxes

Financing	Activities	Kabuyanda	Matanda	Enengo	Nyimur	Amagoro	Olweny	Agoro	FLI
IDA	2.1 Consultancy services to farmers for production & productivity	3.0	1.0		0.3		1.4	0.7	
	2.1 Matching grants to improve production and productivity	8.2							
	2.1 Quality assurance and inspection	0.2							
	2.1 Agricultural statistics and research	0.3							
	2.1 Consultancy services for on-farm irrigation design and supervision	1.7	1.9						
	2.1 Matching grants for on-farm irrigation equipment	3.0	3.8						
	2.2 Consultancy services for value chain and marketing groups	3.6					0.4		
	2.2 Matching grants for value addition	1.7							
Farmers	2.1 Matching grants to improve production and productivity	10.0							
	2.1 Matching grants for on-farm irrigation equipment	3.0	3.8						
	2.2 Matching grants for value addition	1.7							



Sub-component 2.1: On-farm Production and Productivity (US\$25.8 million)

Consultancy services to farmers to improve production and productivity on-farm

71. Farmers Groups. Farmers will be organized in groups of about 25 farmers, comprising men, women and youth. Extension services will be provided to the groups to assist them in shifting from rainfed to irrigated, more intensive and market-oriented farming and related land preparation, soil, water, pest and crop management practices to improve productivity and production. In the new irrigation schemes of Kabuyanda and Matanda, the Farmers' Group will be formed based on the hydraulic infrastructure of the irrigation network, which builds on a 20 ha block.

72. Changing from rainfed to irrigated farming. Most farmers in the newly developed irrigation schemes are only used to rainfed farming and turning them into successful irrigated farmers will be a major change. Farmers will have to learn to prepare the land to facilitate proper water distribution, sharing the water, providing the right amount of water at the right time and in the right way on the crop, dealing with different pests and diseases, growing crop outside the seasons, etc. It will require a change in mentality from the farmers and mastering new knowledge and skills which they will only be able to obtain when receiving intensive extension support, practically training them on all the different aspects of irrigated farming, optimal use of quality agricultural inputs and growing a marketable crop (type and quality) through a season long training approach. Experience has proven that the best way to do this is through the FFS approach (Box 1.1), which has been currently institutionalized by MAAIF.

73. Extension services. To facilitate intensive extension support in a sustainable way and to the benefit of all farmers, each farmer group will select, with the support of the local extension officers and facilitated by a service provider, two skillful farmers (one female and one male) to become lead farmers responsible for facilitating the intensive extension support to the members in their group. The service provider will train the lead farmers on irrigated agriculture and as facilitators of FFS and other participatory extension activities (including through exchange visits) on irrigated farming. At the same time, the service provider will build the capacity of the District / Sub-County extension officers in the targeted irrigation schemes to provide the needed support to the trained lead farmer FFS facilitators to facilitate at least three FFSs seasons (in the new irrigation schemes; one season before the farmers have started to receive water and two season after the farmer have started to receive water from the irrigation scheme) and additional extension activities such as organize field days, use of the FFS learning field as demonstration plots with the farmers of their farmer group as well as to provide the needed technical backstopping and supervision support to these lead farmer FFS facilitators in successfully facilitating the FFSs and additional participatory extension activities on irrigated farming.

74. Topics. Extension service will provide learning experiences to farmers, among others, on the following topics:

- Farmer group formation and capacity development;
- Good Agricultural Practices;
- Irrigated agriculture, introduction to irrigation, choice of appropriate irrigation technology, irrigation scheduling;
- Climate smart technologies;
- Enterprise selection;
- Soil (fertility) management and sustainable land management practices;
- Affective use of agricultural inputs
- Integrated Pest Management;
- Nutrition-sensitive agriculture; and
- On-farm mechanization.



Box 1.1. FFS approach in irrigated agriculture

A FFS on irrigated agriculture offers participating farmers a platform for hands-on group learning, enhancing skills for critical analysis and improved decision making on irrigated cultivation of one or two crops selected by the group. FFS activities are field based, include experimentation to solve problems, reflecting the specific local context. Participants learn how to improve skills through observing, analyzing and trying out new irrigation and cultivation practices and ideas on their own fields, contributing to improved production and livelihoods. The FFS process enhances individual, household and community empowerment and cohesion.

A whole production cycle, related to the relevant cropping cycle of the selected crop(s), sets the duration of an FFS learning program. In a typical FFS on irrigated farming, a group of farmers meet regularly (weekly) in a local field setting, under the guidance of a trained facilitator. They make observations on the practiced irrigated agricultural production system practiced in the FFS learning field, focusing on the topic of study and observe and compare the effects of two or more alternative irrigation and cultivation practices aiming to address the challenges and testing the proposed 'best practices'. Participants discuss and take decision by conducting observations and analysis directly on the plots, through an assessment and decision-making tool named the "Agro Eco System Analysis" (AESA). At the end of the season, the FFS group holds a field day using their FFS learning field to demonstrate and share findings with local authorities, agriculture workers and other farmers. Exchange visits with other FFS are also encouraged.

An essential element of good quality FFS programs is the training of facilitators who will support the process of FFS. 'FFS Master Trainers' prepare facilitators in season long field-based training programs complementing practice with theory. Facilitators typically include field extension workers and farmers. Some FFS programs focus on training local farmers as facilitators. This may lead to higher levels of success as farmers are motivated to return home with useful skills and knowledge to share. This strengthens community ownership and may be a source of sustainability.

FFS have proved to strengthen not only technical skills and decision-making capacities of farmers, but also to significantly influence the community and strengthen group formation.

75. Implementation arrangements. Development, capacity building support and initiation of the needed Extension services will be provided by a recruited service provider. The actual provision of the extension support (FFS, etc.) will be provided by trained lead farmers supported and technically backstopped by the field extension officers in the respective irrigation schemes. For Kabuyanda, Olweny, and Agoro, activities will all start the first year; while for Matanda and Nyimur in the second year. The contracts will be for two years, renewable upon satisfactory performance and achievement of results up to five years, so to provide support to farmers and district local agents for the whole duration of project implementation.

76. Action research. Agricultural researchers or graduate students may be linked to the irrigation schemes to support the development of suitable and tailor-made irrigation solutions to be proposed to the farmers and enrich the trainings. The project will establish partnerships with research and training institutions to conduct adaptive research trials, technology development and promotion, and to provide practical experience to students and researchers.

Matching Grants to farmers to improve Production and Productivity on-farm

77. Access to agro-inputs. To ensure optimal use of the irrigation investments to achieve increased yields, production and improved incomes to the farmers, profitable enterprise selection and access to and use of quality inputs is a pre-requisite. Poor input quality leads to below expected yields and demotivates the farmer. In addition to access to improved seeds, the quality of agro-chemicals (especially fertilizer) is a challenge, as products are often substandard or counterfeit. Therefore, the project will facilitate access to quality agro-inputs (certified and not adulterated) to farmers as a pivotal investment to sensitize the farmers on the benefits of their use, encourage the uptake of quality inputs and ensure access to these high-quality inputs in the irrigation schemes.



78. As part of the extension support, the extension service provider, in close coordination with the public extension officers, will: (i) assist the farmers in the FFS groups in the identification of the needed type and quantities of agricultural inputs; and (ii) provide the needed training support to agricultural input dealers and farmers on safe use and handling of agro-chemicals. The service provider will train the public extension officers and farmers through the FFS in the identification of quality planting (seed and seedlings) materials. The project will assist MAAIF in strengthening its Inspections Unit and local level inspectors.

79. *Matching Grants.* In the short run, two issues constrain the likely adoption of high quality inputs by farmers: (i) the lack of quality inputs (planting materials such as seeds and seedlings and agro-chemicals such as fertilizer and pesticide) availability in the country, and in particular in the local areas; and (ii) farmers' mindsets towards improved practices, partly due to quality issues and partly due to previous interventions which have provided inputs for free, creating adverse incentive and expectation on the farmer side. The project will therefore explicitly ensure availability of high-quality seed and other inputs to the farmer through a phased subsidy approach, to gradually stimulate the farmers' willingness to adopt improved inputs, and trust in the input supply system.

80. *On-farm irrigation equipment.* The project will support the farmers in the new pressurized irrigation schemes (Kabuyanda, and Matanda) in the selection and purchasing the needed type of on-farm equipment for irrigating his/her crop(s). The recruited service provider will establish demonstration plots of the different types of on-farm irrigation technologies that farmers can use in a pressurized irrigation schemes (drip, sprinkler, hose). The service provider will actively make use of these demonstrations in training the public extension officers and lead farmers and host field visits from the FFS groups. During the first season of the FFS, the final selection of the type of irrigation will be discussed and the FFS group will make a joint request, together with the other FFS groups in the same irrigation block, for on-farm irrigation equipment to the matching grant manager. For purpose of maintenance and repair of the on-farm equipment, interested youth will be trained in maintenance and repair of the on-farm equipment as well as other farming equipment. The artisanal skills will therefore be easily accessible from within the community.

Sub-component 2.2: Value Addition and Market Linkages (US\$5.7 million)

81. *Scope.* Ensuring adequate post-harvest handling, value addition and market access for the crops produced is critical to increase farmers' income and ensure viability of the irrigation investments. The project will support farmers to come together as marketing groups for post-harvest handling and value addition (minimizing post-harvest losses, bulking, storage, value addition/processing and marketing) and for linkages with off-takers, both nationally (local market in Kampala or other major centers) and internationally (export), through a combination of capacity building and Matching Grants.

Consultancy services to marketing' groups for Value Addition and Market Linkages

82. *Value-chain approach.* The project will take a value chain approach, focusing on key commodities for commercialization as well as commercial seed production (Box 1.2). Some hypothesis in terms of evolution of the cropping pattern have been made for the purpose of the Economic and Financial analysis (Annex 4). At the same time, the project will carry out value chain analyses and market surveys to identify potential off-takers and business opportunities for key commodities in the project area. Linkages with potential value chain actors (both national and international ones) will be fostered.



Box 1.2. Seed multiplication as an enterprise and possible activities to undertake with the seed companies / agro-input dealers

Seed multiplication is a preferred value chain for irrigation schemes given the high value of the output, more controlled growing conditions, opportunities to produce outside the normal growing season and the often high water requirements. Different models may be adopted for different seed enterprises depending on the characteristics and the seeds being produced:

Quality declared seed may be an enterprise for farmer local seed business, to be directly available in the local areas, where use of home-saved seed is discouraged;

Certified seed production may be an enterprise for seed companies in collaboration / contract farming with the farmers;

- Vegetative crops (banana, coffee, pineapples): may be promoted at community level with MAAIF Inspection and Certification Support
- OPV varieties (especially related to maize) may be developed through seed multiplication as an enterprise;
- Hybrids may be promoted through organizing and estimating demand to ensure sufficient imports to the country, Irish potatoes;
- Farmers may also be supported directly to set up local seed business for production of quality declared seed.

The project may link interested seed companies such as (East African Seed (U) Ltd., NASECO, FICA Seeds, Victoria Seeds and Pearl Seeds) to engage farmer groups in seed multiplication in irrigation schemes. Seed enterprise may make economic sense given the relatively high value, the water availability for seed production and the (initial) availability of service providers on ground to support the extension and farmer organization activities. This model is to be actively encouraged to increase the overall availability of quality seed. The project may support seed companies to engage with NARO to access foundation seed, and to engage with MAAIF Inspection Unit for on-the ground support. This would require the certified seed companies to register as input suppliers.

83. Marketing Groups. Farmers will come together around the common interests of post-harvest handling and/or marketing. Marketing Groups have a minimum of 15 members, and it may include farmers from within the irrigation scheme and in the surrounding areas and may be built around one or multiple value chains. The term is used in a flexible way, encompassing any type of group (i.e. single groups, cooperatives, associations, unions etc.) which has marketing or value addition as a common interest. The Marketing Groups roles include learning quality standards for different markets, mobilizing for bulking of produce, collective processing and marketing; linking with and negotiating with input suppliers and potential buyers; internal resource mobilization and management; quality assurance; and meeting co-funding obligations. Participation in a Marketing Group is voluntary.

84. Establishment and Strengthening of Marketing Groups. The contracted service providers will engage with farmers to assess the situation in terms of existing marketing groups and where needed, to assist farmers in the formation of new marketing groups. Particular attention will be given to women and youth groups. The project will provide training support to existing and newly formed groups in institutional strengthening, governance and business plan development as well as quality standards, post-harvest handling and sanitary measures, commodity bulking, sourcing markets, collective marketing and adherence to market requirements, access to financial services and contract negotiation. Mentoring and intensive hands-on support will be provided for the duration of the project, in collaboration with the District Commercial Officers, Agricultural Engineers and Community Development Officers. Business plans will, to the extent possible, be based on actual and realistic market opportunities in terms of quantities, quality, variety, time of delivery etc. The project may explore the use of the productive alliance mechanisms where business plan development may be based on a contract, or agreement, with a specific off-taker. Two or more marketing groups with similar interests may choose to come together under Higher-Level Farmers' Organizations (HLFO) of various types, or join existing institutions. In such a case, the project will support the HLFOs with institutional, governance and business development training. The project will also support cooperatives established as management structures in older irrigation schemes on governance, marketing and value addition activities.



85. *Market linkages.* Marketing Groups will be supported to enter into productive alliances, PPPs or other types of contract farming relationships. The service provider will play a brokerage role and actively engage with existing sub-sector or commodity platforms (for example the rice sector platform which brings value chain actors together); or support the creation of new partnerships, around prioritized value chains in the irrigation schemes.

Matching grants for value addition and marketing

86. The project will support marketing groups to attain increased commercialization and value addition from the increased agricultural production, by providing matching grants. The project will provide matching grants to interested marketing groups, based on a careful selection and assessment of the capacity of the group to utilize the public investment for maximum long-term gain.

Box 1.3. Matching Grant experiences in MAAIF

MAAIF has several, varying experiences in the use of matching grants. Some of the most relevant experiences which have informed the project design are:

- National Agricultural Advisory Services (NAADS): during FY 2005/06 government provide funding through Integrated Support to Farmer Groups, in the form of revolving grants managed at sub-county level. The grant scheme was designed for farmer institution development and organization; increasing effective farmer demand for productivity enhancing technologies; and increasing farmers' access to input and product markets through active linkage of farmer groups with processors/produce buyers and input stockists. Farmers' access to production inputs; and value addition and marketing tools, equipment and machinery was improved under the grant. The key principles of managing the grant were demand-driven and market-oriented production; empowerment, ownership and promoting self – reliance; promoting entrepreneurship and innovation; maintaining equitable access to the grant; and linkage with research for technology development.
- JICA has through several smaller projects provided grants (with and without matching contributions from farmers) mainly in the rice sub-sector. The observed productivity and value addition benefits have not been observed and there has been limited maintenance and thus limited lifespan of the machinery / processing equipment provided. The presence of any grant element, even if matched, has been found to create adverse effects. JICA no longer provides grants or matching grants to inputs or agro-processing or other inputs.
- FIEFOC provides grants to the specific groups which have been trained by the project; no matching contribution from the farmers in envisaged as they are selected based on demonstrated willingness and commitment on ground. Goods are either bulk procured or funds disbursed to FGs on ground and spent on post-harvest handling equipment, small equipment, rice threshers, rippers, hullers etc through community procurement. A special youth incubator and investment fund is established providing dedicated business plan development, validation, grants for investment and mentoring to ensure usage of the grant finance in accordance with the business plan.
- ACDP envisages to provide matching grants to HLFOs, following a graduation of farmers' groups approaches. The grant may be up to US\$7,000, with 67 percent of the investment financed by the project and 33 percent matched by the farmer. Co-financing is assessed through on-the-ground verification of e.g. cash, bricks or land, and the grant disbursed directly to the farmer group to be used through community procurement processes. No grants have yet been disbursed.

87. The activities are designed in accordance with lessons learnt from other projects, namely: (i) distribution of free inputs or equipment does not necessarily lead to intended results; (ii) identification of high-potential and serious farmers, one needs regular and hands-on engagement on ground; (iii) matching grants should only be provided through strong, commercially-oriented groups, which have good governance and business-plans which clearly demonstrates willingness and ability to operate and maintain equipment; and (iv) the modality for matching contributions from groups may need to be flexible, and may include both cash or in-kind contributions.



88. *Matching Grants.* Marketing groups shall access matching grants to construct warehouses or other investments to facilitate post-harvest handling and marketing. Eligible investment areas include:

- Quality control tools such as moisture meters
- Post-harvest handling equipment such as solar driers, drying yards, forage cutters;
- Post-harvest handling equipment, such as cold, wet and dry storage, smoking kilns, silos;
- Marketing infrastructure such as bulking stores;
- Agro-processing machinery such as food processing plants, mills or hullers;
- Food safety equipment such as rapid aflatoxin testing kits; and
- Construction and installation costs related to the above.

89. A matching contribution from the marketing groups is required. The amount of co-financing (cash) will be defined in the business plan which forms the basis for the investment and approved by the project. The recipient will submit its application for a matching grant to the Grant Manager, containing a business plan, a description of the short and medium term vision; the structure of the group or institution; the elements of the constraints to be addressed through the proposed investments and justification of contribution/of the investment to the business and the estimated profitability, marketing strategies etc.

90. Screening criteria for Matching Grant approval adopted by the project will be detailed in the PIM, and are likely to include:

- Score based on a managerial score index;
- Applicant will need to be Recommended by the service provider providing marketing TA;
- Approval of the District Local Government;
- A strong business plan in terms of profitability, realism etc.;
- Proposed management and ownership arrangement of the asset;
- Evidence of ability and commitment to finance 50 percent of the cost of the purchase with own funds;
- Evidence of off-taker agreements will be an added advantage; and
- Positive assessment of the environmental and social effects of the interventions

Heavy, single elements of the business plan (such as civil works, agro-processing equipment or similar) will be procured centrally by the MWE. The detailed plans and specifications will be developed by MAAIF on the basis of the demand from the beneficiary farmers. MAAIF shall also participate in the procurement process as well as supervision of the works. The agro-processing and marketing requirements (goods and services) that will be available in the community shall be procured through community procurement or other relevant methods which allow for the group to gain competitive market prices and stimulating local market development. Where the equipment or machinery or service skill is not available in the community, other procurement methods shall be applied.

***Component 3. Institutional Strengthening and Implementation Support
(US\$10.3 million equivalent, of which US\$10.3 million on IDA credit)***

91. *Scope.* Component 3 will comprise of two sub-components. Sub-component 3.1 (US\$1.9 million) will provide institutional strengthening. Sub-component 3.2 (US\$8.4 million) will provide project implementation support.

92. *Sub-component 3.1 – Activities.* Activities will include: (i) short-term studies on management models in irrigation, tariff structures, and prerequisites for financial sustainability; and (ii) capacity building and training for irrigation development and management.



93. *Sub-component 3.2 – Activities.* This includes support to the PST for project coordination, implementation, supervision and M&E, including for the management, implementation and supervision of the project’s fiduciary and safeguards aspects. Activities will include: (i) hiring of specialists for the PST; (ii) purchase of project implementation goods and services (ICT equipment, software, vehicles); and (iii) operational costs.

94. *Costs.* Breakdown of costs by activity is presented in the table below.

Table 1.3. Cost of Component 3.

Financing	Activities		
IDA	3.1	Studies	1.3
	3.2	PST	2.9
	3.2	Training & capacity building	0.7
	3.2	Vehicles	2.1
	3.2	IT support	0.6
	3.2	Operational costs	2.7

95. *Readiness for implementation.* ToRs for PST personnel have been drafted and are awaiting World Bank approval. The contracts are expected to be signed by effectiveness.



ANNEX 2: Implementation Arrangements

1. MWE is the Implementing Agency for the project. MWE will be responsible for planning, budgeting, procurement, FM, safeguard, M&E and reporting for the whole project. The PS of MWE will be the Accounting Officer for all project funds. MAAIF will be a technical implementation partner for activities which fall under MAAIF's mandate under Sub-component 1.2 and Component 2. NFA will be a technical implementation partner for activities which fall under NFA's mandate, namely the reforestation activities in Rwoho CFR under Sub-component 1.3.
2. **MWE.** The Assistant Commissioner of the WfP Department, under the Directorate for Water Development (DWD) will be the Project Coordinator for MWE, and he/she will report to the Commissioner WfP. Prior to effectiveness, MWE will nominate focal persons from its relevant Departments. Focal persons will be mainly from the WfP Department at central level. At deconcentrated level, technical support officers will be nominated from the Water for Production Regional Center (WfPRCs) for the Western Region (under which fall Isingiro and Kanungu Districts), the Northern Region (under which fall Lira and Lamwo Districts), the Eastern Region (under which falls Tororo District) and the Central Region (under which fall Mukono, Wakiso and Mpigi Districts). Each WfPRC currently has four core professional staff (including Engineers, Social Scientists, Environmental Specialists and Surveyors). Contract management teams, headed by a Contract Management team leader, shall be set up for each contract with members from both the central and the regional level. The regional teams will be responsible for the day to day supervision of construction works in the field along with consultancy services procured under the project. The regional teams will report to the focal point of the component, who in turn will report to the Project Coordinator. In relation to Sub-component 1.3, focal person(s) will be nominated from the Directorate of Water Resources Management (DWRM), operating at both national and Water Management Zone (WMZ) level, will be responsible for the implementation of the catchment management measures for each scheme. WMZs currently have five core professional staff (including a team leader and social scientist) in each of the zones supported by the appropriate departments in the DWRM, and their respective divisions.
3. **MAAIF.** The Department of Agricultural Infrastructure, Mechanization and Water and Agricultural Production will lead and coordinate project implementation from the MAAIF side. The Commissioner AI&WfP will be the Project Co-Coordinator for MAAIF, and he/she will be report directly to the PS MAAIF. Prior to effectiveness, MAAIF will nominate focal persons from the various Departments, according to the technical expertise needed. The Directorate of Agricultural Extension Services (DAES), Directorate of Crop Resource, Department of Planning and other focal persons will be involved as required.
4. **NFA.** NFA will nominate focal person(s) for the technical support to Sub-component 1.3.
5. **LGs.** The targeted Districts will work closely with the WfPRCs teams, and will participate in the supervision activities, as well as mobilization of beneficiaries. MTIC may provide technical backstopping and oversight in more commercially oriented technical fields, and in the work and operations of District Commercial Officers. Prior to effectiveness, a District Technical Support Team (DTST) will be established by the CAO in each targeted district, with focal points notably from the Production Department, safeguards, forest officers. Prior to effectiveness, MoUs outlining joint responsibilities will be signed between MWE, MAAIF and each District Local Government.
6. **PST.** The project will be implemented through existing Government structures, relying mainly on Government staff. Individual consultants – where necessary - will be recruited where the Ministry has inadequate capacity. The PST will comprise Government staff and individual consultants recruited for the purpose of ensuring efficient project



implementation. While each Ministry may have staff already engaged in these activities, the individual consultants under the PST will provide additional support to the extensive additional work that the project will bring along, an additional work-load that may end once the project ends. This set-up strengthens and is aligned with Government structures and ensures sustainability. It also promotes cooperation between two ministries which have to keep working in close alignment when it comes to irrigation development, building on their respective mandates. The PST is headed by the Project Coordinator in MWE who will be assisted by the Co-Coordinator in MAAIF. The PST will work closely with all project staff and relevant stakeholders. The following thematic specialists will be recruited to support implementation, namely:

- Procurement specialist;
- FM specialist;
- Accountant;
- Environmental, health and safety specialist;
- Social safeguard specialist;
- Project Support Officer;
- M&E specialist;
- Communication specialist;
- Grant disbursement team (grant manager and three grant assistants) for purposes of managing the wide range of matching grants under the project, including for quality inputs (Component 2.1) and for agro-processing equipment and on-farm irrigation equipment (Component 2.2).

In addition, technical expertise will be hired as need be. On MAAIF side, technical experts will include agri-business expert, sociologists and irrigation engineers.

7. **DTST.** At local level, staff will be designated from the relevant implementing departments. The DTST will chaired by the Chief Administrative Officer, to provide technical oversight on implementation at LG level. The DTST will consist of the District Production Coordinator, District Engineer, District Community Development Officer, District Natural Resources Officer, District Agricultural Officer, District Water Officer, Senior Agricultural Engineer and District Commercial Officer. In addition, the Secretary for Production, Secretary for Works, and a representative of the beneficiary farmers.

8. **PTC.** It will be comprised of the Commissioner WfP, Commissioner WRRD, Assistant Commissioner WfP and Project Coordinator in MWE; Commissioner for AI&WfP, Commissioner Crop Production, Commissioner Agricultural Investment and Enterprise Development, Commissioner Agricultural Extension and Skills Management, Commissioner Crop Inspection and Certification and Project Coordinator in MAAIF and Executive Director of NFA, who shall provide technical oversight of project activities under their mandate. The PTC will be chaired by the Commissioner WfP in MWE.

9. **PSC.** MWE will establish a multi-sectoral PSC to provide high-level operational and policy guidance and oversight to ensure that the project components and activities are implemented as intended. The PSC will meet at least twice a year to approve work plans and budgets, review progress of implementation, and ensure adherence to relevant government policies and strategies. The PSC will be co-chaired by the PS of MWE and the PS of MAAIF, and it will comprise PSs (or their representatives) of the MoFPED; MoGLSD; MoTIC; MoLG; MoLHUD; Executive Secretaries of UNFFE; Executive Director of NFA; and the Chief Administration Officers (CAOs) of the Districts where the project is implemented.

Procurement

10. *Project Procurement Strategy for Development (PPSD).* MWE has prepared a PPSD. A Market Sounding Conference



was held on December 12, 2018 to obtain knowledge of the market to help in the packaging of the contracts under the project. A Procurement Plan (PP) for the first 18 months of project implementation has been developed based on the PPSD.

Box 1.4. Summary of PPSD

Procurement will be conducted by MWE for both MWE and MAAIF led activities. The department of Water for Production, which is the MWE technical department for Components 1 and 3 as well as the MAAIF staff who are the technical department for Component 2 don't have experience in any IDA funded project. The project implementation team received training on the New Procurement Framework in October 2018 to provide them with basic knowledge of the procedures to be followed but will require further training for the different categories and stages of procurement. The Contracts Committee of five members which provides oversight over the procurement function has only recently taken up the job and has no experience in IDA procedures.

The Works under the project involve irrigation schemes that cover a much wider area than those previously handled by the Borrower and can thus be categorized as complex works. MWE will enhance its technical capacity to ensure adequacy in skills and numbers to execute these works. That said, lessons from other similar projects such as the AfDB funded FIEFOC in engagement of communities and collaboration with LGs will be used.

For high-value, high-risk, or complex contracts identified in the PP, contract management plans will be prepared. To mitigate procurement capacity risks, there will be a need for staff capacity building and training, continuous oversight, reviews and audits, and the use of real-time monitoring and tracking tools.

11. *Systematic Tracking of Exchanges in Procurement (STEP)*. The project will use STEP, a planning and tracking system, which would provide data on procurement activities, establish benchmarks, monitor delays and measure procurement performance.

12. *Use of National Procurement System*. National procurement procedures shall only apply if the requirements as required by the paragraph 5.3 Procurement Regulations⁴⁸ are met. Therefore: (i) The Public Procurement and Disposal of Public Assets Authority (PPDA) bidding documents shall be used subject to; (i) permitting universal eligibility (see paragraph immediately below); and (ii) being amended to include environmental, social (including sexual exploitation and abuse and GBV), Environmental Social, Health and Safety ("ESHS") provisions; and (ii) The Guideline issued by PPDA on "reservation scheme to promote local content in public procurement" shall apply in accordance to the exception included under no.8 which will ensure that contracts subject to the national approach also meet the World Bank's requirement for universal eligibility. Therefore, when approaching the national market, the country's own procurement procedures including bidding documents may be used subject to permitting universal eligibility and including ESHS provisions.

13. *Standard Procurement Documents*. The World Bank's Standard Procurement Documents (SPDs) shall be used for procurement of goods, works, and non-consulting services under Open International Competitive Procedures. National Bidding documents as set forth in the Public Procurement and Disposal Act, 2003 may be used under Open National competitive as well as for the Request for Quotation method subject to the inclusion of the universal eligibility and ESHS

⁴⁸ (a) open advertising of the procurement opportunity at the national level; (b) the procurement is open to eligible firms from any country; (c) the request for bids/request for proposals document shall require that Bidders/Proposers submitting Bids/Proposals present a signed acceptance at the time of bidding, to be incorporated in any resulting contracts, confirming application of, and compliance with, the World Bank's Anti-Corruption Guidelines, including without limitation the World Bank's right to sanction and the World Bank's inspection and audit rights; (d) Procurement Documents include provisions, as agreed with the World Bank, intended to adequately mitigate against environmental, social (including sexual exploitation and abuse and GBV), ESHS risks and impacts; (e) contracts with an appropriate allocation of responsibilities, risks, and liabilities; (f) publication of contract award information; (g) rights for the World Bank to review procurement documentation and activities; (h) an effective complaints mechanism; and (i) Maintenance of records of the Procurement Process.



provisions. Similarly, selection of consultant firms shall use the World Bank's SPDs, in line with procedures described in the Procurement Regulations.

14. In accordance with paragraph 5.3 of the Procurement Regulations, the request for bids/request for proposals document shall require that Bidders/Proposers submitting Bids/Proposals present a signed acceptance at the time of bidding, to be incorporated in any resulting contracts, confirming application of, and compliance with, the World Bank's Anti-Corruption Guidelines, including without limitation the World Bank's right to sanction and the World Bank's inspection and audit rights. The form of the Letter of Acceptance is attached in Appendix 1.

15. *Procurement risk assessment.* A procurement capacity and risk assessment was carried out by the World Bank on February 14 and 19, 2019. It was established that PST staff are proficient in procurement processing under PPDA guidelines but have limited proficiency in IDA procurement management attributed to the agency portfolio being subject to the PPDA Law save for the few IDA funded contracts which are managed by Procurement Specialists though submitted to the Contracts Committee by the PST staff. PST manage a heavy workload under GoU funding leading to delays in procurement processing. MWE has allocated adequate seating space for the PST staff except for Individual Consultants hired under the project. The storage of records is still inadequate but there is an ongoing procurement process for shelves and cabinets with delivery is expected by October 2019. Component 1 and 3 will be implemented by MWE's Water for production Department, which has previous experience with AfDB but not with IDA. Works under the proposed project involve irrigation schemes that cover a much wider area than those previously handled by the Borrower. The Ministry will enhance its technical capacity by hiring staff to fill the skills gap including i.e. a Dam Specialist and a Procurement Specialist proficient in IDA procurement Management to ensure adequate in-house capacity to superintend over the Supervising Consultant and Contractor. MAAIF will be the technical department⁴⁹ for Component 2, which will be implemented by a team spread across four departments of MAAIF. MAAIF has assigned staff to work on the project, none of whom is familiar with IDA procedures. The Contract Committee provides oversight over the procurement function, a mandate granted by the PPDA Law. MWE only recently got new members of the Contracts Committee after the term of the old members expired. The new members have already caused some delays under IWMDP attributed to lack of familiarity with IDA procedures. MWE will closely monitor progress during implementation and hire additional technical staff to fill any gaps to mitigate the risk of delays. Based on this assessment, the project procurement risk rating is "High". The residual risks after the implementation of the mitigation measures would be reduced to "**Substantial**".

16. *Record keeping and management.* MWE with the support of the Procurement Specialist of the PST will be responsible for record keeping and shall open a procurement file for each contract processed and upload the same information in the STEP. The file should contain all documents on the procurement process in accordance with the IDA requirements.

17. *Disclosure of procurement information* shall follow the requirements of the Procurement Regulations subject to the market approach and selection method. In addition, the IAs shall publish an action report on any complaints received on a quarterly basis.

18. *Beneficial Ownership Pilot.* The project procurement involves no procurements within Operational Procurement Review Committee (OPRC) thresholds, hence beneficial ownership pilot may not be applicable.

⁴⁹ MWE and MAAIF have used a similar arrangement under the AfDB funded FIEFOC.



19. *Operating costs.* These will be procured using the Borrower's procurement, financial, and other administrative procedures acceptable to the World Bank. These include costs associated with travel, accommodation, per diems, office consumables and maintenance, motor vehicle maintenance, and implementation support personnel, and so on. The credit proceeds shall not finance salary top-ups, meeting allowances, sitting allowances, and honoraria to civil/public servants.

20. *Training and workshops.* The project will finance training and workshops, if required, based on an annual training plan and budget which shall be submitted to the World Bank for its prior review and approval. The annual training plan will identify, among other things: (a) the training envisaged; (b) the justification for the training; (c) the personnel to be trained; (d) the duration for such training; and (e) the estimated cost of the training. At the time of the actual training, the request shall be submitted to the World Bank for review and approval. Upon completion of the training, the trainees shall be required to prepare and submit a report on the training received.

Financial Management

21. *A financial assessment was carried out in October 2019.* The objective of the assessment was to determine: (a) whether MWE has adequate financial management arrangements to ensure that project funds will be used for purposes intended in an efficient and economical way; (b) financial reports will be prepared in an accurate, reliable and timely manner; and (c) the project assets will be safeguarded. The conclusion of the assessment was that the financial management arrangements for the project had an overall risk rating of Substantial, but the residual risk after implementation of risk mitigation measures will be Moderate.

22. *Budgeting arrangements.* There is a planning unit in the MWE that is responsible for budgeting in the ministry, with involvement of other departments in the process. The capacity of the accounting staff to fulfill budgeting needs of the project is adequate.

23. *Accounting arrangements:* The Project activities and transactions will be approved and authorized by the Permanent Secretary who is the accounting officer. All transactions will be processed in accordance with GOU established controls and procedures- Government's Treasury Accounting Instructions 2016 and the Public Finance Management Act 2015. MWE has a fully functioning accounts department headed by the Assistant Commissioner- Accounts who is a qualified accountant. In addition, the department has a senior accountant, and several Accounts Assistants. The accounting section also has a unit that handles the Integrated Water Management and Development Project (World Bank funded), that has fully qualified accounting staff which will also support the project. This unit has a Financial Management Specialist (FMS) who is qualified and experienced with Bank supported operations. However, due to the magnitude of work there will be need to recruit a project accountant to help manage the implementation of the project.

24. *Internal Controls and Internal Auditing.* The Project transactions will be managed within the existing set-up in the MWE. All transactions will be processed in accordance with GOU established controls and procedures- Government's Treasury Accounting Instructions 2016 and the Public Finance Management Act 2015. The MWE has an internal audit unit comprised of four internal auditors seconded from MoFPED, department of internal audit. There is also an audit committee in place at the MOFPED to whom the internal audit unit reports. The committee meets quarterly to review internal audit findings and what action has been taken to address them. The Permanent Secretary ensures that action is taken to implement internal audit recommendations and where action is not taken the findings are also reported in the external audit report. The audit committee closely follows up on the action taken by the ministry as part of their oversight role. The internal audit function in the MWE works well, however, additional resources will be required for



the project during implementation, given its country-wide coverage. The MWE will also be required to share with the Bank, on six monthly basis, the internal audit reports.

25. Funds flow arrangement. The Ministry will open and maintain a US dollar denominated Designated (Special) Account at the Bank of Uganda which will receive dollar deposits/transfers from the IDA Credit. These funds will be used to meet US dollar payments as well as meet transfer of funds to the local currency project account for meeting the Uganda shilling payments. The Ministry will also open and operate a local currency Project Bank Account, whose funds will be used to meet local payments.

26. Disbursement arrangements. Report based disbursement will be applied. Initially requests for disbursement by the MWE will be made on the basis of approved work plans and cash flow projections for eligible expenditures for six months. The Bank will make advance disbursements from the proceeds of the Credit into the project Designated Accounts, to expedite project expenditures as evidenced by quarterly IFRs. MWE has established effective financial management and accounting systems, which will facilitate six monthly disbursements. The project will need to: (a) sustain satisfactory financial management rating during project supervision; (b) submit IFRs consistent with the agreed form and content within 45 days of the end of each reporting period- calendar quarter.

27. Financial Reporting arrangements. The Project will follow the current reporting arrangements for all World Bank funded projects agreed with governments; detailed in the Project Implementation Manual. The project will submit an interim unaudited financial report to the Bank every calendar quarter. This report will be due forty-five days after the end of the calendar quarter. Training shall be conducted for the project staff, together with coaching, during project implementation.

28. Auditing Arrangements. The Auditor General is primarily responsible for the auditing of all government projects. Usually, the audit may be subcontracted to a firm of private auditors, with the final report being issued by the Auditor General, based on the tests carried out by the subcontracted firm. The arrangements for the external audit of the financial statements of the project shall be communicated to IDA through agreed terms of reference. Appropriate terms of reference for the external auditor will be developed and agreed within six months of Credit Effectiveness. MWE will submit an audit report to the Bank within six months after the end of each financial year.



ANNEX 3: Implementation Support Plan

1. **Strategy and Approach for Implementation Support.** The World Bank task teams will support implementation of the project. The type and level of support will be guided by the scope of the project, the activities in each component, relative risks involved, and the institutional capacity of the government counterpart. Implementation support by the World Bank will consist of at least semiannual full supervision missions, short technical missions, meetings and audio conferences between the World Bank and relevant implementing agencies. Field visits to key construction and rehabilitation sites will be conducted during supervision missions. Additional support will also be provided by the World Bank's procurement, FM, and safeguards specialists, most of whom will be based in the Kampala office, on project contracts and overall compliance with safeguard and fiduciary requirements. In addition, the project will support international technical experts to provide technical support to the implementing agencies as they develop ToRs, design and feasibility studies. This Implementation Support Plan is indicative and may be revised during project implementation based on emerging project challenges and field conditions.

2. **Implementation Support Plan.** At least semiannual supervision missions and short follow-up technical missions will focus on the following areas:

- **Strategic support.** Supervision missions will meet with national and local authorities to (i) review progress on the project's activities; (ii) discuss strategic alignment of the project's different activities, especially at the planning level between the relevant stakeholders; and (iii) evaluate progress on cross-cutting issues such as M&E, training, communication, dissemination of project results and experiences, and coordination between relevant stakeholders. Additional meetings will also be conducted with other donors active in the irrigation sector in Uganda.
- **Technical support.** Supervision will concentrate on ensuring the technical quality of bidding documents, evaluation reports, and construction plans. During construction and commissioning, technical supervision will be provided to ensure that technical contractual obligations are met. Regular site visits will be carried out during project implementation and will involve technical specialists, as needed. Moreover, TA including capacity building and institutional strengthening will be provided to enhance performance of the service provision structure, to develop policy in support of effective service delivery.
- **Fiduciary support.** Supervision of procurement and FM support will be carried out by the World Bank semiannually to: (i) perform desk reviews of project interim financial reports (IFRs) and audit reports, following up on any issues raised by auditors, as appropriate; (ii) assess the performance of control systems and arrangements; (iii) update the FM rating in the FM Implementation Support and Status Report as needed; (iv) provide training and guidance on carrying out procurement processes in compliance with the Procurement and Anti-Corruption Guidelines and the OM; (v) work with the internal audit units at the MWE to enhance their capacity in procurement and FM to facilitate project implementation; (vi) review procurement documents and provide timely feedback to MWE and MAAIF; (vii) carry out the post review of procurement actions annually; and (viii) help monitor project progress against the PP.
- **Safeguards support.** The coordination begun during preparation would continue throughout project implementation, especially to ensure that relevant safeguards concerns are included in the works financed under Component 1 through due diligence from applications of the site-specific ESIA, ESMPs, and RAPs and effective mitigation measures. Supervision from the World Bank safeguard specialists will take place every quarter and close communication will be maintained if requested by the Government.



ANNEX 4: Economic and Financial Analysis

1. **Background.** The project's principal economic and financial benefit will be an increase in the quantities of farm output primarily as a result of water availability complemented with other agricultural practices including better access to finance, inputs and extension services. This project is built on the premise that farmers are largely constrained by dependence on rainfall. Increasing unpredictable climate often manifests in changing rainfall patterns and prolonged dry spells, making Ugandan small farmers more vulnerable. For Kabuyanda, for which detailed designs are available, returns were estimated by constructing with and without project scenarios for the three dominant landscape typologies in the proposed command area (alluvial terraces, hill slopes, flood plains/valley floors). For Matanda, for which feasibility study is ongoing, scheme-wide cropping pattern was determined for with and without project scenarios, and the gross margins calculated for Kabuyanda were used to generate project benefits. The without project scenario considers the current management practices in place as well as the level of investment made by farmers in their respective enterprises and cropping patterns. It also assumes the prevalent access to agro-inputs, finance, extension services and markets. On the other hand, the with project scenario not only considers the availing of water by irrigation but also considers that farmers are better equipped with agronomic knowledge and skills as well as having better access to agro-inputs, extension services, finance and markets.

2. **Main Assumptions and Methodological Approach.** The main assumptions made in the assessment include:

- Based on constant prices
- Exchange rate: US\$1 = UGX 3,729
- VAT at a standard rate of 18 percent
- Standard conversion Factor 0.96
- The unskilled labor wage was adjusted by 0.53
- Crop inputs and outputs were adjusted using a conversion factor of 0.805
- Multiplier (spillover) effects not included
- Lifetime of irrigation scheme is 30 years, after which rehabilitation is required to ensure continuous proper functioning of the irrigation scheme
- Scheme construction takes three years with implementation schedule of 20 percent in the first year, 40 percent in the second year, and 40 percent in the third year
- Investment costs (including consultancy services, catchment management activities, safeguard related activities, and public contribution to on-farm equipment) of US\$54.5 million (corresponding to a unit cost of about US\$16,828 per ha) in Kabuyanda, and of US\$66.42 million in Matanda.⁵⁰
- Annual recurring costs, including O&M costs, is at 1.5 percent of direct scheme cost
- 10 percent and 5 percent discount rates were used to assess the sensitivity of project returns to discount rate assumptions
- The financial analysis was based on a smallholder farm model of 0.4 ha (average farm size)

3. **Benefits.** With provision of irrigation, agricultural water productivity is likely to culminate into the following:

- Crop production certainty: farmers shall become more certain in their crop planning and hence they will likely venture out into producing three or more crops annually.

⁵⁰ Costs for Matanda has been assessed in a conservative way considering the possibility that a larger command area than Kabuyanda will be developed, as feasibility study is still ongoing.



- Resilience to climate change: farmers shall be able to venture out into crops which require ample water or those which are highly sensitive to moisture stress and these may include horticultural crops which are often of high value.
- Taking advantage of price arbitrage: farmers shall be able to produce and supply markets in traditional seasons of scarcity hence taking advantage of the price premium which accrue when supply is insufficient.

Production and net income increase of the farms would come from improved crop productivity, production intensification, crop diversification towards high value crops, and converting current grazing land into irrigated agriculture.

Economic Analysis

4. The NPV of the project over a 30-year period at a discount rate of 5 percent is estimated at US\$285 million with the Economic Internal Rate of Return (EIRR) of 18.4 percent, while the Benefit-Cost ratio is 3.16.

Table 4.1. Summary results of the economic cost benefit analysis

Items	Kabuyanda		Matanda		Overall Project	
	10%	5%	10%	5%	10%	5%
Present Value of Benefits (million)	85.5	165.8	128.7	251.1	214.3	416.9
Present Value of Costs (million)	49.9	59.4	61.0	72.5	110.9	131.9
NPV (million)	35.6	106.4	67.8	178.6	103.4	285.0
EIRR (%)	16.8		19.6		18.4	
B/C	1.71	2.79	2.11	3.46	1.93	3.16

5. *Sensitivity Analysis.* The sensitivity of the project returns to selected decision relevant variables was assessed. It can be concluded that the returns of the project are highly sensitive to discount rate and magnitude of expected revenues of the project.

Table 4.2. Sensitivity of project returns to key variables

Items	Kabuyanda			Matanda		
	NPV (million US\$)		EIRR (%)	NPV (million US\$)		EIRR(%)
	10%	5%		10%	5%	
Baseline (million)	35.6	106.4	16.8%	67.8	178.6	19.6%
10% cost escalation	30.6	100.4	15.4%	61.7	171.4	18.2%
25% cost escalation	23.1	91.5	13.8%	52.5	160.5	16.4%
10% reduction in revenue	27.1	89.8	15.3%	54.9	153.5	18.1%
25% reduction in Revenue	14.2	64.9	13.0%	35.6	115.8	15.6%
Two-year implementation delay	31.7	101.4	15.8%	63.9	173.7	18.9%
Three-year implementation delay	24.2	91.5	14.2%	52.2	158.2	16.8%
Five-year implementation delay	11.1	73.0	11.8%	31.9	129.5	13.9%

Economic Analysis of the Shadow Price of Carbon

6. The results of the cost-benefit analysis taking into consideration climate change benefits are shown in the table below. These results were obtained by following the World Bank’s 2017 methodology to calculate the Shadow Price of Carbon and are based on the Greenhouse Gas Accounting results (see Annex 5).



Table 4.10. Cost benefit analysis with and without social value of carbon

Cost Benefit Analysis	NPV (US\$)	IRR (%)
Without Shadow Price of Carbon	86,494,588.91	16.8
With low shadow price of Carbon	103,923,470.59	18.0
With high shadow price of Carbon	113,757,048.54	19.2

Financial Analysis

7. Cropping Pattern. Representative cropping patterns and farm model are developed based on main crops, using information from available detailed design study, information gathered from published materials, and field observations. Table below shows the identified farm typologies and their associated crop mixes as is currently practiced or for without project scenario, for both Kabuyanda (broken down by the three dominant landscape typologies in the command area: alluvial terraces, hill slopes, flood plains/valley floors) and Matanda.

8. In Kabuyanda, on the hill slopes, banana, maize, beans and sorghum are currently grown as monocrops whereas in some instances, banana is intercropped with coffee and beans yet only 25 percent of the land is under fallow. However, with this project, it is proposed that banana, coffee, sorghum and beans be maintained but as monocrops. In the alluvial terraces, the crops currently grown include banana, maize, beans, sorghum, coffee and combinations of banana and coffee or beans as well as maize and beans while only 7 percent of the land is under fallow. With the onset of the project, banana, maize, beans and coffee will be maintained as monocrops while horticultural crops (onion, tomato, cabbage, potato and water melon) shall be introduced and grown in two seasons. Close to 60 percent of the flood plains and valley floors are unutilized or simply under fallow and the rest of this land is under cultivation with maize, beans, banana and sorghum. With the coming of the project, rice and fodder grass shall be introduced for growing in the second season hence optimizing land utilization. Over a command area of 3,300 ha, the project will increase the cropping intensity from the current 167 percent to 195 percent.



Table 4.3. Kabuyanda, cropping pattern without the project

Typology	Crop	Extent of Area (Ha)		Gross Cultivated Area (ha)
		Season-I	Season-II	
Flood plains and valley floors	Banana	286	286	572
	Maize	109	144	253
	Sorghum	54	67	121
	Beans	142	176	318
	Millet	13	17	30
	Ground Nuts	20	20	40
	Irish Potato	3	8	11
	Coffee	79	79	158
	Fallow / Grazing	224	133	
	Sub-Total	930	930	1,503
Alluvial Terraces	Banana	540	540	1080
	Maize	275	309	584
	Sorghum	128	127	255
	Beans	360	424	784
	Millet	4	11	15
	Ground Nuts	10	14	24
	Irish Potato	4	10	14
	Coffee	63	63	126
	Fallow / Grazing	364	250	
	Sub-Total	1,748	1,748	2,882
Hill slopes	Banana	248	248	496
	Maize	34	69	103
	Sorghum	22	29	51
	Beans	89	125	214
	Millet	9	9	18
	Ground Nuts	3	8	11
	Irish Potato	4	4	8
	Coffee	62	62	124
	Fallow / Grazing	83	0	
	Sub-Total	554	554	1,025
Total Cropped Area (ha)		2,561	2,849	5,410
Cropping Intensity (%)				167%



.Table 4.4. Kabuyanda, With project cropping pattern

Typology	Crop	Extent of Area (Ha)		Total Gross Irrigated Area (Ha)
		Season-I	Season-II	
Flood plains and valley floors	Banana/Coffee	285	285	570
	Beans	95	95	190
	Maize	31	31	62
	Sorghum	48	48	96
	Vegetables	147	147	294
	Rice	0	162	162
	Fodder	162	162	324
	Fallow / Grazing	162	0	
	Sub-Total	930	930	1,698
Alluvial Terraces	Banana/Coffee	518	518	1036
	Beans	162	162	324
	Maize	97	97	194
	Vegetables	744	744	1488
	Watermelon	162	162	324
	Fodder	65	65	130
	Sub-Total	1,748	1,748	3,496
Hill Slopes	Banana/Coffee	266	266	532
	Beans	65	65	130
	Maize	32	32	64
	Sorghum	114	114	228
	Vegetables	77	77	154
	Sub-Total	554	554	1,108
Total Cropped Area (ha)		3,070	3,300	6,302
Cropping Intensity (%)				195%

9. In Matanda, the cropping pattern differentiated by with and without project scenarios is summarized in the table below. Over an indicative command area of 3,600 ha, the cropping intensity increases from 129 percent to 200 percent.



Table 4.5. Matanda, Without and with project cropping pattern

Without Project			With Project			
Crops	Rainfed Area (Ha)		Gross Cultivated Area (ha)	Irrigated Area (Ha)		Gross Cultivated Area (ha)
	Season-I	Season-II		Season-I	Season-II	
Rice	184	263	447	237	237	474
Banana	230	329	559	474	474	948
Coffee	658	940	1598	1,660	1,660	3,320
Beans	280	400	680	237	237	474
Maize	741	1058	1799	237	237	474
Vegetables	5	5	10	0	0	0
Tomato	0	0	0	356	356	712
Irish Potato	0	0	0	356	356	712
Cabbage	0	0	0	356	356	712
Onion	0	0	0	356	356	712
Watermelon	0	0	0	237	237	474
Fodder	0	0	0	237	237	474
Fallow / Grazeland	2221	1143	0	0	0	0
Grass	53	75	128	0	0	0
Ground Nut	130	186	316	0	0	0
Millets	210	300	510	0	0	0
Casava	31	44	75	0	0	0
Total Cropped Area (ha)	2,522	3,600	6,122	4,743	4,743	9,486
Cropping Intensity (%)			129%			200%

10. Gross Margins Analysis. The gross margins for selected crop enterprises and the identified farm typologies for with and without project scenario are presented in the table below. The results indicate that irrigation significantly enhances the production and productivity of the crop enterprises, which leads to significant increases in farm income.

Table 4.6. Kabuyanda, Gross margins for farm typologies (UGX/Acre)

Crops	Hill Slopes		Alluvial Terraces		Flood Plains and Valley Floors	
	Without	With	Without	With	Without	With
Banana	2,902,290	5,805,800	4,318,000	9,160,995	2,549,350	
Maize	207,800		229,700	5,193,350	207,800	744,950
Sorghum	287,700	821,950	277,700		207,800	503,450
Beans	382,250	3,641,100	511,050	3,694,310	188,600	822,100
Banana + Coffee	4,049,958		5,410,815			
Coffee	581,290	2,032,932	1,100,231	2,056,824		
Banana +Beans	3,902,840		5,209,875			
Maize + Beans			911,700		455,000	
Onion				7,532,750		
Tomato				12,951,400		
Cabbage				4,936,700		
Potato				3,964,600		
Water Melon				11,713,325		
Rice						2,130,550
Grass Fodder Crop						2,759,800



11. Farm Income Analysis. The effect of the project on the income of the beneficiary farmers was assessed using the cropping pattern and gross margin analysis results presented in the preceding sections. The analysis was done based on a 0.4ha farm model. The results indicate that access to irrigation almost triples the farmers income, mainly due to changes in cropping pattern and cultivation of the hitherto fallow land.

Table 4.7. Kabuyanda, The effect of the project on farmers’ income

Farm typology	Annual Farm Income (UGX)		Incremental Farm Income (UGX)
	Without	With	
Flood plains and valley floors	933,439	4,134,022	3,200,583
Alluvial Terraces	4,271,772	7,635,248	3,363,475
Hill Sides	1,495,050	4,348,875	2,853,825
Average	2,233,420	5,372,715	3,139,295

O&M costs

12. Costs have been calculated based on three categories: (i) maintenance costs; (ii) staffing costs; and (iii) office running costs. Regarding maintenance, costs have been estimated as a percentage of the investment costs for different categories of items, considering a low and high percentages based.

Table 4.8. Kabuyanda, Maintenance costs (including contingencies and taxes)

Description of Item	Total Cost (US\$)	% of Total cost - low	Maintenance cost - low (US\$)	% of Total cost - high	Maintenance cost - high (US\$)
Head Works (Dam, Spillway & Outlet)	13,427,354	0.1%	13,427	0.5%	67,137
Pipe Network Distribution					
Distribution lines	23,209,829	0.5%	116,049	1.0%	232,098
Valves and auxiliary works	4,756,093	1.0%	47,561	3.0%	142,683
Roads	259,600	0.5%	1,298	2.0%	5,192
Office and Stores					
Offices	45,430	1.0%	454	1.0%	454
Stores	19,470	1.0%	195	1.0%	195
Total	41,717,776		178,984		447,759

13. Staffing costs are estimated in the order of 43,000 US\$/year, while office running costs in the order of 5,500 US\$/year. Overall, O&M costs would range between 227,500 US\$/year (69 US\$/ha/year or in the order of 100,000 UGX/yr for an average 1 acre farm) and 496,500 US\$/year (150 US\$/ha/yr or in the order of 225,000 UGX/yr for an average 1 acre farm). Ideally, collection of farmers’ fees should allow for covering O&M costs of the irrigation scheme. An initial comparison between the O&M costs in Kabuyanda and the capacity to pay of farmers has been carried out. For the farmers’ capacity to pay, 5 percent of incremental farm income was used. It is estimated that farmers will be able to cover for the O&M costs both in the low and high cost scenarios, with the exception of farmers in the flood plains where increase in income would be lower. Further analyses will be carried out during project implementation in parallel to the construction works, to be facilitated by a targeted consultancy services which will support the identification and establishment of the management model for the scheme.



Table 4.9. Kabuyanda, Affordability of the O&M cost to beneficiaries, optimistic scenario

Farm typology	O&M cost per farm per year (UGX)	O&M cost per farm per year (UGX)	Farm income per farm per year (UGX)	O&M cost as percentage of irrigated farm income	
	low	high		low	high
Flood plain valley floors	100,000	225,000	4,134,022	2%	5%
Alluvial Terraces			7,635,248	1%	3%
Hill Sides			4,348,875	2%	5%



ANNEX 5: Greenhouse Gas Accounting

Background and Methodology

1. In its 2012 Environment Strategy, the World Bank has adopted a corporate mandate to conduct greenhouse gas (GHG) emissions accounting for investment lending. The quantification of GHG emission is an important step in managing and ultimately reducing GHG emission, and is becoming a common practice for many international financial institutions.
2. To estimate the impact of agricultural investment lending on GHG emission and carbon sequestration, the World Bank has adopted the Ex-Ante Carbon-balance Tool (EX-ACT), which was developed by the FAO in 2010.⁵¹ EX-ACT is a land-based appraisal system that allows the assessment of a project's net carbon-balance, defined as the net balance of CO₂ equivalent GHGs that were emitted or sequestered as a result of project implementation compared to a business-as-usual scenario. EX-ACT thus estimates the carbon stock changes (i.e. emissions or sinks of CO₂) as well as GHG emissions per unit of land, expressed in equivalent tonnes of CO₂ per hectare and year. EX-ACT can be applied for a wide range of agriculture and forestry development projects as it covers a wide range of activities (e.g. afforestation, agroforestry, improved crop and livestock production practices, improved water management, use of inputs, building of infrastructure, etc.) and aims to support project designers in identifying project activities with high potential for climate change mitigation and can thus support planning and decision making.
3. Similarly, the World Bank Water Practice has developed an internal tool, the GHG Accounting Tool for Water Projects. This tool allows for estimating the impact of water infrastructure on GHG emissions and carbon sequestration. To complement the EX-ACT tool, this tool was used to estimate the impact of Kabuyanda reservoir on GHG emissions and carbon sequestration.

Application of EX-ACT for the Project

4. *Boundaries.* GHG accounting with EX-ACT has been applied with reference to the construction of the two new large-scale irrigation schemes (Kabuyanda and Matanda) (6,300 ha) and small and micro scale irrigation (800 ha), for which construction is financed under the project, and the consequent change in land use. Calculations have been carried out with reference to the one scheme (Kabuyanda) for which detailed designs are available, for a command area of 3,300 ha. Results have been then be extrapolated to the second scheme (Matanda), for a command area of 3,000 ha.
5. *Data source.* Detailed designs for Kabuyanda provided the data for the GHG accounting analysis, including, amongst others, a detailed assessment of current agricultural activities regarding crop production in the project area and projected changes once irrigation introduced; and a detail assessment of current use of inputs and projected use under the Sub-component 2.1.
6. *Basic assumptions.* Uganda has a tropical mountain climate and moist moisture regime. The dominate soil type is LAC. The project implementation phase is five years and the capitalization phase is assumed to be 30 years, in line with the Economic and Financial Analysis. For the analysis, the "without project scenario" is expected not to differ from the "initial scenario". This default scenario is deemed reasonable as changes in agricultural activity crucially depend on the

⁵¹ <http://www.fao.org/tc/exact/ex-act-home/en/>



technology available, which is a contribution of the project. The analysis further assumes the dynamics of change to be linear over the duration of the project.

7. *Project.* Currently, agriculture in Kabuyanda is carried out under rainfed conditions. With the project, irrigation is assumed to be introduced over the whole command area. Construction of a dam is required. Watershed management plans will be introduced.

8. *Current land use – command area.* There are three typologies of land use:

- Flood plains: Representing 931 ha (25 percent of the target area), this typology is characterized by prevalence of bean, maize and banana, sometimes in intercropping. Cropping intensity is low as some of the area is prone to flooding during the rainy season and thus not cropped.
- Alluvial terraces: Representing 1,795 ha (50 percent of the target area), this typology is characterized by prevalence of bean, banana and maize. Cropping intensity is higher than in the valley plains as drainage does not represent a limiting factor.
- Hill slopes: Representing 925 ha (25 percent of the target area), this typology is characterized by prevalence of banana and bean, and to a less extent maize. Cropping intensity is in between that of flood plains and alluvial terraces, with steep soils representing the limiting factor for agriculture.

9. *Current land use – dam and reservoir.* The construction of the dam will result in the inundation of an area of 100 ha located in a heavily degraded forest reserve. Part of the area to be inundated is used by private tree growers and planted with eucalyptus and pines. The development of integrated catchment management plans under Sub-component 1.2 will result in watershed management interventions in hotspot areas. Although these intervention areas are yet to be identified by the plans, most of the intervention area will happen in what is currently used as farm land.

10. *Future land use – command area.* Across the three typologies of land use, the following changes are expected due to the introduction of irrigation:

- Flood plains: In addition to continuing the cultivation of bean, maize and banana, the introduction of drainage will allow for increase in intensification, mainly through the introduction of grass for livestock consumption.
- Alluvial terraces: Importance of bean, banana and maize will be reduced in favor of a variety of higher value horticultural crops, like onion, tomato, cabbage, and potato.
- Hill slopes: Prevalence of banana will more than double.

11. *Future land use – mitigation of dam impacts and watershed management interventions.* As mitigation measure for the 100 ha which will be inundated, the project will finance the restoration of about 500 ha in the forest reserve, currently not planted, and using indigenous trees. Further, the project will develop and implement integrated catchment management plans for an area of 38,000 ha with interventions in hotspot areas for the two new irrigation schemes. Although the intervention types and areas will be identified by the said plans, estimates indicate that the area of the interventions will be 10 percent of the catchment management plans area.

Results

12. *Net carbon balance.* The net carbon balance quantifies the GHGs emitted or sequestered as a result of the project compared to the without project scenario. Over the economic life of the project, 35 years (five years of implementation; 30 years of capitalization phase), the project constitutes a carbon sink of -447,373 tCO_{2eq}, representing net emission reduction. This is largely due to the afforestation in the catchment area for the proposed irrigation scheme under

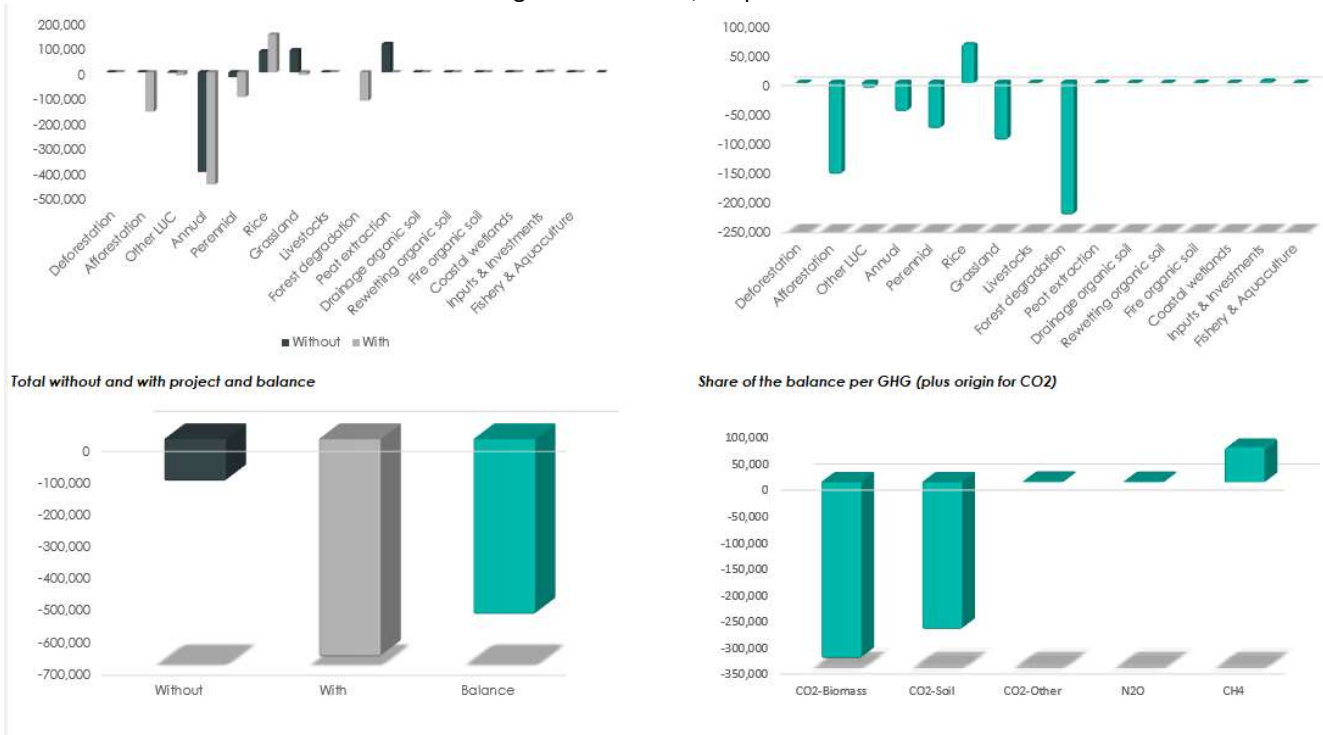


Component 1; to the increase in cropping intensity for annual crops as a consequence of the introduction of irrigation services under Component 1 and of improved agricultural practices under Component 2; as well as the catchment management plans interventions under Sub-component 1.2.

13. Carbon sinks. As per the EX- ANTE tool the main carbon sinks are biomass at -336,597 tCO_{2eq}, followed by soil at -281,309 tCO_{2eq}.

14. These results are in line with other irrigation projects that have achieved a high level of net emissions reductions.

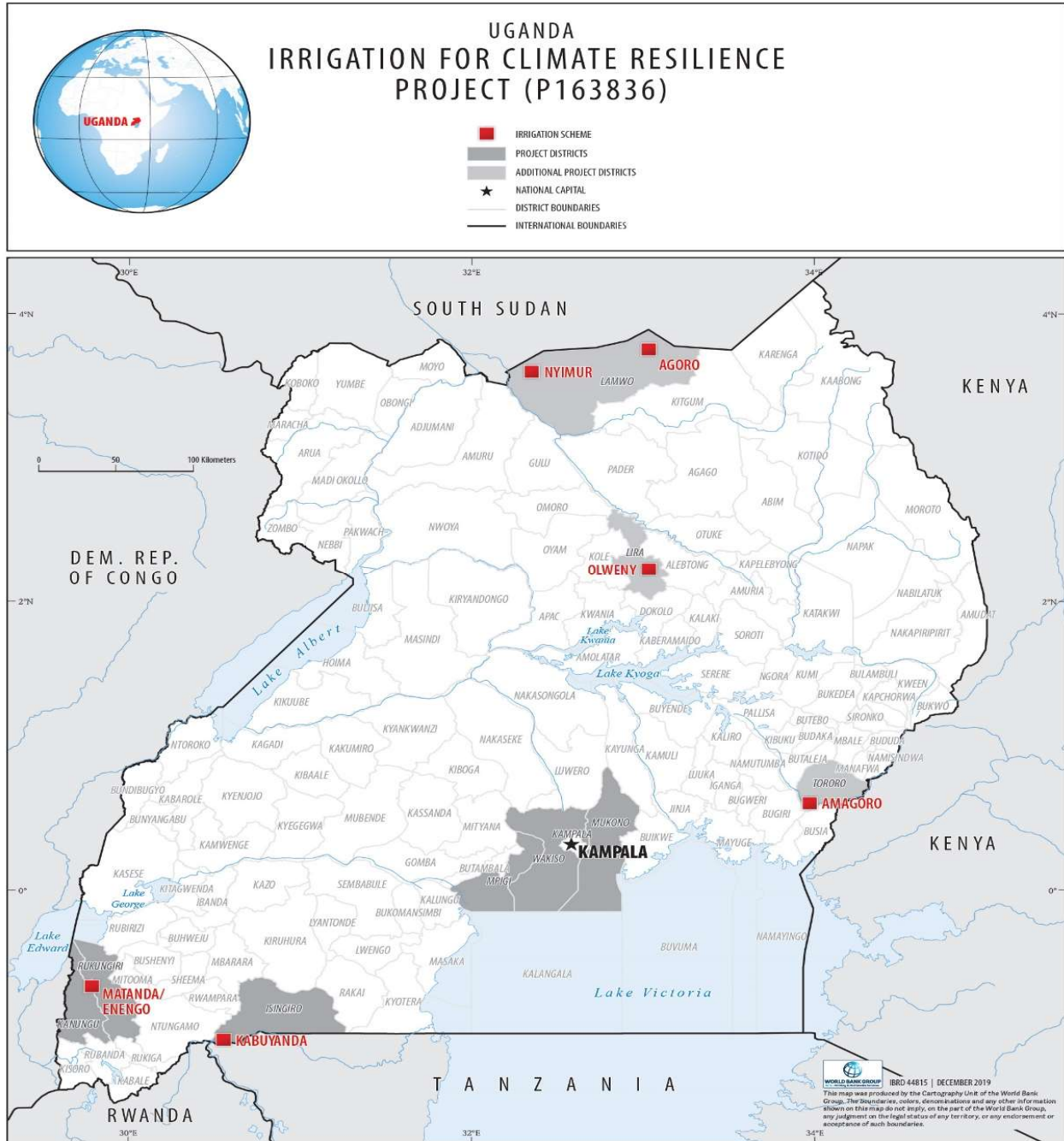
Figure 5.1. EX-ACT, Graph Results





ANNEX 6: Maps

Map A – Location map for the proposed large-scale irrigation scheme investments





Map B – Location map for the medium and large-scale irrigation schemes, by work progress

