UGANDA
TECHNICAL REPORT

Toward Scaled-Up and Sustainable Agriculture Finance and Insurance in Uganda

August 2019

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Acknowledgments

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The WBG team would like to thank the GoU, especially the Financial Services Department of MoFPED, for supporting this study. Similar thanks are due to many other public and private institutions that assisted in the study, including the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Agriculture Credit Facility (ACF) at the Bank of Uganda, the Insurance Regulatory Authority (IRA), Department of Relief, Disaster Preparedness and Management (DRDPM), Uganda National Meteorological Agency (UNMA), Uganda Development Bank Limited (UDBL), aBi Trust, various commercial banks and microfinance institutions, Uganda National Farmers Federation (UNFFE), Uganda Agribusiness Alliance, the Uganda Insurers Association (UIA), and the Agriculture Insurance Consortium (AIC), which is responsible for underwriting the Uganda Agricultural Insurance Scheme (UAIS) on behalf of individual insurance companies and a consortium of private insurance companies.

Funding support from the EU/ACP Africa Disaster Risk Finance Program and the United States Agency for International Development (USAID), through the Global Facility for Disaster Reduction and Recovery (GFDRR), is gratefully acknowledged.

Acronyms and Abbreviations

1AF	One Acre Fund
AAL	annual average loss
aBi	Agricultural Business Initiative
ACDP	Agriculture Cluster Development Project
ACF	Agricultural Credit Facility
ACS	Agro Consortium Secretariat
Africa Re	African Reinsurance Corporation
AgHH	agricultural household
AIC	Agriculture Insurance Consortium
A&O	administration and operating costs
ARM	all risks mortality
ASSP	Agriculture Sector Strategic Plan
AWS	automatic weather stations
AYII	Area Yield Index Insurance
BoU	Bank of Uganda
CAGR	compound annual growth rate
CCA	claims calculation agent
CCE	crop cutting experiment
CoV	coefficient of variation
DANIDA	Danish International Development Agency
DRDPM	Department of Relief, Disaster Preparedness and Management
DRF	disaster risk financing
EARS	Environmental Analysis & Remote Sensing
FAO	Food and Agriculture Organization of the United Nations
FSD	Financial Services Department of MoFPED
GAIP	Ghana Agricultural Insurance Program
GFDRR	Global Facility for Disaster Reduction and Recovery
GoU	Government of Uganda
GRP	Group Risk Plan
IBLI	Index-Based Livestock Insurance
IRA	Insurance Regulatory Authority of Uganda

KAS	Kungula Agrinsurance Scheme
KLIP	Kenya Livestock Insurance Program
LIPW	Labor-Intensive Public Works
LTAY	long-term average yield
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MDI	microfinance deposit-taking institution
M&E	monitoring and evaluation
MFI	microfinance institution
MoFPED	Ministry of Finance, Planning and Economic Development
MOU	Memorandum of Understanding
MPCI	Multi-Peril Crop Insurance
MSC	Microfinance Support Centre
NAADS	National Agricultural Advisory Services
NAP	National Agriculture Policy
NDVI	normalized difference vegetative index
NECOC	National Emergency Coordination and Operations Centre
NFIS	National Financial Inclusion Strategy
NPL	nonperforming loan
NUSAF 3	Third Northern Uganda Social Action Fund Project
OPM	Office of Prime Minister
OWC	Operation Wealth Creation
PARM	Platform for Agricultural Risk Management
PFI	participating financial institution
PIU	program implementation unit
PMFBY	Pradhan Mantri Fasal Bima Yojana (Prime Minister's Crop Insurance Scheme)
PPP	public-private partnership
RE	relative evapotranspiration
REI	Relative Evapotranspiration Index
ROSCA	Rotating Savings and Credit Association
SACCO	Savings and Credit Cooperative Organization
SIIPE	Satellite Index Insurance for Pastoralists in Ethiopia
SMEs	small and medium enterprises
SPDII	Satellite-Based Pasture Drought Index Insurance
TLU	Tropical Livestock Unit
TSI	total sum insured
TSU	Technical Support Unit
TWG	Technical Working Group
UAI	Unit Area of Insurance
UAIS	Uganda Agricultural Insurance Scheme
UBoS	Uganda Bureau of Statistics
UDBL	Uganda Development Bank Limited
UIA	Uganda Insurers Association
UIA-ACS	Uganda Insurers Association–Agro Consortium Secretariat
UNFFE	Uganda National Farmers Federation
UNMA	Uganda National Meteorological Agency
USAID	United States Agency for International Development
USE	Uganda Securities Exchange
VAT	value added tax
VSLA	Village Savings and Loan Association
WBG	World Bank Group
WII	Weather Index insurance
ZEP Re	Preferential Trade Area Reinsurance Company

Executive Summary of Key Findings and Recommendations

In March 2018, Uganda's Ministry of Finance, Planning and Economic Development (MoFPED)[1] formally requested technical assistance from the World Bank Group (WBG) to conduct a technical and diagnostic review of the Uganda Agricultural Insurance Scheme (UAIS) with the objective of providing recommendations to enhance the scalability and sustainability of the scheme going forward. MoFPED asked the WBG (i) to conduct an in-depth review of the UAIS—focusing on the technical soundness of its crop and livestock insurance products and services, the adequacy of its institutional and operational systems and procedures, and the adequacy of its financial performance—in order to identify gaps and to provide recommendations for strengthening scheme design and implementation moving forward; and (ii) to identify potential crop and livestock insurance products that could be introduced under the UAIS and that better align with the Government of Uganda's (GoU's) policy priorities of achieving scalability and financial sustainability for the UAIS. Recognizing the critical role agricultural finance at large plays in the agricultural transformation agenda, it was agreed with the MoFPED that the scope of the analysis be expanded to include a rapid assessment of agriculture finance.

This technical report covers the rapid assessment of agriculture finance and its recommendations, the findings of the situation and gap analysis of the UAIS, and where appropriate, presents the WBG's recommendations for strengthening the scheme; it also includes a proposal for two additional insurance programs, one for crop and one for livestock, targeted at small-scale farmers. Section 1 is comprised of four chapters that provide important background information: Chapter 1 provides context for the study; chapter 2 describes the agricultural sector in Uganda, including the constraints and risk exposure faced by small-scale farmers; chapter 3 offers an overview of the agriculture finance landscape; and chapter 4 describes past and present agricultural insurance initiatives, including the UAIS. Section 2 includes the remaining chapters that present findings and make recommendations for scaling up agriculture insurance in Uganda and making programs sustainable. Specifically, chapter 5 describes in detail the situation and gap analysis carried out for UAIS insurance products, operating systems and procedures, and underwriting results, and it identifies possible ways to strengthen the scheme for the public-private partnership (PPP) stakeholders to consider. Chapter 6 presents options for the development of large-scale Area Yield Index Insurance (AYII) to complement the existing UAIS crop insurance products and programs, and it includes fiscal costings for GoU to consider. Chapter 7 presents options for the development of large-scale Satellite-Based Pasture Drought Index Insurance (SPDII) for open-grazed livestock in semi-arid regions of Uganda, most notably the Karamoja subregion.

[1] MoFPED Letter No. MEP 456/179/10, March 18, 2018.

Situation and Gap Analysis of UAIS

Overview of UAIS Progress

In the 18-month reporting period (January 1, 2017, to June 30, 2018) during which UAIS has been operational, significant progress has been made in expanding access to insurance by farmers in Uganda. Sales of UAIS policies by June 30, 2018, had reached more than 64,000 crop, livestock, and aquaculture producers, thereby considerably exceeding the first-year target of 45,000 policy sales. This is a significant achievement. As of the same date, the total sum insured (TSI) stood at UGX 365.3 billion, with a premium of UGX 8.57 billion, claims of UGX 4.01 billion, and a loss ratio of 47% (table ES.1). It is understood that when the third quarter 2018 results are available they will show that total sales have increased to more than 70,000 bound policies.

Table ES.1. UAIS Underwriting Results, January 1, 2017, to June 30, 2018 (UGX)

SN	Product	No of Insured Farmers [1]	Sum insured (UGX)	Premium (UGX)	Average Premium rate (%)	Claims (UGX)	Loss Ratio (%)
1	Aquaculture Insurance	5	1,098,824,735	47,133,305	4.29%	18,175,158	39%
2	Area Yield Index Insurance	6,932	1,538,904,000	76,552,849	4.97%	272,128,636	355%
3	Crop Weather Index Insurance	5,317	2,326,931,451	110,225,434	4.74%	22,332,466	20%
4	Livestock Insurance	35	322,650,000	10,314,084	3.20%	4,000,000	39%
5	Multi-peril Crop Insurance	42,263	328,323,700,959	7,542,836,106	2.30%	2,874,805,271	38%
6	Poultry Insurance	36	31,689,120,012	785,575,464	2.48%	817,650,375	104%
TOTAL		**64,318**	**365,300,131,157**	**8,572,637,242**	2.35%	**4,009,091,906**	47%

Source: UAI-Agriculture Insurance Consortium.

Note: [1]. The number of insured farmers (policies) for SN3 Crop Weather Index Insurance and SN5 Multi-Peril Crop Insurance are as reported on March 28, 2018, and require updating to June 30, 2018.

Beneficiaries of UAIS by Farm Size

On the basis of the WBG's analysis of the average sums insured and premiums per policy, it is apparent that very small-scale farmers are the beneficiaries of (i) the Drought Weather Index Insurance (WII) Policy[2] and (ii) AYII programs. The average sums insured (and amount of premium) per farmer for the former are US$117 (US$5.5), and for the latter US$59 (US$2.9);[3] these figures indicate the very small size of the farmers who have purchased these products. The fact that these products target this market segment is fully in line with GoU objectives to target the program premium subsidies toward small-scale farmers.

However, in the case of aquaculture and poultry insurance, it is apparent that to date the beneficiaries have been large-scale commercial producers; this inference is based on the average sums insured and premium volumes for these programs. For aquaculture producers, the average sum insured is US$58,604 per policy with an average premium of US$2,514, while in the case of poultry producers, the average sum insured is US$234,734 per policy with an average premium of US$5,819.

Several of the UAIS covers are more suitable for large-scale commercial farmers than for small semi-subsistence farmers, such as the Multi-Peril Crop Insurance (MPCI) and aquaculture covers. To a certain extent, this is also true of the individual animal livestock and poultry policies.

[2] The Drought WII product is based on a Relative Evapotranspiration Index.
[3] This report uses an exchange rate of US$1.00 = UGX 3,750.

Recommendations:

1. **With limited penetration of livestock and poultry insurance among small-scale farmers, it will be important to ensure that products offered by UAIS can be accessed and afforded by this segment of the population.** To date the sales of the poultry cover have been mainly to very large commercial enterprises, as reflected by the premium and sum insured data. This trend is driven by the fact that the Uganda Insurers Association-Agro Consortium Secretariat (UIA-ACS) does not have the staffing capacity or distribution channels needed to promote and sell insurance products to small-scale producers (with say 500 to 1,000 head of poultry). Currently cover is not provided for sheep and goats, which tend to be owned by small-scale livestock producers, and going forward UIA-ACS may wish to conduct research into cover for these small ruminants. Furthermore, there are no insurance products that are suitable for pastoralists and rangeland cattle herders, despite the fact that 18% of households in Uganda as a whole own cattle; the share is as high as 50% of households in the Karamoja subregion.
2. **In order to ensure that large commercial aquaculture and poultry farmers do not capture a disproportionate share of GoU's limited premium subsidy budget, the government may wish to cap the amount of premium subsidies that a single farmer can benefit from each year.** GoU's primary goal is to make agricultural insurance affordable to small and marginal farmers by providing them with premium subsidies. A cap on the amount of premium subsidy that a single farmer is eligible for each season or year would ensure that the limited premium subsidy budget (UGX 5 billion per year) is shared with as many farmers as possible.
3. **More granular information on the insurance policies sold would strengthen understanding in MoFPED of UAIS.** The UIA-ACS quarterly progress reports currently do not present a breakdown of the number of small-scale and large-scale farmers purchasing cover, or the corresponding sums insured, premiums, and premium subsidies. Providing this information to MoFPED would enable GoU to better understand which types of farmer are benefiting from the program subsidies, and therefore enable better advocacy for resources for premium subsidies in the medium to long term.

Product Design and Rating

The Agro Consortium Secretariat (ACS) has developed three crop insurance products and programs—individual grower MPCI, Drought WII, and AYII—as well as livestock insurance for cattle and pigs, poultry, and aquaculture. Interviews with UIA-ACS suggest that they received assistance from their reinsurers and international specialists—e.g., EARS (Environmental Analysis & Remote Sensing) and ARC (African Risk Capacity)—to design and rate these products, and that limited capacity transfer to local insurance companies is taking place. On the basis of this review, it is apparent that the policy wordings conform to international best practice and are basically sound.

The main UAIS smallholder crop insurance cover at the present is the Drought WII Relative Evapotranspiration Index (REI) designed by EARS. This is essentially a drought protection policy and is suitable for farmers in areas that are susceptible to seasonal drought. As the product is solely a drought insurance cover, however, it does not provide broad-based risk protection against key perils such as pests and diseases, which are identified as the most serious cause of loss in Ugandan agriculture (see section 2.7, which draws on PARM [2015]).

AYII is an area-based multi-peril loss of crop yield cover that provides more comprehensive protection to farmers. It provides protection for pests and diseases as well as any other perils that impact area yield, and it is being implemented in several African countries as a smallholder cover linked to crop credit. AYII is being piloted in Uganda, with the One Acre Fund (1AF) maize AYII pilot active in four districts in 2017/18. Unfortunately, due to poor design and implementation, this product produced disappointing results in 2017/18, with very high loss ratios during a bumper harvest year (table ES1). That said, in many other low-income contexts, well-designed and well-implemented AYII has been demonstrated to provide low-income farmers with high-quality, affordable protection that de-risks the agricultural sector and that can crowd in credit.

The average premium rates charged under UAIS (2.35% for all programs) are considerably lower than the published premium rates, raising questions about the sustainability of the program. These lower-than-average rates apply to the majority of policies sold under UAIS.[4] Undoubtedly, some flexibility in premium rates is needed when underwriting risk. Nevertheless, the overall average rate of only 2.35% shown in table ES.1 (less than half of the published rate of 5%) during the program's first 18 months raises questions about the sustainability of the premium rates in the long run, and about the program's exposure to both frictional and catastrophe losses. Based on international experience with crop insurance programs, these rates are significantly lower than in comparator countries and likely unsustainable, particularly for an MPCI policy, in the medium to long term. It should also be highlighted that this period coincides with generally favorable weather in Uganda, and that bumper crop yields (e.g., of maize) were experienced in most regions of the country in 2018. Had yield outcomes been unfavorable, or had Uganda been exposed to a catastrophic shock, the loss ratio would likely have been extremely high, given how severely the program is underrated.

The UAIS stakeholders' decision to adopt single flat rates for every crop and region of Uganda is not technically (actuarially) sound. This applies especially to the crop MPCI cover with a 5% flat rate and the same 75% insured yield guarantee cover level for all crops throughout the country. This decision could lead to anti-selection by farmers in drought-, flood-, or hail-prone areas of Uganda purchasing low-cost MPCI cover, while farmers in low-risk regions consider the policy too expensive to purchase. One approach to offering standard premium rates (e.g., 5.0%) is to adjust the yield guarantee level to achieve the target price: for example, a farmer in a high-risk region with very variable long-term average yield (LTAY) would be offered a guarantee yield of say 60% to match the 5.0% premium rate; conversely, farmers in a low-risk region adopting high husbandry standards and with very low variation in their LTAY could be offered an 85% yield guarantee at the 5.0% premium rate. A further consideration is that some crops are much more susceptible to climatic and biological perils than others, necessitating the introduction of differential crop premium rates to reflect the different risk exposures. Similar concerns are relevant for both the drought REI cover and the AYII programs, where rates should be calculated separately for each Unit Area of Insurance (UAI) based on the calculated pure risk rates for each UAI. Finally, the decision to cap rates at a maximum of 6.0% further distorts the market,[5] as this means UAIS underwriters agree to underprice the products in high-risk regions (which is unsustainable in the long term) and/or to reduce the coverage levels or set very high deductibles, reducing the value of the product for the farmer.

To date, the demand for and uptake of the UAIS livestock insurance policies (cattle and pigs) and poultry insurance policies have been very low and mainly restricted to large-scale producers. One of the major challenges faced by underwriters of individual animal accident and mortality covers is the extremely high costs of animal pre-inspections, health checks, vaccinations, and identification (e.g., through ear tagging). The costs to the insurer of sending a qualified veterinarian to a livestock producer's farm to conduct these pre-inspections, as well as post-mortem inspections in the event of a loss, are usually prohibitively high for smallholders with two to three head of cattle. Insurers therefore tend to target medium- and large-scale commercial enterprises with 25 to 50 head of cattle so they can take advantage of economies of scale in their operating costs.

The UAIS livestock insurance policy for cattle and pigs does not carry any form of policy excess, which is very unusual in an individual animal livestock insurance policy. It is conventional for such a policy to include a **coinsurance** on the market value of the animal at the time of death or the sum insured, whichever is lower, in order to reduce the risk of moral hazard: typically, the coinsurance is between 10% and 20% of the value of the loss.

[4] For the MPCI program, the actual average premium rate has been 2.30%, compared to the 5% published flat rate charged for all crops throughout Uganda (save for cotton, which is 6%). For poultry insurance, the average rate of 2.48% is much lower than the published rate of 5.0%. For aquaculture, the average rate of 4.29% compares with the published rate of 6.0%. For livestock, where stated rates vary from a low of 3.5% for local cattle to a high of 6% for pigs, the actual average rate to date has been only 3.2%.

[5] This cap is per the Memorandum of Understanding for UAIS signed by the key stakeholders in 2016.

Recommendations:

1. **It is recommended that UAIS stakeholders carry out a comprehensive review of the 1AF AYII pilot,** identify the challenges, and refine and develop this AYII cover under Ugandan conditions going forward.
2. **It is recommended that the Technical Working Group (TWG; also referred to as the National Committee for Agricultural Insurance) conducts a review of the adequacy of the premium rates currently being charged on UAIS** and then present their findings and recommendations to GoU.
3. **Following international best practice, UAIS should replace the current system of flat (single) premium rates and adopt an actuarially based risk rating that puts a fair price on risk** and that specifically recognizes the actual risk exposures for different crops grown in different regions of Uganda.
4. **Going forward, UAIS needs to identify suitable low-cost systems and procedures for delivering and administering livestock insurance to small-scale livestock producers.** Here the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) livestock veterinarians and extension officers could play a vital role in supporting activities such as electronic livestock registration and identification (tagging or microchipping), health certification, and vaccination.
5. **It is recommended that the TWG reviews the loss experience with the UAIS livestock policy** thus far to determine whether claims are arising due to moral hazard and to decide whether a policy excess (coinsurance on the value of the animal) is required.

Need for Meso-level Portfolio Cover for Financial Institutions Lending to Farmers

In 2017/18, the UAIS Agriculture Insurance Consortium (AIC) insured about 40,000 Centenary Bank clients under a hybrid EARS REI drought index policy and additional indemnity-based protection against flood and landslide losses. It is understood that the policy is designed not to provide individual farmer cover but as a portfolio protection policy to protect Centenary Bank's short-term loans to 40,000 clients, who include crop producers, livestock producers, and small-scale traders. The 40,000 Centenary clients are incorrectly reported as being insured under the MPCI policy in the UIA-ACS quarterly report for March to June 2018; this error should be corrected. Centenary Bank has insured its total agricultural loan portfolio of about UGX 250 billion with UAIS at an agreed premium rate of 2.5% (1.25% paid by Centenary, the other half being covered by the government premium subsidy)—a flat rate that is well below the minimum 5.0% rate for crops. The policy carries an annual loss limit.

Recommendations:

1. **A meso-level crop credit portfolio protection cover is likely more suitable for the Centenary Bank portfolio of risk.** A meso-level crop insurance portfolio protection product could be designed to protect Centenary Bank's short-term lending to farmers at the level of each of its regional and district branch offices. In this case, the underlying product offered to each bank branch could be the EARS REI, which protects against drought and excess rain. If a special meso-level crop insurance cover is to be designed to protect Centenary Bank's seasonal loans to small farmers, this process will likely require inputs from UAIS's lead reinsurers as well as from the Insurance Regulatory Authority of Uganda (IRA).
2. **The benefit of such meso-level protection is that if a branch office of Centenary Bank incurs a major loss, it will receive an insurance payout to inject financial liquidity.** This in turn will enable it to (i) reschedule loans and interest payments for small farmers who have lost their crops and cannot repay their loans, and (ii) extend new loans to farmers to ensure they are able to purchase seeds and other inputs and plant their crops for the new season. Importantly, for any meso-level insurance product that receives public subsidies, the lending institution must demonstrate how the farmer benefits from the insurance, through a write-off of the loan or extension of additional lines of credit, to justify the use of public funds for premium subsidies.

Organization, Staffing, and Operating Systems and Procedures

The UAIS has been designed in line with international best practice for agriculture insurance programs, as a PPP with active participation of the public and private sectors. Public sector representation includes MoFPED, Bank of Uganda (BoU), IRA, and the Uganda Insurers Association (UIA) acting on behalf of the Agriculture Insurance Consortium (AIC). Private sector participation includes the 11 insurance companies that make up the consortium. The roles and responsibilities of the public sector stakeholders are clearly defined in a Memorandum of Understanding (MOU); however, the structure of the private sector actors is not.

The Agro Consortium Secretariat (ACS) is the key implementing entity for UAIS, and it is responsible for design and rating of products, creation of awareness among farmers, risk acceptance and underwriting, and claims administration and loss adjustment. Currently the ACS is staffed by a core team of four who oversee UAIS implementation. They are backed by a team of four regional inspectors. The 11 AIC member insurance companies assist the ACS in marketing and sales and at times in loss adjustment activities. The ACS lacks sufficient resources to implement MPCI on a large scale, however, as it does not have a network of trained field staff to conduct the pre-season, mid-season, and harvest-time field inspections. This represents an acute challenge in the event of widespread crop losses. For this reason, the ACS is concentrating on developing its drought REI, as this does not require any form of field-level inspection or loss assessment.

Recommendations:

1. **Going forward, stakeholders should review the adequacy of the UAIS institutional and operating structure.** In particular, they should focus on accountability and reporting lines of the AIC and ACS and seek to strengthen these areas as necessary. Furthermore, the MOU does not define the role and functions of the Technical Working Group, and it may be important to review its mandate and to raise its profile in providing oversight of UAIS product and program design and implementation.
2. **There is limited expertise in Uganda for designing, rating, underwriting, and adjusting agricultural insurance products and programs.** Going forward, a program of technical capacity building for the insurance companies is strongly recommended.

Strengthening Data and Statistics for Agricultural Insurance in Uganda

The Uganda National Meteorological Agency (UNMA) is responsible for recording and reporting weather data; however, its network of ground weather stations is inadequate to support the development of WII. In 2015, UNMA had a network of 39 weather stations throughout Uganda, including automatic weather stations (AWS), backed up by manual recording stations. However, some of the stations are not operational due to lack of staffing, inadequate maintenance, or vandalism. The density of ground weather stations is far too low to support WII, and investment in strengthening the network—to monitor and report on weather for farmers and to implement WII—is required.

Currently, Uganda's ability to develop indemnity-based crop insurance products (e.g., MPCI) is severely restricted by the lack of historical data and statistics on crop area, production, and yield, either at the individual farmer level or at the village or parish level. In Uganda routine collection of crop production data was formerly conducted by National Agricultural Advisory Services (NAADS)-MAAIF, but this system broke down many years ago due to internal instability and to lack of resources and funding in NAADS. The Uganda Bureau of Statistics (UBoS) is also involved in agricultural data through the agriculture and livestock censuses carried out every 10 years; the last of these was conducted in 2008/09.

In 2018, the World Bank with NAADS-MAAIF launched a major new initiative designed to strengthen the collection of crop production data and statistics. Under the World Bank–funded Agriculture Cluster Development Project (ACDP) being implemented by MAAIF, seasonal data on crop area, production, and yield will be collected over the project life in up to 40 districts for five major crop value chains (maize, beans, rice,

cassava, and coffee). Yields will be estimated at parish levels using accurate measurement based on sample crop cutting experiments (CCEs), which will be conducted by NAADS field staff.

Recommendations:

1. **There is a clear need to assist UNMA by investment in increasing the density of its meteorological weather station network.** Chapter 6.6 of this report provides cost estimates for strengthening UNMA's weather station network.
2. **UAIS could collaborate with ACDP to roll out AYII cover in the districts and parishes where the CCEs are being conducted by NAADS** and to trigger payouts according to the NAADS CCE data.

Monitoring and Evaluation (M&E)

An M&E system is essential if government is to assess UAIS inputs, outputs, and impacts, such as number of crop, livestock, and aquaculture producers receiving education and training on agricultural insurance; the degree of basis risk being encountered in the crop drought REI and AYII programs; the degree to which insurance helps farmers gain access to formal credit (seasonal loans); and the extent to which insurance smooths consumption, reduces the need for asset depletion following a loss, promotes adoption of new technology, or increases production/yields and incomes.

During this review, discussions with the UIA-ACS on potential basis risk in the REI drought crop insurance program for maize and beans have not been possible. In the start-up phase of any new crop index insurance program, it is extremely important to monitor how closely the satellite-based index correlates with actual drought conditions on the ground. It is not known whether the ACS has the resources to invest in M&E of the potential basis risk problem in its REI program.

Capacity Building for UAIS Stakeholders and Role of a Technical Support Unit

There is a need to develop the technical capacity of public and private stakeholders involved in UAIS design and implementation. The capacity of insurance companies and the ACS could be strengthened by training in product development, pricing, identification of appropriate delivery channels (partner agent model), and loss inspection and loss adjustment systems and procedures, among other areas. Public sector stakeholders would benefit from increased capacity in UAIS implementation support activities, such as farmer registration and creation of crop and livestock data management systems for insurance purposes; fiscal management of premium subsidies, insurance awareness creation strategies, and programs for field extension workers and for farmers; and training in the conduct of CCEs. This report identifies several ambitious large-scale investment projects for UAIS stakeholders—strengthening access to agricultural finance through linkage with agricultural insurance (chapter 2); scaling up of AYII for small-scale farmers borrowing seasonal credit (chapter 6); and research and development followed by implementation of Satellite-Based Pasture Drought Index Insurance (chapter 7). But to implement these products and programs, stakeholders will need to invest heavily in capacity building and training.

Recommendations:

1. **The GoU could establish a Technical Support Unit (TSU) to strengthen the capacity of government bodies and the private sector in the design and implementation of the UAIS program.** The main roles of the TSU would be (i) to build capacity and carry out training, and (ii) to oversee the planning and implementation of the UAIS crop and livestock insurance programs and to report on them to the government. The TSU could also have a window dedicated to agriculture finance and insurance. For the agriculture insurance, the TSU could have specific responsibility for the following:
   - Capacity development of UAIS public and private sector stakeholders
   - Agricultural finance bundled with UAIS agricultural crop, livestock, and aquaculture insurance

- UAIS awareness creation and sensitization activities for public sector field staff and farmers
- Identification and promotion of potential distribution channels for agriculture insurance and marketing strategies
- UAIS technology applications for CCEs (smart sampling, mobile phone technology, etc.)
- Development and management of crop and livestock insurance and premium subsidy databases
- Monitoring and evaluation of UAIS implementation, impacts, costs, and benefits

2. **The GoU would need to decide whether to house the TSU in MoFPED or in MAAIF and would also need to staff and establish a working budget for the TSU.** It is suggested that the TSU be staffed by a minimum of five technical staff, including (i) a manager, (ii) a crop agronomist, (iii) a livestock specialist, (iv) an agro-meteorologist, and (v) a data analyst. The operating cost of the TSU would be in the order of US$190,000 in year 1 (because of the associated start-up costs of equipping the unit); thereafter costs would be about US$170,000 a year, or a total of US$860,000 (UGX 3,225 million) over five years.

Option to Develop Large-Scale Crop Area Yield Index Insurance in Uganda

AYII is the most appropriate product for smallholder farmers in Uganda, and further research and development are required to scale up the existing pilot. Based on the World Bank's international experience—in India, other parts of Asia, and Africa (e.g., Kenya)—AYII is seen as being a suitable product for small-scale farmers in Uganda if the current issues concerning access to historical crop yield data can be overcome. This report identifies opportunities for UAIS to collaborate with the ACDP in the rollout of the AYII program and to use the ACDP's CCE results to trigger payouts on an AYII program at the parish level for five major crops.

AYII linked to seasonal loans through financial institutions can crowd in access to rural credit by de-risking agricultural lending for smallholder farmers. In Uganda, fewer than 10% of farmers have access to formal bank credit, and GoU has identified increasing access to credit as a policy priority; the goal is for farmers to invest in improved seed and fertilizer technology and to thereby increase their crop production, yields, and farm incomes. The bundling of crop insurance with credit and input supplies has been shown in many parts of the world to be mutually beneficial for farmers, credit providers, and insurers. The farmer gains access to seasonal crop credit; lending institutions can expand their lending to a new (underserved) target market, as their loans are protected by crop insurance; and the insurers experience (i) reduced anti-selection, (ii) less need for pre-inspections, (iii) reduced costs for promoting and marketing the agricultural insurance program, and (iv) insurance uptake, spread of risk, and premium volume that are generally much higher than under a purely voluntary program.

Recommendations: Areas of Support from GoU to Crop AYII

Chapter 6 of this report identifies a series of areas where GoU could support the development of a large-scale AYII program in Uganda, including the following:

1. **Data strengthening for crop insurance.** This would include establishing for major cereal and row crops a systematic method for recording and reporting data on crop sown and harvested area, as well as production and yields at local, subdistrict, district, regional, and national levels. This effort would also usefully extend to the identification of homogeneous agroclimatic crop zones for each major crop, which in the future would form the Unit Area of Insurance (UAI) for the operation of the AYII program.
2. **Strengthening of crop cutting experiments for area yield estimation.** Areas for government support include introduction of CCE yield estimation procedures for main crops throughout Uganda, along with adoption of mobile phone or electronic tablet technology to record the CCE data for transmission in real

time to underwriters and other stakeholders. This technology has already been developed and tested, and is now under large-scale implementation in India as part of the Pradhan Mantri Fasal Bima Yojana program.

3. **Strengthening of the automatic weather station network** under UNMA. As noted in chapter 5, the current density of weather stations in Uganda is very low. Investing in AWS technology will not only improve the agricultural insurance programs for smallholder farmers (both AYII and WII) but also strengthen UNMA's weather reporting services for the agricultural sector.
4. **Investment in farmer awareness, education, and training concerning the role of crop insurance** and the operation of the various insurance products and programs. Farmer insurance awareness and literacy creation is a key pillar for scaling up and improving the sustainability of the UAIS.
5. **Premium subsidy provision.** Under UAIS, GoU has already allocated a budget of UGX 5 billion per year for 2018 and 2019 for premium subsidies: for large farmers, a 30% premium subsidy is provided, and for smallholder farmers the subsidy level is higher, at 50% of the cost of premium and in high risk regions the maximum premium subsidy is as high as 80% of the commercial premium. It is suggested that the same premium subsidy rules would apply to the AYII program.

Five-Year Build-Up Plan and Financial Budget for Crop AYII

Chapter 6 presents a five-year (FY2019/20 to FY2024/25) build-up plan for crop AYII with an indicative financial budget. The purpose of presenting the crop insurance build-up plan and budget (numbers of insured farmers, insured area, sums insured, premium projections, and the costs of GoU support) is to help GoU assess the likely fiscal costs of premium subsidy support and financial support for other operational activities. As international experience demonstrates that subsidies once given are very difficult to reduce, GoU should undertake the decision to provide premium support with full knowledge of the likely fiscal impact of the program.

Under the most likely (medium uptake) scenario, it is assumed that by year 5 when the AYII program has achieved scale and sustainability, that it will insure 200,000 farmers with government financial support of US$6.07 million (UGX 22,763 million). By year 5, the program would insure 200,000 farmers per year, with TSI of US$100 million, premium income of US$7.50 million, and government premium subsidies of US$3.75 million. Over the full five years of the project, the cost of the government's 50% premium subsidy support would be US$9.84 million; the cost of other government support to areas (such as awareness creation and data investments) would amount to a further US$6.09 million. Thus the total costs to GoU would come to US$15.93 million (UGX 59,752 million) (table ES.2). Further costings for low and high uptake rates and higher and lower coverage levels and indicative premium rates are shown in annexes 4.1 to 4.3.

Large-Scale Livestock Insurance Opportunities for Uganda: Satellite-Based Pasture Drought Index Insurance

Livestock production is critical to the economy and poverty alleviation in Uganda. According to the 2008 National Livestock Census about 4.5 million households (71% of total households) raise some form of livestock or poultry. Overall, 18.2% of households own cattle, 39.2% own goats, 9.0% own sheep, and 50.1% own poultry (chicken). Most livestock producers are, however, very small-scale producers. According to the same census, households owning cattle have an average herd size of seven animals; for goats the average is five animals per household, and for sheep it is six per household. In Karamoja subregion, the average herd and flock size per owning household is larger, at 21 cattle, 19 goats, and 18 sheep (MAAIF and UBoS 2009).

The current range of UAIS livestock indemnity-based insurance products is more appropriate to commercial cattle, pig, and poultry producers than to small-scale producers. To date the sales of livestock insurance have been very low and restricted to a handful of large commercial producers.

Table ES.2. Five-Year Fiscal Budget for AYII Cover for Maize Farmers in Uganda: Medium Farmer Uptake and Medium Coverage Levels of 65% to 75% of Expected Yield

Insured Farmers, Area, Sum Insured and P	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	25,000	50,000	100,000	150,000	200,000	525,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	50,000	100,000	200,000	300,000	400,000	1,050,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	12,500,000	25,000,000	50,000,000	75,000,000	100,000,000	262,500,000
Premium rate %	7.5%	7.5%	7.5%	7.5%	7.5%	
Premium per hectare (US$/Ha)	18.8	18.8	18.8	18.8	18.8	
Total Premium (US$)	937,500	1,875,000	3,750,000	5,625,000	7,500,000	19,687,500
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**468,750**	**937,500**	**1,875,000**	**2,812,500**	**3,750,000**	**9,843,750**
Other Government Support (US$)						
1. Data strengthening for AYII	75,000	150,000	300,000	450,000	600,000	1,575,000
2. Introduction of CCEs for yield estimation	50,000	100,000	200,000	300,000	400,000	1,050,000
3. Investment in weather data	40,000	80,000	160,000	240,000	320,000	840,000
3. farmer awareness and education	125,000	250,000	500,000	750,000	1,000,000	2,625,000
Sub-Total Other costs borne by Government	**290,000**	**580,000**	**1,160,000**	**1,740,000**	**2,320,000**	**6,090,000**
Total Costs of Government Support (US$)	**758,750**	**1,517,500**	**3,035,000**	**4,552,500**	**6,070,000**	**15,933,750**
Total Costs of Government Support (UGX Million)	2,845	5,691	11,381	17,072	22,763	59,752

Source: World Bank Group analysis.

In Uganda the major causes of livestock mortality include pests and diseases along with drought (leading to death of animals by starvation due to lack of water and pasture). The Platform for Agricultural Risk Management (PARM) risk assessment study for Uganda (PARM 2015) reports annual average losses of US$76.5 million due to livestock pests and diseases, while the droughts in 2010 and 2011 caused livestock losses of US$111.0 million and US$231.5 million, respectively.

The most drought-prone areas in Uganda are the districts in the cattle corridor, a dry stretch of land that extends from Rakai in southwestern Uganda through Sembabule, Luwero, and Soroti to Karamoja in the northeast. In extreme cases, particularly in the Karamoja subregion, frequent droughts lead to starvation and death of human beings as well as livestock. Donor spending in Uganda is overwhelmingly dominated by food aid, leading to a high level of food aid dependency, which considerably increases during crisis events. Food aid spending averaged over US$78 million a year between 2001 and 2014 (World Bank 2015b). Approximately 10% of Uganda's population depends on food aid and some regions, especially along the cattle corridor, remain chronically food insecure.

Satellite-Based Pasture Drought Index Insurance is a promising option for extending drought insurance cover to smallholder livestock producers involved in extensive ranching on natural pasturelands and rangelands. These covers are based on normalized difference vegetative index (NDVI) technology and were first developed for commercial cattle ranchers in Europe (Spain) and North America (United States and Canada). These products are now being used by governments in Mexico, Kenya, and Ethiopia as macro-level livelihood protection programs for small vulnerable livestock producers. Private insurance companies (backed by donor-funded partial premium subsidies) are also marketing these products in Kenya and Ethiopia at the micro-level for voluntary purchase by individual pastoralists. NDVI provides a very good indicator of pasture growth and vigor over time (typically satellites capture imagery every 10 days) and can be used to construct an index to measure loss of pasture and grazing resources due to progressive drought.

The objective of SPDII for smallholder livestock producers is to trigger early payouts as major droughts develop and grazing resources are depleted. These payouts allow the insured livestock producers to make timely purchases of fodder and supplementary feeds to keep their core breeding animals alive until the drought has ended and the pasture and grazing lands have regenerated.

An NDVI cover for smallholder cattle and sheep producers located in the pastoral grazing areas of Uganda such as Karamoja and other parts of the cattle corridor would aim to keep core breeding animals alive during severe droughts, such as those experienced in 2008, 2010, and 2011, when many livestock died from starvation due to lack of grazing and/or drinking water. Such a program could be targeted at vulnerable pastoralists as part of GoU's livelihood protection and drought resilience–building programs in these semi-arid parts of Uganda.

Under this study, two options for SPDII are considered:

1. Voluntary sales to interested livestock producers.
2. A large-scale livelihoods protection program, under which GoU would purchase cover for large numbers of vulnerable pastoralists who would be pre-identified and automatically enrolled under the SPDII program. This program would aim to complement the GoU's existing drought risk management programs in northeastern Uganda.

Recommendations: Areas of Government Support to Livestock Insurance

GoU premium subsidy support aims to make the insurance coverage more affordable for small-scale livestock producers and to encourage uptake:

1. For **voluntary cover, a 50% premium subsidy** is assumed, which would be in line with the existing GoU 50% subsidy level for small-scale livestock producers under the UAIS scheme.
2. For the **livelihood protection cover for the most vulnerable livestock producers, it is assumed that GoU would provide full funding (100% premium subsidy)** as part of its disaster risk management strategy for vulnerable households in the Karamoja subregion.

Other government support for the livestock insurance program would involve assisting the insurance companies in the start-up and implementation of the SPDII program in two main areas:

1. **Registration of the livestock producers (pastoralists).** All pastoralists will need to be electronically registered for insurance and their mobile phone contact details and bank account details recorded. (Those who do not have bank accounts or mobile banking will need to be assisted in opening an account). At registration, pastoralists will be assigned to a UAI where their animals are normally located for grazing purposes. A UAI is likely to be based on a grouping of districts or counties and subcounties according to its NDVI signature.
2. **SPDII awareness creation and education.** It is essential to provide livestock producers with education and training on the role of the SPDII program and on how the cover works, especially how they will qualify for and receive claims payouts.

Voluntary Livestock SPDII: Five-Year Build-Up Plan and Financial Budget

For the voluntary sales option with medium insurance uptake of 12,500 insured livestock producers (pastoralists) and 62,500 insured Tropical Livestock Units (TLUs) annually by year 5 (assumed full-scale implementation), the budgeted cost of GoU financial support is US$700,000 (UGX 2,625 million) per year, made up of US$450,000 for the 50% premium subsidies and US$250,000 for electronic registration of producers and for activities to create awareness of the insurance. The total cost to government of this option over five years would be US$2.10 million (UGX 7,875 million) (table ES.3). The costs of GoU support for other

uptake scenarios vary between a low of US$350,000 (UGX 1,313 million) at year 5 for the low uptake rate of 6,250 insured livestock pastoralists and 31,250 insured TLUs by year 5, and a high of US$1.4 million (UGX 5,250 million) at year 5 for the high uptake rate of 25,000 insured livestock producers by year 5 and 125,000 insured TLUs (see annexes 5.1–5.3 for further details).

Table ES.3. Voluntary Livestock Insurance (SPDII): Five-Year Fiscal Budget for Medium Uptake Scenario (2,500 new pastoralists each year)

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET							
ExpansionPlan and Budget	**Assumptions**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTAL**
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	**2,500**	2,500	5,000	7,500	10,000	12,500	37,500
Total Number of Insured Livestock Units	5	12,500	25,000	37,500	50,000	62,500	187,500
Sum Insured (US$)	96	1,200,000	2,400,000	3,600,000	4,800,000	6,000,000	18,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	180,000	360,000	540,000	720,000	900,000	2,700,000
Premium Subsidy level/ Premium Subsidy (US$)	**50.00%**	**90,000**	**180,000**	**270,000**	**360,000**	**450,000**	**1,350,000**
OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS							
Support to Start up and Operational costs	**Assumptions**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTAL**
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	25,000	50,000	75,000	100,000	125,000	375,000
2. Farmer awareness, education and training (US$/Producer)	10.0	25,000	50,000	75,000	100,000	125,000	375,000
Sub-Total Start-up & Operating Expenses Support (US$)		**50,000**	**100,000**	**150,000**	**200,000**	**250,000**	**750,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**140,000**	**280,000**	**420,000**	**560,000**	**700,000**	**2,100,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**525**	**1,050**	**1,575**	**2,100**	**2,625**	**7,875**

Source: World Bank Group analysis.

Livestock SPDII for Livelihoods Protection: Five-Year Build-Up Plan and Financial Budget

Under the SPDII livelihoods protection program option with automatic enrollment of vulnerable livestock producers (pastoralists), medium insurance uptake of 100,000 insured livestock producers (pastoralists), and 500,000 insured TLUs annually by year 5 (assumed full-scale implementation), the budgeted cost of GoU financial support is US$9.2 million (UGX 34,500 million) per year. This is made up of US$7.2 million for the 100% premium subsidies and US$2.0 million for electronic registration of livestock producers and for activities to create insurance awareness. The total cost to government of this option over five years would be US$27.6 million (UGX 103,500 million) (table ES.4). The costs of GoU support for other uptake scenarios vary, from a low of US$2.30 million (UGX 8,625 million) at year 5 for the low uptake rate of 25,000 insured livestock producers and 125,000 insured TLUs, to a high of US$13.8 million (UGX 51,750 million) at year 5 for the high uptake rate of 150,000 insured livestock producers and 750,000 insured TLUs by year 5 (see annexes 6.1–6.3 for further details).

Table ES.4. Livelihood Protection Livestock Insurance (SPDII): Five-Year Fiscal Budget for Medium Uptake Scenario (20,000 new pastoralists each year)

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET							
ExpansionPlan and Budget	**Assumptions**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTAL**
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	**20,000**	20,000	40,000	60,000	80,000	100,000	300,000
Total Number of Insured Livestock Units	5	100,000	200,000	300,000	400,000	500,000	1,500,000
Sum Insured (US$)	96	9,600,000	19,200,000	28,800,000	38,400,000	48,000,000	144,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	1,440,000	2,880,000	4,320,000	5,760,000	7,200,000	21,600,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**1,440,000**	**2,880,000**	**4,320,000**	**5,760,000**	**7,200,000**	**21,600,000**
OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS							
Support to Start up and Operational costs	**Assumptions**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTAL**
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	200,000	400,000	600,000	800,000	1,000,000	3,000,000
2. Farmer awareness, education and training (US$/Producer)	10	200,000	400,000	600,000	800,000	1,000,000	3,000,000
Sub-Total Start-up & Operating Expenses Support (US$)		**400,000**	**800,000**	**1,200,000**	**1,600,000**	**2,000,000**	**6,000,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**1,840,000**	**3,680,000**	**5,520,000**	**7,360,000**	**9,200,000**	**27,600,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**6,900**	**13,800**	**20,700**	**27,600**	**34,500**	**103,500**

Source: World Bank Group analysis.

While the financial projections are presented separately for the two SPDII programs—(i) micro-level, voluntary sales and (ii) large-scale government livelihoods protection cover—it is strongly recommended that both programs be implemented in conjunction with each other. Using the medium uptake projections for both programs, the total cost to GoU at year 5 for full-scale implementation would be about US$9.9 million (UGX 37.14 billion) per year. This is the case in Kenya where both types of livestock insurance cover are implemented in conjunction: voluntary sales of Index-Based Livestock Insurance (IBLI) cover started there in 2010, and in 2015 the Government of Kenya partnered with a pool of seven coinsurers to launch the Kenya Livestock Insurance Program (KLIP) as a fully funded livelihoods protection program for vulnerable pastoralists (World Bank 2015c). If both programs can be implemented together in Uganda, an objective over time could be to gradually phase out the livelihood protection program as pastoralists become aware of the program and gain trust in and experience with the product; it could then be replaced with purely voluntary sales of SPDII backed by partial premium subsidies. This would hopefully lead to a financially sustainable livestock pasture drought index insurance program for vulnerable pastoralists located in the cattle corridor of Uganda.

Total Fiscal Costs of TSU and Large-Scale Crop and Livestock Insurance Investment Opportunities in UAIS

The combined annual cost of GoU support to the formation of a TSU, the large-scale crop AYII, and the livestock SPDII programs (combining the above scenarios) is estimated at US$16.15 million (UGX 60.5 billion) by year 5, full scheme uptake. The total cost to GoU over five years is estimated at US$46.5 million (UGX 174.4 billion), comprising US$32.8 million for premium subsidies; US$12.8 million for subsidies for data strengthening and awareness creation, as well as program start-up and operating costs; and US$0.9 million for the TSU (table ES.5).

Table ES.5. Total Fiscal Costs of TSU and Large-Scale Agricultural Insurance Programs over Five Years for Medium Uptake Scenarios (US$ and UGX)

Program	Cost Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. Crop AYII	Premium Subsidies	468,750	937,500	1,875,000	2,812,500	3,750,000	9,843,750
	Data Strenghteninng and Operational Cost Subsidies	290,000	580,000	1,160,000	1,740,000	2,320,000	6,090,000
	Sub-Total Costs AYII (US$)	**758,750**	**1,517,500**	**3,035,000**	**4,552,500**	**6,070,000**	**15,933,750**
2. Livestock SPDII (Voluntary and Automatic)	Premium Subsidies	1,530,000	3,060,000	4,590,000	6,120,000	7,650,000	22,950,000
	Operational Cost Subsidies	450,000	900,000	1,350,000	1,800,000	2,250,000	6,750,000
	Sub-Total Costs SPDII (US$)	**1,980,000**	**3,960,000**	**5,940,000**	**7,920,000**	**9,900,000**	**29,700,000**
3. Technical Support Unit (TSU)	Annual staffing and operating costs	**190,000**	**160,000**	**165,000**	**170,000**	**175,000**	**860,000**
Total Costs	Premium Subsidies	1,998,750	3,997,500	6,465,000	8,932,500	11,400,000	32,793,750
	Data Strenghteninng and Operational Cost Subsidies	740,000	1,480,000	2,510,000	3,540,000	4,570,000	12,840,000
	TSU Annual Staffing and Operating budget	190,000	160,000	165,000	170,000	175,000	860,000
	Total Program Costs (US$)	**2,928,750**	**5,637,500**	**9,140,000**	**12,642,500**	**16,145,000**	**46,493,750**
	Total Program Costs (UGX Million)	10,983	21,141	34,275	47,409	60,544	174,352

Source: World Bank Group estimates.

Note: See annexes 4.1–4.3, 5.1–5.3 and 6.1–6.3 for more detail.

Agriculture Finance

Access to financial services, including payments, savings, credit, and insurance, is indispensable to transform the agriculture sector. Commercialization of the agriculture sector requires investment in various activities, starting from land preparation and accessing high-quality inputs to mechanization, storage, and processing. Financial services facilitate such investments by enabling farming households, producer organizations, and agribusinesses to save, borrow, and transfer funds and manage risks effectively.

Agriculture credit grew faster than the total private sector credit in recent years. In Uganda, the total credit to the agriculture sector, including marketing and processing, increased from UGX 301 billion (6.4% of the total private sector credit) in 2010 to UGX 1,654 billion (12.3%) in 2018. Various public support schemes contributed to the increase, especially long-term finance and loans for small farmers and small and medium enterprises (SMEs). The compound annual growth rate (CAGR) of agriculture credit during this period was 23.7%, while that of private sector credit was 14.0%. Within the agriculture sector, credit for processing recorded the fastest growth (CAGR of 33.0%) followed by farming (crops, livestock, and poultry) (27.6%).

However, the amount of financing, especially for smallholder farming and SMEs, is still inadequate compared to the potential demand. Formal credit to agriculture production stood at UGX 670 billion in 2018. This figure suggests that formal financing accounts for only 2.8% of agriculture gross domestic product, while it represents 13.3% of the overall economy. Only 10% of farm households had access to credit in the past five years, according to the Agriculture Census in 2008 (UBoS 2010a). The formal credit to processing and marketing seems to be expanding in the well-organized value chains, but only 6.3% of small-scale agribusiness companies have access to a loan or line of credit, as opposed to 44.1% in Kenya (Walker et al. 2018).

Public support schemes contributed to the recent surge of agriculture credit. However, their overall contribution is relatively small, and the unmet demand is still significant. The total annual loans facilitated by the Agricultural Credit Facility (ACF) and Agricultural Business Initiative (aBi) Finance[6] are estimated at UGX 130 billion, just 10% of the total agriculture loan disbursement in 2018 (UGX 1,315 billion). Even with the aBi guarantees, which cover loans of UGX 75 billion and Uganda Development Bank Limited loans of UGX 48 billion, the contribution to total loans remains relatively small. ACF's average loan size is quite large, at about UGX 640 million, indicating that it mainly targets larger capital investments by SMEs. On the other hand, aBi's average loan size of about UGX 2–4 million indicates that it mainly targets smallholders through the credit line and guarantees.

Recommendations:

Given the challenges that financial institutions face, especially in reaching smallholder farmers and SMEs, existing support schemes should be adjusted and scaled up to address critical bottlenecks.

1. **There is a need to scale up longer term wholesale financing** for on-lending to agribusiness companies, including small and medium enterprises (SMEs), and potentially to farmers and farmer organizations; currently available long-term wholesale financing is limited. The ACF is well positioned as the main supplier and could be further leveraged to scale up the needed financing. In addition to focusing on SMEs, the scheme could also play a significant role in smallholder financing, which is largely untapped.
2. **There is a need to further scale up partial credit guarantees that share risks with the partner financial institutions in agriculture lending.** The guarantees are widely used by financial institutions, especially for smallholder lending, where lack of physical assets for collateral is one of the major obstacles. As the recent evaluation of the existing guarantee scheme suggests, the scheme's capital would need to be increased to respond to the growing demand for smallholder and SME financing from existing and new partner institutions. This increase will offer additional security in lending to these borrowers and help unlock the liquidity in the financial institutions.
3. **Other public sector initiatives could be strengthened and scaled up,** including the warehouse receipt pilots led by the Uganda Warehouse Receipt System Authority as well as technical assistance and credit lines from the Microfinance Support Centre or other development finance institutions. Detailed assessments would be required to identify specific actions on these schemes. The draft Financial Sector Development Strategy and the Agriculture Finance Policy suggest that a review of other development finance

[6] ACF provides medium- and long-term financing to projects engaged in agriculture, focusing mainly on commercialization and value addition. aBi Finance provides lines of credit to financial institutions for on-lending to agribusinesses across the entire value chain, increasing access to financial services to smallholder farmers and agribusinesses.

institutions would be a useful step. Rationalization and enhancement of these institutions could be indispensable to achieve the private sector–led agriculture finance market envisioned in the draft policy.

While they are beyond the scope of this report, the demand-side interventions are equally important. Key interventions that require close collaboration with relevant stakeholders (such as the MAAIF) include enhancement of production, value chain development, access to high-quality inputs and market, promotion of climate-smart agriculture, and organization of farmers for aggregation and commercialization. These activities would make the sector more resilient and productive and create healthy demand for financial services, facilitated by the supply-side actions in a coordinated manner. There is also a need for increased collaboration and coordination with other development partners that are involved in related activities and projects.

Way Forward and Next Steps

The World Bank Group plans to disseminate this UAIS technical report and a separate policy note to GoU and other public and private stakeholders in 2019 and to discuss their findings and recommendations.


BECK'S

1. Background and Introduction to the World Bank Group Technical Study

1.1. Background

Importance of Agriculture in Uganda

Uganda is a low-income central east African country with a 2018 population of 43.02 million, a gross domestic product (GDP) of US$30.8 billion, and average annual per capita income of US$716.[7] Real GDP growth over the past five years has ranged from a low of 4.72% in 2014 to a high of 5.92% in 2018 (AXCO 2018).

About 70% of Uganda's population depends on agriculture as a means of employment or as a source of livelihood, consumption, and income. The bulk of the population (83.2%) is located in rural areas, and the remainder (16.8%) is urban based. Most rural people depend on crop and livestock production for their livelihoods, with smaller numbers involved in forestry and fishing. Agriculture is the largest source of employment in Uganda, accounting for about 8 million people or approximately 60% of the labor force.

Agriculture is a major contributor to Uganda's economy, providing about 24.6% of GDP in 2015 and 50% of Uganda's export earnings. The good conditions (soil, topography, and climate) support a wide range of food crops, especially in the subsistence sector, which accounts for approximately 50% of total production. The main food crops are plantain bananas, cassava, sweet potatoes, millet, maize, beans, sorghum, groundnuts, and sesame. The major cash crops are tea, accounting for 35.5% of exports in 2015; coffee, accounting for 21%; fish, accounting for 19.7%; and cotton, accounting for 7.6% (AXCO 2018).

The majority of Uganda's farmers are smallholder subsistence farmers owning less than 5 ha of land. According to the Uganda National Household Survey 2016/17, 47.3% of rural people are involved in subsistence agriculture; among households headed by subsistence farmers, the percentage of poor increased from 20.3% to 38.2% between the 2012/13 and 2016/17 surveys. Moreover, between these two survey periods, poverty increased from 23% to 36% among those reporting crop farming/subsistence farming as their main source of income (UBoS 2017).

[7] This report uses an exchange rate of US$1.00 = UGX 3,750.

Climatic and Other Risk Exposures Faced by Ugandan Farmers

The agricultural sector in Uganda is very exposed to natural, climatic, and biological shocks. The main perils affecting agriculture include **droughts,** which result in decreased crop production and yields over wide areas, and which lead to death of cattle and other livestock due to lack of drinking water, starvation, and diseases; **floods,** which cause loss of or damage to crops and livestock; and **pests and diseases,** which can cause widespread loss of crops and animal deaths. Localized perils such as landslide, hail, windstorm, and excess rain can also cause major damage to crops, especially at the time of harvest.

In Uganda, climate change is leading to higher uncertainty and increased vulnerability in the agricultural sector. Climate change is likely to increase average temperatures in Uganda up to 1.5°C by 2030 and 4.3°C by 2080. Rainfall variability and rising temperatures are expected to lead to higher incidences of drought and water scarcity.[8]

Access to Financial Services

Access to financial services—including payments, savings, credit, and insurance—is indispensable for transforming the agriculture sector. Commercialization of the sector requires investment in various activities, including land preparation, accessing high-quality inputs, mechanization, storage, and processing. Financial services facilitate such investments by enabling farming households, producer organizations, and agribusinesses to save, borrow, transfer funds, and manage risks effectively.

Financial exclusion in rural areas and among smallholder farmers remains significantly high. In rural areas about 25% of adults are excluded, compared to only 14% in urban areas. Within the rural population, smallholder households have less access to financial services than others. Only 10% of smallholder farmers in Uganda have bank accounts. To buy agriculture inputs, just 7% have access to credit that allows later payment (Anderson, Learch, and Gardener 2016).

The agriculture credit grew faster than the total private sector credit in recent years. The total credit to the agriculture sector, including marketing and processing, increased from UGX 301 billion (6.4% of the total private sector credit) in 2010 to UGX 1,654 billion (12.3%) in 2018. Various public support schemes contributed to the increase, especially long-term finance and loans for small farmers and small and medium enterprises (SMEs). The compound annual growth rate (CAGR) of agriculture credit during this period was 23.7%, while that of the private sector credit was 14.0%. Within the agriculture sector, credit for processing recorded the fastest growth (CAGR of 33.0%) followed by farming (crops, livestock, and poultry) (27.6%).

However, the amount of financing, especially for smallholder farming and SMEs, is still inadequate compared to the potential demand. Formal credit to agriculture production stood at UGX 670 billion in 2018. This figure suggests that formal financing accounts for only 2.8% of agricultural GDP, while it represents 13.3% of the overall economy.[9] Only 10% of farm households had access to credit in the past five years, according to the Agriculture Census in 2008 (UBoS 2010a). The formal credit to processing and marketing seems to be expanding in the well-organized value chains, but only 6.3% of small-scale agribusiness companies have access to a loan or line of credit, as opposed to 44.1% in Kenya (Walker et al. 2018).

Agricultural Insurance Provision in Uganda: Uganda Agricultural Insurance Scheme

Uganda does not have a tradition of providing agricultural insurance. Historically, the insurance sector in Uganda did not develop agricultural insurance products and services that were suited to the needs of the very large numbers of small-scale semi-subsistence farmers. Rather, some commercial farmers and agribusinesses purchased facultative tailor-made policies—such as greenhouse insurance for high-value export flowers and

[8] Global Facility for Disaster Risk Reduction and Recovery, "Uganda," https://www.gfdrr.org/en/uganda.
[9] Formal finance is defined as loans disbursed by commercial banks, credit institutions, and microfinance deposit-taking institutions.

horticultural crops, and all-risk livestock insurance for large dairy cattle enterprises—from the London and European reinsurance markets, which were fronted by local insurers.

Over the past decade, there have been several pilot initiatives in Uganda to introduce Crop Weather Index Insurance (WII) for small-scale cereal farmers as well as livestock insurance. During this period several leading insurers, such as Jubilee and UAP, attempted to introduce WII against rainfall deficit (drought), but these pilots experienced severe basis risk and were not a success.

In order to promote the development of a sustainable agricultural insurance market, in 2016, the Government of Uganda (GoU) launched the Uganda Agricultural Insurance Scheme (UAIS) under a public-private partnership (PPP) with a consortium of leading private commercial insurers. GoU agreed to provide UGX 5 billion annually in financial support for premium subsidies over a five-year pilot implementation period (2016 to 2020). The UAIS is underwritten by a consortium of 11 Ugandan leading private commercial insurers termed the Agriculture Insurance Consortium (AIC). The Uganda Insurers Association (UIA) has been appointed to manage scheme implementation on behalf of the AIC.[10] The AIC insurance companies have formed an Agro Consortium Secretariat (ACR) to market and promote and underwrite and adjust claims on the UAIS on their behalf.

GoU has several objectives for agricultural insurance: (i) increase small farmers' access to production credit (crop and livestock loans), which is seen as a key to raising farm-level productivity and incomes; (ii) contribute to food security by smoothing consumption and incomes; and (iii) contribute toward increased export earnings of key commodities such as coffee, tea, etc.

GoU is funding premium subsidies to make insurance accessible and affordable to the majority of very small farmers in the country with the goal of achieving maximum uptake and penetration of agricultural insurance over the next five years. In the 18-month period from January 1, 2017, to June 30, 2018, about 50,000 crop, livestock, poultry, and aquaculture policies were issued by the AIC. Uganda has at least 3.95 million farm households,[11] 96% of whom own or cultivate less than 5.0 ha of land. Going forward, the Ministry of Finance, Planning and Economic Development (MoFPED) hopes that the UAIS uptake can be significantly increased. The ministry is also keen to discover whether small-scale farmers are being reached by the scheme and whether they are benefiting from it.

1.2. GoU Request to World Bank Group for Technical Assistance

In March 2018, MoFPED formally requested technical assistance from the World Bank Group (WBG) to conduct a technical and diagnostic review of the UAIS and to provide recommendations to enhance the scalability and sustainability of the scheme going forward.[12] The WBG has international experience in the planning, design, and implementation of large-scale PPPs for agricultural insurance in Africa, Asia, and Latin America. On this basis MoFPED requested that the WBG conduct an in-depth review of the UAIS, focusing on the technical soundness of its crop and livestock insurance products and services, the adequacy of the UAIS institutional and operational systems and procedures, the adequacy of the scheme's financial performance, and the identification of any gaps, in order to provide recommendations for strengthening scheme design and implementation. In turn, the review would identify new crop and livestock insurance products and programs

[10] The UAIS is underpinned by a Memorandum of Understanding (MOU) signed between the Government of Uganda represented by MoFPED, the Bank of Uganda (BoU), the Insurance Regulatory Authority (IRA) of Uganda, and the Uganda Insurers Association acting on behalf of the Agro Insurance Consortium (also referred to in the MOU as the Agro Consortium).
[11] According to the Uganda Census of Agriculture 2008/09, there were 3.95 million agricultural households in the country; male-headed agricultural households outnumbered female-headed agricultural households. The census also revealed that 19.3 million persons were living in agricultural households, of whom 50.5% were males and 49.5% were females; that the national average agricultural household size was 5.3 members; and that male-headed agricultural households had an average of 5.6 members, compared to female-headed agricultural households with 4.2 members (UBoS 2012).
[12] MoFPED Letter No. MEP 456/179/10, March 18, 2018.

that could be introduced under the UAIS in the future and that would contribute toward the GoU's goals of achieving scalability and financial sustainability for the UAIS.

Despite the government's strong commitment to agriculture transformation, several binding challenges limit the sector's potential to contribute to economic growth and poverty reduction: (i) the share of farms with less than 2 ha has increased, from 75% in 2006 to 83% in 2016; (ii) agriculture production is largely rain fed, with only 1.2% under irrigation coverage, and is thus highly exposed to climate shocks; (iii) low-quality agricultural inputs disrupt productive activities; (iv) access to finance is still extremely limited despite the recent expansion of digital financial services; and (v) the linkages with markets and other value chain actors such as processors remain weak except in the case of several cash crops.

In this context, the MoFPED positions its recent efforts to expand agriculture finance and insurance within a broader agriculture transformation agenda. Thus the request for technical assistance from the World Bank on the Uganda Agriculture Insurance Scheme was expanded to include agriculture finance. The agriculture transformation requires concerted efforts in different areas by several ministries: on rural infrastructure, organizing of farmers, and enhancement of production yield by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF); on market linkages and value addition by the Ministry of Industries; and on agriculture finance and insurance by the MoFPED. This expansion of scope was agreed with MoFPED, and the World Bank conducted a rapid assessment of Uganda's agriculture finance landscape that will support the recommendations made in this technical report.

In order to carry out the technical review of the UAIS, a WBG team of agricultural insurance specialists conducted three mission visits to Uganda in 2018. During these visits, meetings were held with key public and private sector stakeholders involved in the design and implementation of UAIS; the goal was to collect data and information to enable an assessment and analysis of UAIS's products, programs, coverage, and performance.

The agreed outputs from the 2018 WBG technical assistance include (i) a technical report identifying the issues and challenges facing UAIS and future options for scaling up the scheme, and (ii) a policy note providing options for GoU to consider for future investment in agricultural insurance.

1.3. Technical Report Scope and Outline

This technical report presents the key findings and recommendations of the World Bank Group diagnostic review of the UAIS and also presents options for introducing large-scale crop and livestock insurance programs into Uganda for GoU to consider. A rapid assessment of public support schemes for agriculture finance is also included.

The report consists of seven chapters including this introduction. Chapter 2 offers an overview of crop and livestock production in Uganda, along with an assessment of the main risk exposures that impact agriculture. Chapter 3 presents a review of the issues, challenges, and opportunities relating to agriculture finance. Chapter 4 presents a review of the insurance market and the current risk management and risk transfer options for the rural and farming community, including agricultural insurance markets and government natural disaster relief programs. Chapter 5 presents a situation and gap analysis of the technical, institutional, and operational features of the UAIS and the issues and challenges facing this scheme. Chapters 6 and 7 respectively, present options and budgeted proposals for the design and implementation of large-scale crop and livestock insurance programs, which GoU could consider introducing into Uganda as part of the scale-up of the UAIS.

This technical report should be read in conjunction with a separate policy note on agricultural insurance in Uganda that was also prepared by the WBG team in early 2019.

2. Agricultural Production in Uganda and Challenges for Agricultural Insurance

2.1. Importance of Agriculture in the Economy

The agriculture sector is a key pillar of the Ugandan economy. Agriculture accounts for nearly 25% of gross domestic product (GDP) (2015 estimate) and 54% of the value of exports (in 2014) (AXCO 2018). Exports of agricultural goods represent about 20% of the country's total foreign exchange earnings from exports of goods and services (Walker et al. 2018). The agricultural sector in Uganda includes food crops, cash crops, floriculture, livestock, forestry, and fisheries. The major traditional agricultural export products include coffee, cotton, sugar, and tobacco, while nontraditional exports include rice, maize, flowers, fruits, and vegetables (PARM 2015).

Around three out of four Ugandans still reside in rural areas, and agriculture employs over 70% of the labor force. An estimated 87% of the working poor are primarily engaged in agricultural activities. Therefore, increasing the productivity and commercialization of the sector would be a critical driver of poverty reduction.

Despite the importance of agriculture to the economy, the growth of the agricultural sector (at 1.5% in FY2013/14) is still much below the National Development Plan annual growth target of 5.6% and the 5.9% growth rate that is required for effective poverty reduction. The low growth rate can be attributed to weather hazards, economic downturns, limited availability of improved inputs, diversion of investment into the industrial sector, and/or insurgencies in neighboring countries (PARM 2015).

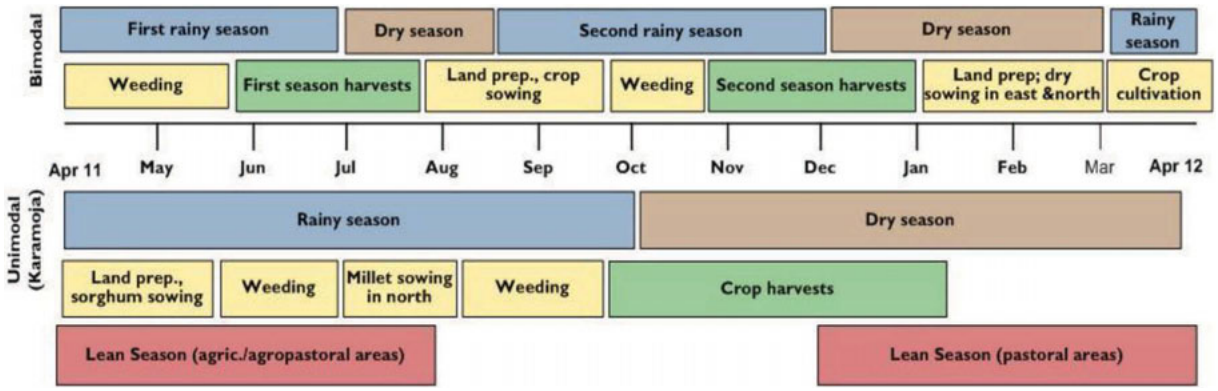
2.2. Climate, Seasons, and Agroclimatic Regions

Uganda has an area of 241,550.7 km^2, of which 18.2% is open water and swamps, and 81.8% is land. The altitude above sea level ranges from 620 m (Albert Nile) to 5,111 m (Mt. Rwenzori peak). A total of 42% of the available land is arable, although only 21% is currently utilized, mostly in the southern part of the country.

Most of Uganda experiences a subtropical climate with a bimodal rainfall distribution that permits two cropping seasons. The first rainy season runs from March to June, while the second season runs from September to December (figure 2.1). Annual average rainfall typically varies from 1,200 mm to 1,500 mm per year but varies by region: in Ntoroko in the west, annual average rainfall is 979 mm, rising to 1,102 mm; in Isingiro in the far south, annual average rainfall is only 871 mm (figure 2.2). The bimodal rainfall distribution and moderate temperature ranges in the southern parts of Uganda are favorable for the production of coffee, bananas, beans, and vegetables (PARM 2015).

Figure 2.1. Uganda Bimodal and Unimodal Crop Calendars

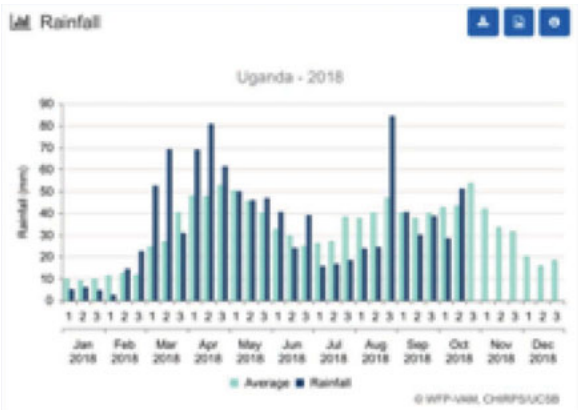
Seasonal calendar and critical events



Source: USAID and FEWS NET 2011.

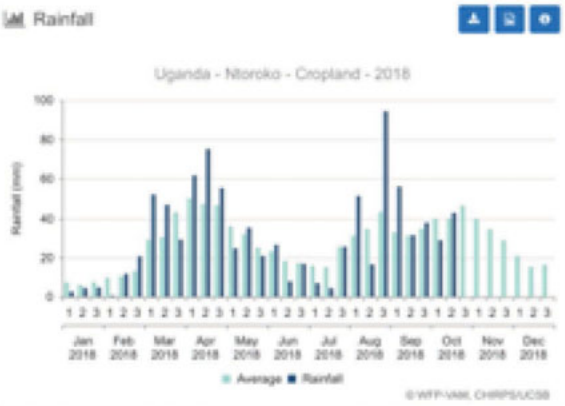
Figure 2.2. Bimodal Rainfall in Central, Eastern, Western, and Southern Uganda with Two Cropping Seasons (March–July and Sept.–Dec.)

a) Uganda

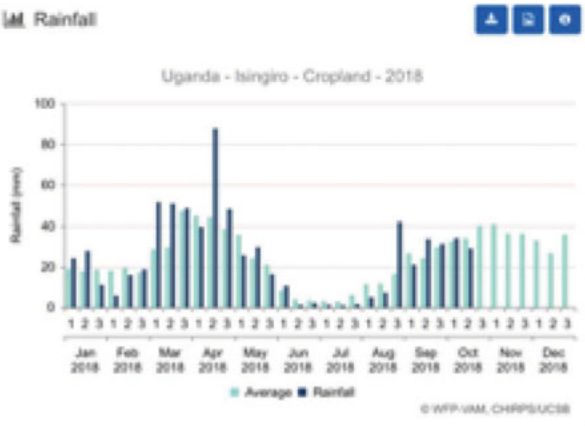


c) Ntoroko, Western Region

b) Tororo, Eastern Region



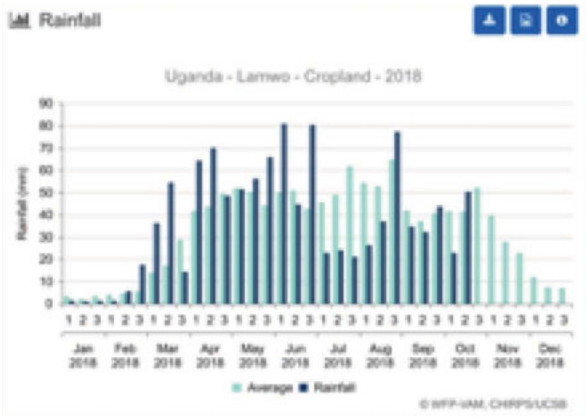
d) Isingoro, Southern Region



Source: World Food Programme–Vulnerability Analysis Mapping, WFP-VAM Data Visualization Platform, dataviz.vam.wfp.org.

Figure 2.3. Unimodal Rainfall Patterns in Northern Uganda with Single Cropping Season (March to September)

a) Lamwo, Northern Region



b) Kabong, Northern Region

Source: World Food Programme–Vulnerability Analysis Mapping, WFP-VAM Data Visualization Platform, dataviz.vam.wfp.org (accessed on January 5, 2019).

The northern parts of Uganda have higher average temperatures and a unimodal rainfall pattern, and thus are more restricted in the range of crops that can be grown. There is a single cropping season that runs from March to September: the main crops include cereals and oilseeds, and the area also engages in extensive livestock production. Average annual rainfall varies from 1,085 mm in Kamwu to a low of 738 mm in Kaabong (Karamoja), which is a semi-arid zone (figure 2.3).

Uganda is highly influenced by climate change. According to PARM (2015), climate change is affecting the timing and distribution of rainfall during the rainy seasons; the onset and cessation of rains have become increasingly erratic, heavier, and more violent. Climate change models for Uganda from the Intergovernmental Panel on Climate Change (IPCC) point to an increase in temperature of between 0.7°C and 1.5°C by the year 2020. The same models predict a likely increase in the variability of rainfall, with most areas probably getting higher rainfall. Vulnerability assessments for Uganda identify precipitation as the most important climate change–related variable (PARM 2015 citing NEMA 2008). In Uganda, the impacts of climate change create challenges and impose severe losses and hardships on the poorest communities, as their livelihoods are likely to be especially sensitive to climatic risks and variability (World Bank Group 2015b).

Farming Systems

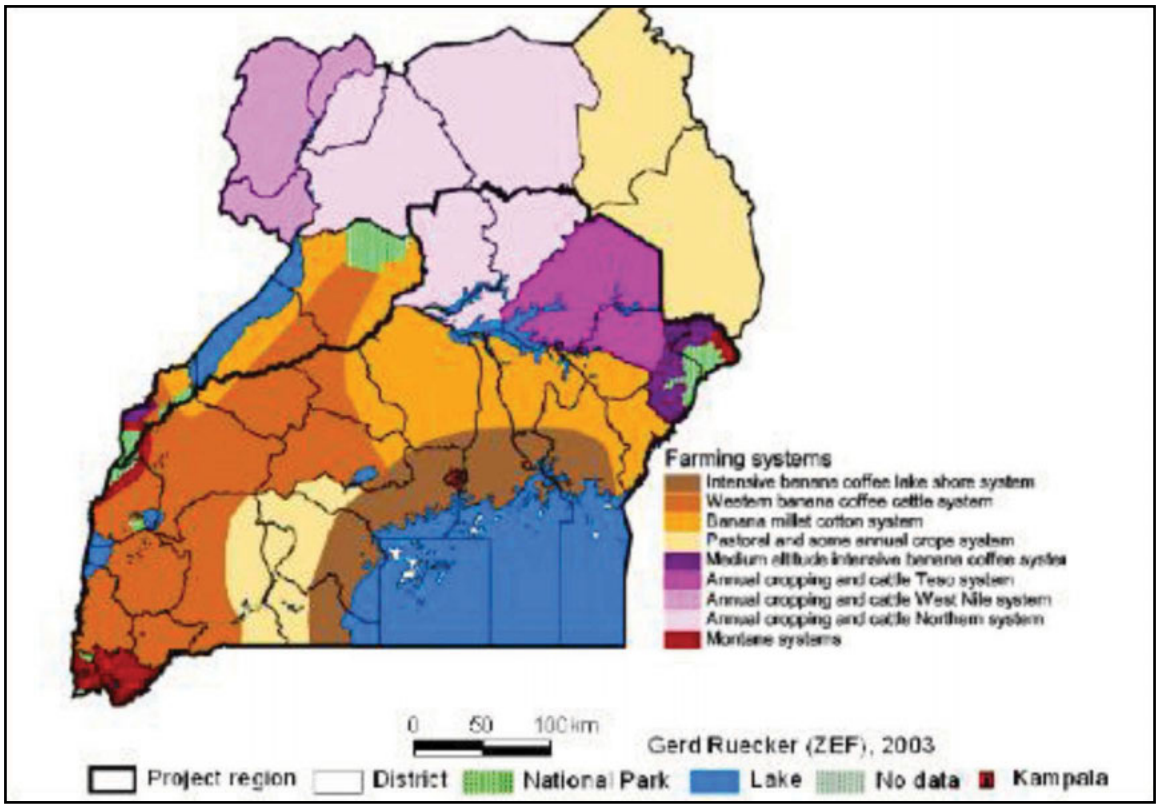
The farming systems of Uganda vary according to climatic and soil conditions, cultural practices, and other factors. The nine major farming systems are shown in figure 2.4 and include (i) intensive banana-coffee lakeshore system, (ii) medium altitude intensive banana (food)-coffee system, (iii) western banana (food)-coffee-cattle system, (iv) banana (food)-millet-cotton system, (v) annual cropping and cattle Teso system, (vi) annual cropping and cattle West Nile system, (vii) annual cropping and cattle Northern system, (viii) pastoral and some annual crops system, and (ix) montane systems (PARM 2015).

2.3. Farm Size Distribution and Types of Farmer

According to the most recent Agriculture Census (2008/09), Uganda has a total of 3.95 million agricultural households (AgHHs) with very small average farm size of only 1.1 ha (or 2.72 acres) per AgHH (UBoS 2010b).[13] Farm size varies from a low of 0.8 ha (1.98 acres) in the Western region to a high of 1.6 ha (3.95 acres)

[13] In a separate study, Zorya et al. (2012) report a larger average farm size of 1.98 ha/household (4.9 acres/household).

Figure 2.4. Farming Systems of Uganda



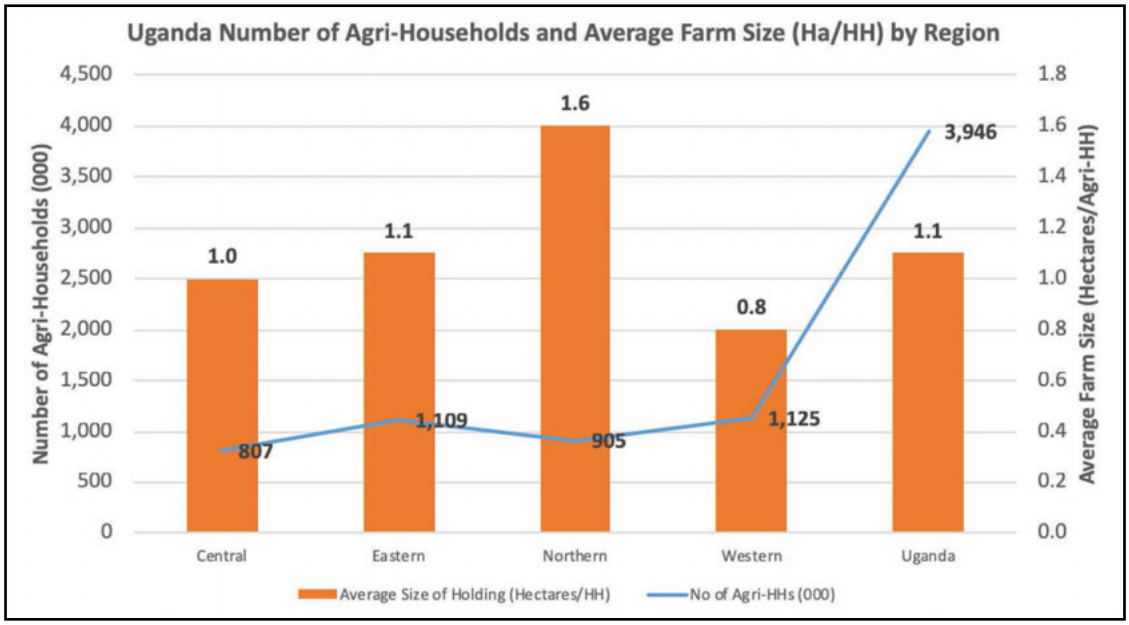
Source: PARM 2015 citing Ruecker et al. 2003.

in the Eastern region. About 20% of the 3.95 million AgHHs are headed by female farmers. The largest number of AgHHs—1.1 million (28.5% of total)—are located in the Western region; the smallest number—0.8 million AgHHs (or 21% of total)—are located in the Central region (figure 2.5) (UBoS 2010b).

In Uganda most farmers are very small producers, and 96% of all farms are less than 5 ha (12.5 acres) in size. Small farmers owning or cultivating less than 1 ha (2.5 acres) account for 58% of all farmers; medium farmers with up to 5.0 ha (12.5 acres) account for a further 38% of all farms; and only 4% of farmers own more than 5.0 ha (12.5 acres) (table 2.1).

In Uganda, land is in various tenure systems, namely customary (68.8%), mailo (9.2%), freehold (18.6%), and leasehold (3.6%) (PARM 2015). Customary tenure is the most common system in Uganda, accounting for more than two-thirds of all land ownership. Under this system, access to land is governed by the rules of the community. It is a secure tenure but does not offer formal land titles. Mailo tenure is a quasi-freehold tenure system that is most common in Central Uganda. Freehold tenure is a system in which owners have titles with unrestricted and permanent access to their land. Leasing/tenancy agreements are not very common in Uganda. Four out of five Ugandan farmers do not have formal freehold title to their land; this constraint limits farmers' access to credit because they cannot offer collateral in the form of a land title.

Figure 2.5. Agricultural Holdings by Region: Number and Size of Households



Source: UBoS 2010b.

Table 2.1. Farm Size Distribution by Agro-Ecological Zone in Uganda (percentage)

Agro-Ecological Zones	Small (up to 1 ha) (%)	Medium (up to 5 ha) (%)	Large (more than 5 ha) (%)	No. Observations
Eastern Highlands	53	43	3	1,689
Karamojo Drylands	73	25	2	76
Lake Albert Crescent	51	44	4	655
Lake Victorias Crescent	66	30	3	609
Mid-Northern	62	35	2	312
Southern Drylands	56	38	5	669
Southern Highlands	55	40	4	375
West Nile	66	30	4	576
Western Highlands	63	34	3	406
National	**58**	**38**	**4**	**5,367**

Source: Zorya et al. 2012, based on Uganda National Household Survey III data (2005/06).

2.4. Crop and Livestock Production

The quality of data on agricultural crop and livestock production in Uganda is very weak, as data are not collected routinely on a seasonal or annual basis. There is one exception to this rule: the Census of Agriculture 2008/09 conducted by the Uganda Bureau of Statistics (UBoS 2010a, 2010b), which provides extremely high-quality and useful data on farmer household characteristics; farmers' access to factors of production (such as credit and inputs); and their cropped area, production, and average yields at regional and district levels for all major crops. Similar high-quality data are available from the 2008 National Livestock Census, which was conducted by UBoS and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF and UBoS 2009). Although now 10 years out of date, this census contains much useful information to guide policy and planning on UAIS. This subsection presents salient features of crop and livestock production in Uganda.

Food Crop Production

The major food crops grown by most smallholder farmers in Uganda include maize, cassava, bananas (food), beans, and sweet potatoes. Maize is the most important food crop, accounting for slightly over 1 million ha in 2008/09, or 19.5% of cultivated food crop area, followed by cassava (871,387 ha, 17.7% of area), bananas (806,630 ha, 15.5% of area), beans (617,521 ha, 11.9% of area), and sweet potatoes (440,256 ha, 8.5% of area). Other important food crops include sorghum, groundnut, finger millet, and simsim. Nontraditional crops such as rice and soya beans are still grown on a very small scale (table 2.2). Further information is provided for the top-five crops by season in annex 1).

Table 2.2. Uganda Cultivated Area, Production, and Average Yields for Major Food Crops, 2008/09

Crop	Total area (hectares)	% of Area	Production (MT)	Average yield (MT/ha)
Maize	1,014,260	19.5%	2,361,956	2.33
Cassava	871,387	16.7%	2,894,309	3.32
Banana (food)	806,630	15.5%	4,017,986	4.98
Beans	617,521	11.9%	929,274	1.50
Sweet potatoes	440,256	8.5%	1,818,769	4.13
Sorghum	399,255	7.7%	375,794	0.94
Groundnuts	345,234	6.6%	244,688	0.71
Finger millet	249,990	4.8%	276,935	1.11
Simsim	175,599	3.4%	101,027	0.58
Banana (beer)	86,128	1.7%	242,843	2.82
Rice	75,088	1.4%	190,738	2.54
Field peas	43,835	0.8%	16,454	0.38
Soya beans	36,448	0.7%	23,610	0.65
Cow peas	23,818	0.5%	11,056	0.46
Banana (sweet)	23,124	0.4%	36,520	1.58
Total	**5,208,573**	**100.0%**		

Source: UBoS 2010b.

Note: The crop production figures shown cover the agricultural year 2008/09 and include both the second season of 2008 (September to December) and the first season of 2009 (March to August).

Maize, the most important crop, is grown by 1.83 million Ugandan farmers, or 46% of the total 3.65 million AgHHs. The major maize-producing region is the Eastern region, with a total cultivated area of 388,762 ha, or 38% of total cultivated maize area, in 2008/09. The first season is the most important season for maize, accounting for 54% of total sown area (annex 1).

Beans, the second most important crop, are grown by 1.6 million farmers (42% of total AgHHs), followed by bananas (food) (35% of AgHHs), cassava (29% of AgHHs), and sweet potatoes (29% of AgHHs). The Western region is the most important area for growing beans, with total cultivated area in 2008/09 of 241,915 ha (39% of total bean area). Banana (food) production is also concentrated in the Western region (accounting for 458,312 ha, or 57% of total banana area), followed by the Central region (35% of area). Conversely, banana (food) production is very low in the Eastern region (7% of total banana area) and especially in the Northern region (1% of area). The Eastern region is the most important cassava-producing region in Uganda, with cultivated area of 342,387 ha (39% of total cassava area), and it is also the main region for sweet potatoes (accounting for 36% of total sweet potato area in 2008/09). The second season is the main growing season for beans, cassava, and sweet potato (annex 1).

Given the very small size of farms in Uganda—the average area is only 1.1 ha—and the practice of mixed farming, the average annual cultivated area of the major food crops is small. In 2008/09, the average cultivated area per AgHH was 0.28 ha for maize, 0.22 ha for beans, 0.29 ha for bananas (food), 0.42 ha for cassava, and 0.21 ha for sweet potato. The cultivated area of maize varies from a low average of 0.22 ha per AgHH in the Western region, to a high average of 0.35 ha per AgHH in the Northern region (see annex 1 for further details).

Food Crop Production and Yields

The most recent data on national crop production and yields are from the 2008/09 Census of Agriculture. Average annual (first- and second-season) yields for rain-fed maize were 2.33 MT/ha, but with considerable variation between an average of 2.85 MT/ha in the Eastern region and only 1.23 MT/ha in the Northern region. In the case of rice (both upland and irrigated rice, the national average was 2.54 MT/ha, but again with major regional variation, from a maximum of 3.56 MT/ha in the Eastern region to a low of only 0.82 MT/ha in the Central region. Average yields for beans were 1.5 MT/ha, with the highest average yields in the Northern and Western regions (1.71 MT/ha and 1.70 Mt/ha respectively) and the lowest yields in the Eastern region (0.91 MT/ha). Average yields for bananas (food), cassava, and sweet potatoes are more stable across regions (table 2.3).

Table 2.3. Average Annual Yields for Major Food Crops by Region, 2008/09 (MT/ha)

Crop	Central	Eastern	Northern	Western	Uganda
Maize	2.38	2.85	1.23	2.64	2.33
Beans	1.38	0.91	1.71	1.70	1.50
Banana(food)	3.28	5.58	5.14	5.95	4.98
Cassava	3.21	3.10	3.64	3.35	3.32
Sweet Potato	3.19	5.30	4.84	3.01	4.13
Rice	0.82	3.56	1.69	1.59	2.54

Source: UBoS 2010b.

Farm-level crop yields in Uganda are low and well below potential yield levels. The Platform for Agricultural Risk Management (PARM) reports that current yields for maize, millet, rice, and sorghum are only 20% to 33% of the potential yield for rain-fed agriculture and even less for irrigated agriculture. The main explanations for low crop yields include (i) the lack of commercially available high-quality improved seeds, meaning that 90% of farmers have to resort to home-saved seeds; and (ii) farmers' scant use of improved inputs such as fertilizers, plant protection chemicals, herbicides, etc. (PARM 2015).

There is very little available information on crop yield tendencies over the past 10 to 20 years in Uganda, and the available data are sometimes inconsistent. Table 2.4. reports available time series yields for maize and beans for three time periods from 1999/2000 to 2008/2009. The data suggest that in the four years from 2004/05 to 2008/09, national average maize yields increased by 62% and bean yields increased by 169%, which is implausible even with improved hybrid seed and fertilizer technology.

The above evidence suggests that collection of data on crop area, production, and yield must be strengthened. An initial starting point under UAIS would be for public and private stakeholders to collect and collate data under a single national Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) database. With a focus on historical time series crop production and yield data from the MAAIF districts and subdistrict field offices, the goal should be to construct time series yields for the past 10 to 15 years. Going forward, systematic seasonal surveys will be required at local (e.g., parish), subdistrict, and district levels to collect and report data on crop area, production, and yield at each level. (See section 6.3 for further discussion of efforts to strengthen yield data collection under the Agriculture Cluster Development Project, ACDP).

Table 2.4. Comparison of Crop Yield Estimates from Different Sources and Time Periods

Year	Maize yield (kg/ha)		Bean yield (kg/ha)	
	UNHS	National Accounts; FAOSTAT 1999/00 and 2004/05; Census of Agriculture 2008/09	UNHS	National Accounts; FAOSTAT 1999/00 and 2004/05; Census of Agriculture 2008/09
1999/00	1,234	1,732	752	599
2004/05	1,677	1,440	887	560
% change	36%	–17%	18%	–7%
2008/09		2,329		1,505
% change		62%		169%

Source: Zorya et al. 2012 (for 1999/00 and 2004/05 yields); UBoS 2010b (for 2008/09 yields).

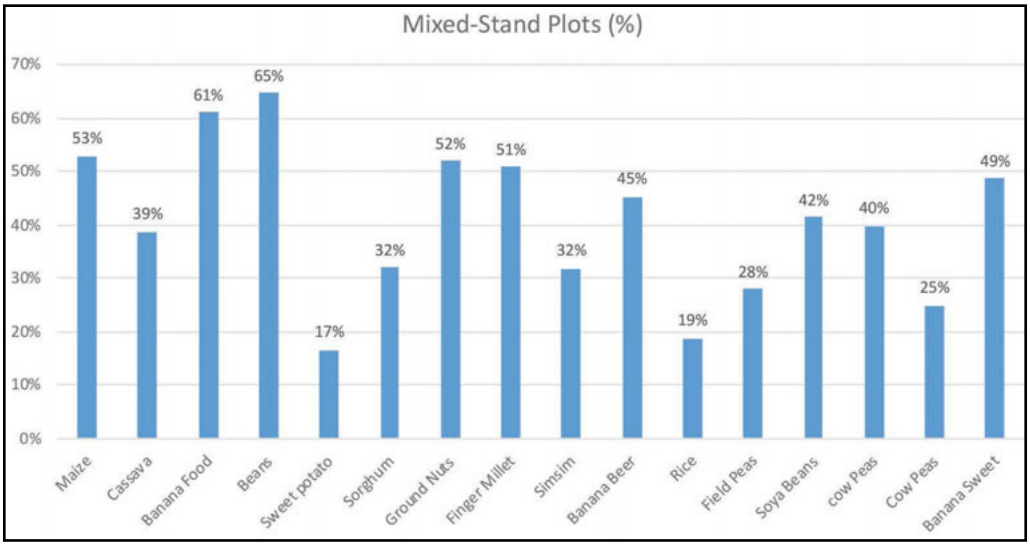
Note: UNHS = Uganda National Household Survey.

It is important to stress that the strengthening of agricultural data and statistics in Uganda will be beneficial for a whole series of public and private end users. It will help insurers design and implement agricultural insurance schemes, but it will also allow financial institutions to better understand the agricultural sector, which will lead to improved access to financial services. In addition, it will help governments at all levels—local, regional, and national—plan and budget for agricultural development, for fiscal (taxation), and for strategic planning for food commodity imports and exports.

Mixed Cropping (Intercropping)

In Uganda, mixed cropping is a very common practice for smallholder farmers, who grow two, three, or more crops in the same plot of land with staggered planting and harvest dates. Figure 2.6 shows that for major staple food crops, mixed cropping is prevalent: for beans 65% of plots are mixed; for bananas (food), 61% are mixed, and for maize, 53% of plots are mixed with one or more other crops.

Figure 2.6. Mixed Cropping in Uganda, 2008/09 (percentage of total plots with mixed crops)



Source: UBoS 2010b.

Note: See annex 2 for further details.

Mixed cropping (also termed intercropping) is common among smallholder farmers under rain-fed agriculture throughout semi-arid parts of Africa and in the tropics. One of the earliest studies in low rainfall areas of northern Nigeria showed that mixed cropping compared to single-stand monocropping was a rational strategy both in terms of profit maximization and risk minimization: while single-stand crops suffered total failure in a severe drought, some parts of mixed crops could be harvested (Norman 1974). But other comparative studies—from India, Tanzania, and El Salvador—found that intercropping per se did not appear to contribute much to yield stability (Walker and Jodha 1982). In Uganda, Asten et al. (2011) compared monocropped and intercropped farms in the Mount Eldon region (bananas and arabica coffee) and in the southwest (bananas and robusta coffee). The authors found that although arabica and robusta coffee yields did not differ between monocrops and intercrops, banana yields were significantly higher when intercropped with arabica, but were lower when mixed with robusta. They concluded that intercropping is agronomically and economically more beneficial that monocropping of these two crops.

Mixed cropping raises specific issues and challenges for both traditional indemnity-based crop insurance and for new Weather Index Insurance (WII) programs. In the case of Multi-Peril Crop Insurance (MPCI), the challenge is to establish time series yields for each intercrop, since insurers generally insure only sole-stand crops under an MPCI cover. For designers of WII, it is very difficult to design a rainfall deficit and/or excess rainfall cover for mixed crops with different planting dates, maturity dates, and water requirements. (See sections 5.2 and 5.3 for further discussion).

Cash Crops

Agricultural products make up nearly all of Uganda's foreign exchange earnings and contribute to more than half of its formal export earnings, although this latter percentage has gone down between 2005, when it was 61%, and 2014, when it was 54% (PARM 2015).

Uganda is an important producer and exporter of traditional cash crops, including coffee, tea, cotton, and tobacco. In 2013 coffee exports contributed 27.5% of total formal export earnings, closely followed by exports of tobacco, tea, and cotton (PARM 2015).

Uganda produces both arabica and robusta coffee. According to the 2008/09 Agriculture Census, the national production of arabica (old) was 89,000 MT, grown on 62,000 ha (average yield 1.4 MT/ha); the Eastern region contributed 61% of total production, followed by the Western region with 32% of production. Arabica production is negligible in the Central and Northern regions (<6% of production). The national production of robusta (old) coffee was 115,000 MT grown on 110,000 ha (average yield 1.4 MT/ha), with 51% of production located in the Central region, followed by the Western region with 33% of production. In 2008/09 there were smaller areas of arabica (new) coffee (8,400 MT grown on 4,600 ha, with higher average annual yield of 1.8 MT/ha). In addition, robusta clonal coffee was cultivated (33,000 MT were grown on 18,000 ha, leading to an average yield 1.8 MT/ha) (UBoS 2010b).

Livestock Production

Livestock production is very important in Uganda. According to the 2008 National Livestock Census, about 4.5 million households in Uganda (71% of total households) raise some form of livestock or poultry. Overall, 18.2% of households own cattle, 39.2% own goats, 9.0% own sheep, and 50.1% own poultry (chicken) (table 2.5). There are, however, major regional differences in livestock ownership: 18% of households in the Central and Western regions own cattle, compared to 50% of households in Karamoja, which is a very important livestock-raising subregion. In the Central region, 21% of households own goats and only 4% own sheep, while in the Karamoja subregion, 54% of households own goats and 46% own sheep (table 2.5) (MAAIF and UBoS 2009).

The size of landholding and number of livestock owned by Ugandan households tends to be very small, and most livestock production is subsistence-based. According to the 2008 National Livestock Census, the average size of landholding (excluding communal landholdings for livestock rearing) is only 2.2 ha, and only

Table 2.5. Livestock and Poultry Ownership in Uganda by Region

Region	Cattle		Goats		Sheep		Pigs		Poultry (chicken)	
	No. HHs owning (000)	% of HHs owning	No. HHs owning (000)	% of HHs owning	No. HHs owning (000)	% of HHs owning	No. HHs owning (000)	% of HHs owning	No. HHs owning (000)	% of HHs owning
Central	339.2	18.2%	401.9	21.5%	81.7	4.4%	436.4	23.4%	697.0	37.4%
Eastern	630.0	39.1%	739.2	45.9%	107.3	6.7%	262.4	16.3%	977.0	60.7%
Northern	298.0	26.4%	531.0	47.0%	129.7	11.5%	105.1	9.3%	651.8	57.6%
Western	287.5	18.4%	716.0	45.7%	160.0	10.2%	321.7	20.6%	761.5	48.6%
Karamoja sub-region	108.5	53.6%	108.8	53.7%	93.0	46.0%	9.6	4.7%	107.0	52.9%
UGANDA	**1,663.2**	**18.2%**	**2,496.8**	**39.2%**	**571.7**	**9.0%**	**1,135.1**	**17.8%**	**3,194.2**	**50.1%**

Source: MAAIF and UBoS 2009.

2.4% of households have planted pasture, reflecting the overreliance on natural pasture for livestock rearing in Uganda. Average cattle herd size is seven cattle per cattle-owning household: in the Eastern region this is as low as four cattle per cattle-owning household and in Karamoja as high as an average of 21 cattle per household. Most cattle (93.6%) are indigenous breeds, and only 1.0% of households own exotic beef or crossbreed animals. In 2008, a total of 1.52 million dairy cows (32.8% of all adult cows) were recorded under the National Livestock Census, producing an average of 1.85 litres of milk per cow per day, which is very low. The average size of holding for goats is five animals per goat-owning household; for sheep it is six sheep/household. In Karamoja, however, the average flock size is considerably larger at 19 goats/household and 18 sheep/household. More than 99% of sheep and goats are indigenous or local breeds (MAAIF and UBoS 2009).

The numbers of livestock in Uganda have increased significantly over the past 10 to 15 years. Table 2.6 reproduces data presented in the 2008 census report for livestock and poultry at three time periods: 2002, 2005/06, and 2008 Uganda, while figure 2.7. reports annual livestock numbers from 2000 to 2016 based on statistics from the Food and Agriculture Organization of the United Nations (FAOSTAT). Since the turn of the century, the numbers of cattle and goats have increased nearly threefold, from about 6 million head of each type to 15.6 million and 14.8 million respectively in 2016. Over the same period, the numbers of sheep have

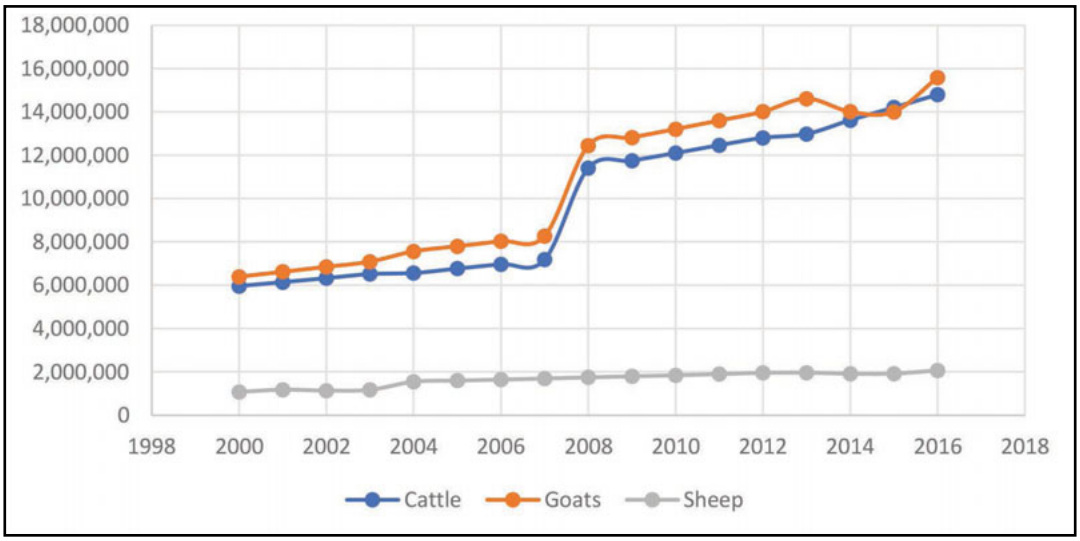
Table 2.6. Trends in Livestock and Poultry Numbers in Uganda, 2002–2008 (million animals)

Type of animal	2002 (PHC)	2005/06 (UNHS)	% change, 2002 to 2005/06	2008 (UNLC)	% change, 2005/06 to 2008
Cattle	5.2	7.5	44%	11.5	53%
Goats	5.2	8.5	63%	12.5	47%
Sheep	1.56	1.22	–22%	3.41	180%
Pigs	0.8	1.7	113%	3.2	88%
Poultry	n.a.	23.5	n.a.	37.4	59%

Source: MAAIF and UBoS 2009.

Note: PHC = Population and Housing Census; UNHS = Uganda National Household Survey; UNLC = Uganda National Livestock Census.

Figure 2.7. Numbers of Cattle, Goats, and Sheep in Uganda, 2000–2016



Source: FAOSTAT data downloaded, December 2018.

doubled, from 1.1 to 2.1 million animals. The dramatic increase in the number of cattle and sheep between 2007 and 2008 coincides with the livestock census of 2008: previously the number of cattle and goats appears to have been considerably underestimated (MAAIF and UBoS 2009).

The 2008 National Livestock Census concluded that the outlook was gloomy for future growth and development of the livestock and poultry sectors unless urgent measures were taken to improve productivity. The report highlighted several constraints to growth: the very small size of livestock holding, very low proportion of households with planted pasture, limited adoption of exotic breeds, limited use of hired labor, and the sectors' subsistence orientation. It noted that urgent measures were needed to introduce high-yielding and exotic breeds of animals; to invest in planted pasture; and to train livestock and poultry breeders in modern animal husbandry and management techniques (MAAIF and UBoS 2009).

2.5. Value Addition and Agribusiness

The increasing demand for high-value and processed food products offers expanding markets for agribusiness companies. The demand for meat, vegetables, fish, milk, and fruits will continue to increase in the foreseeable future due to population and income growth and urbanization (Walker et al. 2018). The changes are widespread in urban and rural areas. In addition to the expanding domestic food market, similar changes in neighboring countries also offer regional opportunities for the Ugandan agribusiness sector.

Ugandan food processing companies seem to be seizing the growing business opportunities. From 2011/12 to 2015/16, food and drink processing accounted for 57% of all the manufacturing value added in the country, and the value addition of the subsector grew faster than that of the total manufacturing sector. Major export crops have experienced rapid growth since the early 2000s. For example, coffee exports increased from US$118 million (annual average in 2001–2005) to US$372 million in 2016. Similarly, nontraditional food export items such as sugar and confectionary, maize, and vegetable oils grew up to 10 times during the same period (Walker et al. 2018).

Most agro-processing companies are small and informal. Over 75% of the agro-processing companies are small in scale. Most of them are informal and produce low-value products with limited innovation. Especially in the major value chains like coffee and tea, the processors use local raw materials and often suffer from low capacity utilization (EPRC 2018).

The high-value and processed food products require well-integrated value chains in which agriculture products are transformed in the passage from farm to processors and retailers. Traditionally, coffee and tea value chains are well organized, and a large number of farmers are integrated into these chains through strong cooperatives, processing companies, and/or estates. In response to the growing market demand and public incentives, other value chains—such as dairy, maize, and edible oil—are showing increased vertical integration that encompasses farmers, cooperatives, traders, and processors.

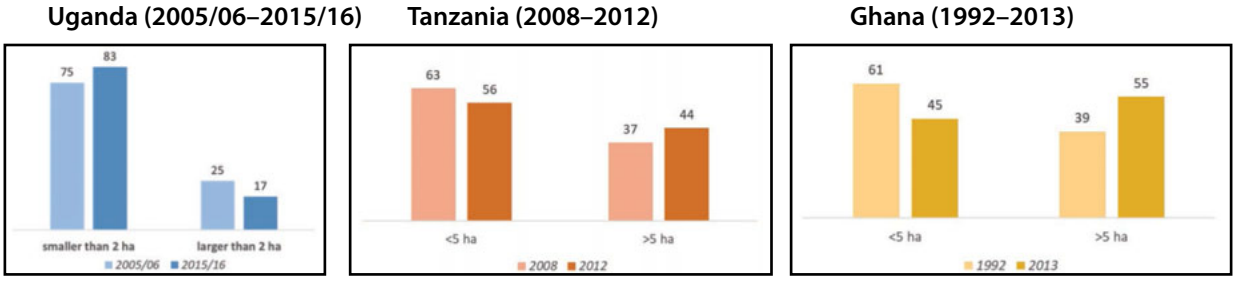
2.6. Challenges for Agriculture and Government Support Programs

Challenges Facing the Agricultural Sector

Uganda's agricultural sector is dominated by smallholdings. Smallholder farmers comprise 85% of the population in agricultures (Mesharsh and Robert 2018), with average farm sizes in the range of 0.8 ha to 1.6 ha (Anderson, Learch, and Gardner 2016). Few large-scale commercial farms have been established in recent years. The sector continues to rely on rain-fed and subsistence farming, with irrigated agriculture comprising only 1% (15,000 ha) of total cultivable land (3.03 million ha) (MoFPED 2018).

The agriculture sector faces two main worrying trends. First, the average size of landholding operated by households is shrinking. From 2006 to 2016, the share of all households that operated farms smaller than 2 ha rose from 75% to 83% (World Bank Group 2018; see also figure 2.8). Second, agriculture sector growth is declining: over the past five years, national agricultural output has grown at only 2% a year, which is lower than the average annual GDP growth rate of 5.2% and the average annual population growth rate of 3% over the same period (Walker et al. 2018).

Figure 2.8. Farm Size Distribution, Selected Countries in Africa



Source: Walker et al. 2018.

In addition to these trends, the agriculture sector faces significant challenges that could hamper its efforts to promote economic growth and poverty reduction. The first challenge is the decline in yields. Between 2010 and 2015, the average yield decline was 2.07% for bananas, 7.26% for cereals, 8.00% for root crops, and 0.61% for pulses (MAAIF 2016a). Yield gaps range between 50% and 75% for many commodities (AGRA 2017), and the uptake of improved seeds and fertilizers is quite low. Indeed, only 20% of famers use improved seeds; fertilizer use in Uganda is at 2–3 kg/ha versus the target of 50 kg/ha set by the Comprehensive Africa Agriculture Development Programme. A second challenge is that levels of mechanization remain low. The hand hoe is the main production tool, and roughly 10% of farmers use animal traction compared to 1.2% who use tractors (World Bank Group 2018). A third challenge is that farmers have inadequate access to credit and other financial services, limiting the growth potential of their operations. Fourth, the 2008 crop census indicated that on average only 19% of rural households had access to agricultural extension services. Finally, value chains and output markets are poorly developed for most agricultural commodities: although the demand for high-value products is increasing, food processing companies are mostly informal and suffer from numerous challenges such as lack of electricity, limited access to finance, and low capacity utilization.

Government of Uganda Support Programs for the Agricultural Sector

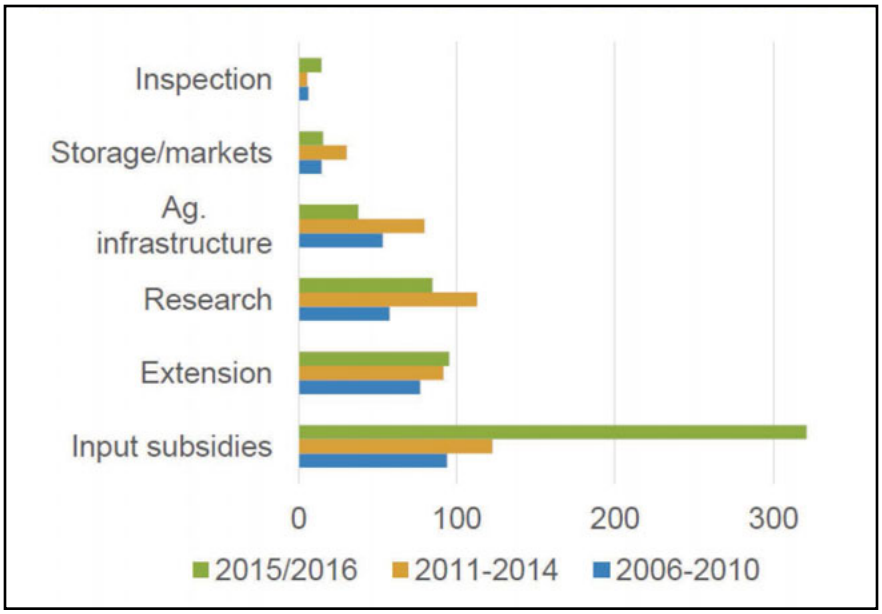
To overcome these challenges, the Government of Uganda (GoU) has adopted the National Agriculture Policy (NAP) and the Agriculture Sector Strategic Plan (ASSP). The overall objective of the NAP is to achieve food and nutrition security and improve household incomes through coordinated interventions that enhance sustainable agricultural productivity and value addition, provide employment opportunities, and promote domestic and international trade. The ASSP aims to operationalize the NAP over the period 2015–2020 with the objective of transforming subsistence farming to sustainable commercial agriculture.

The ASSP is aligned with the National Development Plan II 2015–2020 and the African Union's Comprehensive Africa Agriculture Development Programme, which set a goal of achieving average annual growth of 6% for each country. ASSP has a value chain investment approach focusing on research, extension, pests, vector and disease control, provision of inputs, promotion of sustainable land use and soil management, post-harvest handling, improved market access, and value addition. The interventions will involve 12 priority commodities (bananas, beans, maize, rice, cassava, tea, coffee, fruits, vegetables, dairy, fish, and meat) and four strategic commodities (cocoa, cotton, oilseeds, and oil palm). The required ASSP budget has been computed at UGX 6.969 trillion (US$1.939 billion) for the five-year period and seeks to achieve four objectives:

- Increasing agricultural production and productivity
- Increasing access to critical farm inputs
- Improving agricultural markets and value addition
- Improving service delivery by strengthening the institutional capacity of MAAIF and its agencies (MAAIF 2016a)

The GoU has several interventions that support the goals set out in the ASSP. These include subsidies to improve access to high-quality seeds and fertilizers, facilitate access to credit, and improve agriculture risk management (figure 2.9).

Figure 2.9. Public Expenditure in Agriculture per Category (actual)



Source: FAO 2018.

Free Inputs Distribution through the Operation Wealth Creation Program

Officially started in 2014 as a result of the National Agriculture Advisory Services (NAADS) restructuring, the Operation Wealth Creation (OWC) program targets 68% of the farmers in the subsistence economy (Mesharsh and Robert 2018). OWC aims to commercialize agriculture and thus to create wealth and reduce poverty. Through this program, the GoU provides inputs to farmers free of charge; inputs are distributed and supervised by the Ugandan military (Uganda Peoples' Defense Forces). OWC has no clear legal status, and its operations are funded by the money budgeted under NAADS. The latter's operations have ceased except for those of the secretariat in Kampala, which is in charge of purchasing inputs for distribution to farmers.

The free agricultural inputs provided by OWC include seedlings for cash crops such as coffee, tea, citrus, mangoes, pineapples, and apples. Seeds are also distributed for food security crops such as maize and beans, and livestock are provided to a smaller range of enterprises (Mugasi 2017). Inputs are slated for delivery in the months of March/April and August/September for the first and second seasons, respectively.

The budgets allocated to NAADS for OWC operations in 2016/17 and 2017/18 were UGX 318.61 billion and UGX 319.70 billion respectively (MAAIF 2016a) for purchases to be shared among 116 districts. This means that the share per district is limited. Table 2.7 shows quantities of inputs supplied nationally as well as quantities needed.

For the period 2017/18, the government introduced an e-voucher for the fertilizer subsidy scheme. Through the ACDP project, MAAIF launched an e-voucher system that will allow farmers to purchase fertilizers, seeds, and equipment for post-harvest handling and processing with agro-dealers. The e-voucher system is mobile-based and uses a matching grant mechanism (i.e., the farmer makes a contribution). The subsidy (contribution) decreases year by year. When registered farmers load money on their accounts, the government will also top up the funding through the matching grant scheme. The e-voucher system involved different stakeholders from both the public and private sector: United Bank of Africa, which trains farmers in both basic use of ICT and the e-voucher system; Life Mobile, a Uganda-based company that ensures farmers' access to affordable mobile phones that can access the e-voucher system; and the National Information Technology Authority of Uganda (NITA-U), which is in charge of designing the e-voucher system. This new e-voucher subsidy scheme will be piloted with 10,000 farming households.

Table 2.7. Input Needs and Acquisitions

S/N	Input	Quantity needed	Quantity available	Discrepancy
1	Coffee seedlings	70,915,889	37,000,000	33,915,889
2	Tea seedlings	4,414,225	28,000,000	-23,585,775
3	Mango Seedlings	15,228,970	1,085,000	14,143,970
4	Orange seedlings	11,150,217	2,800,000	8,350,217
5	Banana Plantlets	36,243,379	760,000	35,483,379
6	Tree seedlings	49,720,423	483,000	49,237,423
7	Maize seeds	36,952.1	1,787.5tons	35,165
8	Beans	73,488.1	1,309.6tons	72,179
9	Cassava Cuttings	2,790,840	80,000bags	2,710,840
10	Cattle (Dairy)	13,507,700	5,321 heads	13,502, 379
11	Cattle (Beef)	5,709	390 heads	5,319
12	Pigs	2,413,337	2,106	2,411,231
13	Goats	3,262,880	1,530	3,261,350
14	Chicken	37,799,473	95 units of 500 birds each=47,500	33,915,889

Source: NAADS Secretariat; data from Ministry of Defense and Veteran Affairs (n.d).

Facilitation of Access to Credit

To facilitate access to finance in the agriculture sector, in 2009 the government established the Agricultural Credit Facility (ACF) in partnership with commercial banks, Uganda Development Bank Limited (UDBL), microfinance deposit-taking institutions (MDIs), and credit institutions.[14] The objective of ACF is to promote commercialization of agriculture by providing medium- and long-term financing to projects engaged in agriculture, agro-processing, modernization, and mechanization. The scheme is administered by the Bank of Uganda (BoU). (See sections 3.1 and 3.2 or further information on the ACF and other public support initiatives to increase farmers' access to agricultural finance.)

Agricultural Extension Services

Recognizing the crucial role of agricultural extension in transforming the sector, the GoU revamped the service. In 2017, the MAAIF Directorate for Extension was recreated—with a new National Agricultural Extension Policy (2016) and a National Agricultural Extension Strategy (2016–2021). The latter aims to promote the diffusion and application of appropriate information, knowledge, and technological innovations for commercialization of agriculture. It has four objectives:

- Establish a well-coordinated, harmonized, pluralistic agricultural extension delivery system for increased efficiency and effectiveness
- Empower farmers and other value chain actors (including youth, women, and other vulnerable groups) to effectively participate in and benefit equitably from agricultural extension processes and demand for services
- Develop a sustainable mechanism for packaging and disseminating appropriate technologies to all categories of farmers and other beneficiaries in the agricultural sector
- Build institutional capacity for effective delivery of agricultural extension services (MAAIF 2016b).

The agricultural extension service is the second largest area of public expenditure in the agriculture sector, as illustrated by figure 2.9. The network of crop and livestock extension workers is established in each district and subcounty. With support from the Uganda National Farmers Federation (UNFFE), the extension workers seek to foster smallholder organization. In addition, a new state minister for cooperatives has been appointed in the Ministry of Trade and Cooperatives to support about 10,000 farmers cooperatives across Uganda (Walker et al. 2018).

The Agriculture Cluster Development Project of the MAAIF, supported by the World Bank, helps strengthen the extensions' services in 42 districts. The project will build extensions' capacities in data collection and will leverage technology solutions to deliver high-quality knowledge and information to farmers and to support technology transfer in the districts and subcounties.

Agricultural Risk Management

The GoU takes measures to enhance the resilience of both farming systems and rural households to agriculture-related risks. In 2016 an agricultural risk management unit was created at the MAAIF level to raise awareness of the government's holistic approach of agriculture risk management across all thematic areas, and to develop a national coordination mechanism for advising relevant ministries, departments, and agencies.

Despite the agriculture sector's prominent contribution to national economic development and poverty reduction, financial resources remain constrained. Between 2012/13 and 2015/16, the country recorded a decline in the percentage of the national budget allocated to the agriculture sector, from 3.4% in 2012/13 to 2.7% in 2015/16—equivalent to UGX 484.68 billion. There is a need to attract more private investment to financing of agriculture in Uganda.

[14] For information on ACF, see Bank of Uganda, "Agricultural Credit Facility Brief to the Clients," https://www.bou.or.ug/bou/bou-downloads/Agricultural-Credit-Facility/Brief-to-Clients-on-the-ACF-V.pdf.

2.7. Key Risk Exposures in Agriculture: Economic Impacts and Challenges for Agricultural Insurance

Climatic and Other Risk Exposures

Many parts of Uganda now receive less rainfall than in the past, due to global warming and deteriorating regional weather conditions. The most drought-prone areas in Uganda are the districts in the cattle corridor stretching from Western and Central regions to mid-Northern and Eastern regions. In extreme cases, particularly in the Karamoja subregion, the frequent failure of the rain leads to starvation. Droughts severe enough to result in human and livestock deaths are exemplified by the reduced water table, diminishing water levels in the major lakes, and crop failure (DDPM-OPM 2011).

The cattle corridor is a dry stretch of land extending from Rakai (in the south) through Sembabule, Luwero, and Soroti, to Karamoja in the northeast. It often experiences highly variable levels of rainfall—the average annual rainfall is 400 mm in the east and 1,000 mm in the west—which combined with poor soil fertility can lead to chronic food insecurity in the area (World Bank 2015b).

Heavy rainstorms and flooding in Uganda can cause human deaths, damage to public and private property and infrastructure, and loss of crops and livestock. Floods also trigger outbreaks of waterborne diseases and malaria, hence compounding community vulnerability to health hazards. The most flood-prone areas are Kampala and the Northern and Eastern regions. Excess rainfall and flooding are also a cause of landslides, which affect the Mt. Elgon region, Ruwenzori region, and Kigezi.

Heavy storms in Uganda are often accompanied by hail, lightning, and violent winds. Localized hailstorms and thunderstorms result in immense destruction of crops, animals, public infrastructure, and human settlements, and often lead to deaths and disruption of social services (DDPM-OPM 2011).

Crop and livestock production in Uganda are highly exposed to pests and diseases. Common crop pests include weevils, locusts, and caterpillars, while diseases include coffee wilt, banana wilt, and cassava mosaic. Animal epidemics include swine fever, foot and mouth disease, Nangana, and bird flu.

Parts of Uganda are exposed to earthquakes. In 1994, for example, a strong earthquake hit districts in the Rwenzori region, affecting over 50,000 people. Earthquakes generally cause little direct damage to agriculture and livestock but can lead to huge consequential losses through disrupted infrastructure and inability to transport perishable crops to markets.

Since independence, Uganda has been characterized by successive internal armed conflicts,[15] which have led to loss of lives and massive displacement of rural communities. Other forms of unrest include land disputes between individuals and communities, and cattle rustling in the northern, northeastern, and eastern parts of Uganda.

The most rigorous agricultural risk assessment study in Uganda to date was conducted by the Platform for Agricultural Risk Management in conjunction with MAAIF in 2014/15 (PARM 2015). The study ranks the risks according to their frequency and severity in Uganda (table 2.8).

According to PARM (2015), the following six risks make up more than 99% of average annual losses in Uganda:

1. **Price fluctuations.** Interannual price variability is a major concern for all major food crops and cash crops. For example, coffee has experienced shocks of up to 49% every three years. Matoke banana is similarly

[15] The major conflicts have included the 1979 war that ousted the government of Idi Amin, the 1980–1986 armed struggles that took place mainly in the central parts of Uganda, and the 1986–2007 armed conflicts in northern and eastern regions.

Table 2.8. Ranking of Risks Affecting Agriculture in Uganda

Risk	Average severity	Average frequency	Worst-case scenario	Score
Crop pest & diseases	Very high	Very high	Very high	5.00
Post-harvest losses	Very high	Very high	High	4.75
Price risk food & cash crops	Very high	High	High	4.35
Livestock pests & diseases	High	Very High	Medium	4.10
Droughts	Medium	Medium	Very high	3.50
Counterfeit inputs	Medium	Very high	Low	3.40
Cattle rustling	Low	High	Very low	2.37
Floods	Very low	High	Very low	1.75
Hailstorms	Very low	High	Very low	1.75
Thunderstorms	Very low	High	Very low	1.75
All other natural risks	Very low	High	Very low	1.75
Northern Uganda insurgency	Very low	Very low	Medium	1.50

Source: PARM 2015.

affected, while cassava, maize, and potatoes have seen smaller shocks in recent years. On average, losses for farmers due to price risk are estimated at US$262.22 million a year.

2. **Crop pests and diseases.** Average crop losses in Uganda due to pests, diseases, and weeds are estimated at 10–20% during the pre-harvest period and 20–30% during the post-harvest period. The annual losses for major crops (mainly banana, cassava, coffee, and cotton) are in the range of US$113 million to US$298 million.
3. **Post-harvest losses.** The weight loss to major cereals (mostly maize, but also barley, millet, rice, sorghum, and wheat) resulting from attacks of pests and animals causes losses of US$97.17 million a year. This figure does not, however, include the opportunity cost for farmers forced to sell at low market prices directly after harvest due to lack of proper storage facilities.
4. **Livestock pests and diseases.** The economic impacts of diseases on farming households are diverse, and include costs incurred for disease control, treatment, and vaccination. Direct losses are associated with animal mortality, reduced milk production, and use of animals for traction. The total economic cost for diseases in cattle alone is estimated at US$76.5 million a year.
5. **Droughts.** Uganda has been hit by severe droughts in recent years (2002, 2005/08, and 2010/11). The return period of a large-scale drought that affects 25,000 people or more is 5.3 years. The average annualized losses amount to US$44.4 million. But drought has the highest probable loss of all risks in Uganda. For example, the drought period of 2010/11 caused damage of US$383.45 million in 2011 alone.
6. **Low-quality inputs.** Yields for maize, millet, rice, and sorghum are only **20%** to **33%** of the potential yield for rain-fed agriculture and even less for irrigated agriculture. A major contributing factor is the lack of good quality, higher yielding, more vigorous, drought resistant, and disease free seeds and planting material. Counterfeit inputs are a major problem that lead to losses of US$10.7 to US$22.4 million a year.

Fiscal Impacts of Natural Disasters on Agriculture

The annual economic impact of agricultural risk is estimated at between US$606 million and US$804 million in Uganda (PARM 2015). Based on an agricultural GDP of US$5.71 billion (2014 figure), annual losses are extremely high, at between 10.61% and 14.08% of agriculture GDP and between 2.3% and 3.1% of overall GDP. The highest annual losses are due to price risk (US$262 million per year, or 43.3% of total losses), followed

by crop pests and diseases (US$113 million, or 18.6% of total losses). In years of crop pests and disease outbreak, however, losses may rise to as high as US$298 million, or 36.6% of total losses. The next highest losses are post-harvest crop losses due to inadequate on-farm and off-farm storage infrastructure, which amount to between US$97 million and US$107 million (16% of total losses), followed by livestock disease-related deaths, which amount to US$76.5 million (13.2% of total losses). It is notable that the economic value of weather-related losses in agriculture is relatively low: crop losses due to drought average **US$44 million** per year (7.3% of total losses), but losses due to flooding, hail, and windstorm are all valued at less than 0.1% of total losses per year (table 2.9).

Table 2.9. Quantification of Annual Losses Due to Agricultural Risks in Uganda

Risk Category	Risk	Average Annual Loss (US$)	% of Annual Loss	Frequency of Shocks
Input Risk		10,700,000 to 22,400,000	1.8%	The risk occurs on an annual basis but only an estimated 3 to 4.5`% of farmers are affected by counterfeit products every year
Weather Risk	Drought	44,402,581	7.3%	Local rainfall deficits occur every year but rarely at regional or national level. The return period of large-scale droughts that affect > 25,000 people is 5.3 years. The catastrophe year of 2010/2011 was the worst
	Flood	166,271	0.0%	Frequent risk in Eastern parts of the country with larger shocks affecting > 25,00 people every 2.8 years
	Hail Storm	68,377	0.0%	Small scale events every year but no regional or national catastrophe has been recorded so far
	Storm	20,974	0.0%	Small scale events every year but no regional or national catastrophe has been recorded so far
	All other natural risk	9,296	0.0%	Small scale events every year but no regional or national catastrophe has been recorded so far
Biological Risk	Crop pest & diseases	113,000,000 to 298,000,000	18.6%	High (annual) frequency of plant pests and diseases
	Livestock pest & diseases	76,524,482	12.6%	High (annual) frequency of livestock diseases
Infrastructure risk	Post-harvest revenue loss	97,179,571 to 106,923,541	16.0%	Annual phenomenon on concentrated in some parts of the farming population: e.g. post-harvest loss in maize is concentrated among only 21.5% of the population. Kloss level is fairly constant except in particularly wet years when losses are 10% higher than normal; this phenomenon occurs on average every 5.75 years
Price Risk	Price risk food & cash crops	262,226,143	43.3%	Depending on the crop, major price shocks may occur every 2.7 to 7 years
Conflict risk	Northern Uganda insurgency	n/a		Low probability of occurrence in the future
	Karamoja cattle raids	1,906,670 to 3,177,783	0.3%	Annual with slightly declining tendency
Total cost of Risk	**US$ 696 million to 808 million per year**		100.0%	

Source: Adapted from PARM 2015.

Issues and Challenges for Agricultural Insurance

The findings of the PARM (2015) agricultural risk assessment study have several implications for agricultural insurance policy makers and agricultural insurers in Uganda:

1. **Price risk is usually not insurable** and is normally hedged using futures price contracts or derivatives (put and call options).[16] Only one major crop insurance program in the world, namely the U.S. Federal Crop

[16] A further alternative is to seek to develop a warehouse receipt system to enable farmers to store their crop output post-harvest when prices are at their lowest and to sell their crops at a later date when market prices have increased.

Insurance Program, offers farmers the option to purchase loss of revenue protection against both physical loss of crops and price loss at the time of harvest, and this cover is available only for a few traded commodities such as wheat, maize, and soya beans. It is very unlikely that crop insurers in Uganda will be able to offer price risk protection to farmers in the foreseeable future.

2. **Crop pests and diseases are often foreseeable and manageable** using a combination of preventive and corrective measures, including resistant crop varieties and biological and chemical pest and disease control. Many crop insurers exclude pest and disease cover in their individual farmer MPCI policies because of concerns about moral hazard. Underwriters may agree to accept pests and diseases where these are deemed uncontrollable (even when the insured has applied the pest and disease measures recommended by the local Ministry of Agriculture). Covering pests and diseases is less of an issue under an Area Yield Index Insurance (AYII) policy because actions by individual farmers are unlikely to influence the average area yield of the insured crop. In Uganda, crop pests and diseases are the largest cause of financial losses in agriculture after price risk, and therefore the demand for protection against pests and diseases is likely to be very high; but since Weather Index Insurance does not protect against these risks, farmers are more likely to request loss of yield protection in the form of individual grower MPCI or AYII. Ugandan insurers are likely to agree to insure only those pests and diseases that are considered uncontrollable according to each insured crop and that can cause losses of up to 100% of expected production and yields (e.g., black sigatoka and bacterial wilt in bananas, coffee wilt, brown streak and mosaic virus disease in cassava, maize lethal necrosis disease in maize).
3. **Most crop insurance policies do not insure post-harvest losses.** Crop insurance policies normally protect against crop losses from the time of planting or emergence of the crop up to completion of the harvest.[17] Post-harvest losses are usually insured separately under a loss of stored grain/produce cover. Very few insurers in Uganda offer insurance covering post-harvest loss of crops in storage except to large-scale agribusiness clients and processors.
4. **Livestock pest and disease losses are relatively high in Uganda.** As most livestock pests and diseases can be prevented (through vaccination) and/or managed, insurers usually insure against only named perils for which the animals have been vaccinated and where death of the animal is due to vaccination failure (e.g., anthrax, blackwater, Rift Valley fever, and foot and mouth disease in cattle; Awjeski's disease in pigs; Newcastle disease and avian flu in poultry).
5. **Drought is the main weather peril that causes crop and livestock losses in severe years.** According to PARM (2015), droughts affect Uganda quite frequently; major droughts occurred in 2002, 2005/08 and in 2010/11. The 2010/11 drought was a 1-in-60-year event and was associated with crop losses of about US$341 million, while drought losses in livestock were slightly higher, at US$343 million (table 2.10). This evidence suggests there is a need for suitable crop and livestock insurance products and programs that will protect Ugandan farmers against drought risk.

Table 2.10. Economic Losses from Droughts in Uganda, 2005–2013 (US$ millions)

Year/Item	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average annual loss
Food crops	0.07	0.24	0.22	0.00	0.00	151.60	121.57	0.00	0.00	30.41
Cash Crops	17.99	16.62	2.62	0.00	0.00	37.90	30.39	0.00	0.00	11.72
Livestock	1.81	1.69	0.28	0.11	0.00	111.42	231.50	17.24	11.58	41.74
Total	**19.87**	**18.55**	**3.12**	**0.11**	**0.00**	**300.92**	**383.46**	**17.24**	**11.58**	**83.87**

Source: PARM 2015, based on data from the Office of the Prime Minister.

[17] India is an exception to this rule. Under the Pradhan Mantri Fasal Bima Yojana national crop insurance scheme, since 2015/16 limited post-harvest excess rain/flood cover has been available for up to two weeks post-harvest for crops such as paddy rice that are traditionally dried in the field prior to threshing.

3. Access to Agriculture Financial Services

3.1. Financial Sector and Financial Inclusion

The financial sector in Uganda is composed of commercial banks, credit institutions, microfinance deposit-taking institutions (MDIs), and Savings and Credit Cooperative Organizations (SACCOs). It includes 25 commercial banks, four credits institutions, five MDIs,[18] and more than 1,000 SACCOs and microfinance institutions (MFIs). Despite such a diversity of providers, financial inclusion remains a challenge, particularly for the rural population.

Commercial banks, the major lenders in the country, are sound and highly liquid. As a group, they represent about 95% of the total private sector credit. The rest is financed by credit institutions and MDIs. Although precise statistics are not available, credit from other institutions, including SACCOs and microfinance institutions, seems to be much smaller than that from financial institutions supervised by the central bank. Commercial banks generate healthy returns, and their nonperforming loans (NPLs) have been steady at around 4–5% except for the hike in 2016. As the banks reduced NPLs in 2017, they shifted to safer and more liquid assets; their investment in the government and central bank securities increased by UGX 2.1 trillion. At the same time, the private sector loans grew only by UGX 168 billion (BoU 2017). With total liquid assets of UGX9.9 trillion, or 37% of total assets, commercial banks have enough liquidity in their balance sheets. The capital adequacy of the banks is more than 20%, well above the international standard set by the Basel Accords.

Financial institutions' traditional brick-and-mortar branch network is limited, but mobile agents offer wider access points. According to the International Monetary Fund Financial Access Survey,[19] there were 566 bank branches as of 2016, or 2.77 branches per 100,000 adults in Uganda, much lower than in Kenya (5.43) and Rwanda (6.16). The rural population in Uganda has limited access to bank branches, 70% of which are in urban areas. The coverage of mobile money agents far exceeds that of banks. While only 16% of the population had a bank point of service within the radius of 1 km, a mobile money point of service existed for 54% of the population in 2015 (Republic of Uganda 2017a). Agency banking was not permitted until recently, but in July 2017 the Bank of Uganda (BoU), which is the banking and insurance regulator, finally approved amendments to the Financial Institutions Act to permit agency banking (Panturu 2019). In response to these amendments in

[18] Bank of Uganda, "Supervision: Supervised Financial Institutions," https://www.bou.or.ug/bou/supervision/financial_institutions.html.
[19] https://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C.

the banking regulatory framework since early 2018, several banks have launched agent banking services under the umbrella effort of the Uganda Bankers Association.

According to FSD (2018), 78% of Ugandan adults are financially served, while 22% are financially excluded. This includes both formal and informal financial inclusion. Overall, formal financial inclusion improved to 58% of adults in 2018, up from 52% in 2013 and 28% in 2009. Uptake of formal services is driven by mobile money services, with 56% of adults having or using mobile money services; 43% of adults are registered to use mobile money services, while 8% use mobile money services through family or friends. Mobile money has significantly narrowed the access gap. Transactions via mobile money amounted to 44% of gross domestic product (GDP) in 2015. In rural areas particularly, where 46% of adults have a mobile phone, the potential for digital financial services is great.

Saving is the financial service most used by Ugandans. Indeed, 54% of adults report that they save or put money away and intend to keep doing so to ensure that the amount increases over time. In the Global Findex 2017[20] survey, 29% of adults responded that they saved money to start, operate, or expand a farm or business (Demirgüç-Kunt 2018). Half (50%) of savers (5 million adults) save informally—i.e., with savings groups or Village Savings and Loan Associations (VSLAs) and Rotating Savings and Credit Associations (ROSCAs), giving their savings to someone in the community to keep safe.

Although digital payments are increasing, agricultural payments are largely conducted via cash. According to the Global Findex 2017 survey,[21] about 54% of adults reported making or receiving digital payments in the past year. However, only 32.3% of Ugandans who sold agricultural products received payments in their financial institution or mobile accounts, suggesting that the rest (67.7%) received cash payments or equivalents. Mobile accounts are far more popular than financial institution accounts: 27.6% of payment recipients aged 15+ years received agriculture payments to their mobile accounts in 2017 (as opposed to 7.5% who used financial institution accounts), up from 12.7% in 2014. The penetration of mobile money in the agriculture transactions is still lower than in Kenya (37.3%), but much higher than in Rwanda (8.5%) and Tanzania (18.7%).

Borrowing money is common, but mainly from informal lenders. According to FSD Uganda (2018), 46% of Ugandans borrowed in the 12 months prior to the survey. However, 90% of borrowers reported using informal lenders made up of: 37% used VSLAs, 25% bought goods and services on credit, 14% used ROSCAS, 12% used burial societies, and 2% relied on money lenders. Only 10% of borrowers borrowed from formal lenders such as commercial banks, microfinance institutions, credit institutions, or SACCOs. Only 3% of borrowers borrowed from banks; another 3% borrowed from SACCOs; and the remainder borrowed from microfinance institutions. Those who borrowed from SACCOs borrowed an average of UGX 450,000, and those who borrowed from banks borrowed an average of UGX 500,000. The interest rate on loans was an average of 23.5% in June 2016. In the Global Findex 2017 survey,[22] 20% of adults reported that they borrowed to start, operate, or expand a farm or business.

Financial exclusion in rural areas remains significant. In rural areas, about 25% of adults are excluded from financial services, in comparison to only 14% in urban areas. In addition, uptake of formal financial services is skewed toward urban adults, with 77% of urban adults versus 52% of rural adults formally served. Moreover, only 10% of urban adults rely entirely on informal services, whereas the number stands at 23% for rural adults. With 76% of Ugandan adults residing in rural areas, financial institutions that do not provide services in these areas are missing out on the largest market share.

Similarly, smallholder households have limited access to financial services. According to the Consultative Group to Assist the Poor (CGAP) national survey (Anderson et al. 2016), only 10% of smallholder farmers in Uganda have bank accounts, but 73% have used mobile money. To buy agriculture inputs, 93% of the surveyed

[20] Global Findex Database 2017, https://globalfindex.worldbank.org.
[21] Ibid 2017.
[22] Ibid 2017.

households pay cash immediately, while only 7% have access to credit that allows later payment. About 80% of them sell crops for income, and all of them are paid in cash when they sell.

Agriculture Payments

Agriculture payments to mobile or bank accounts can lead to the expansion of financial services for farmers. As indicated above, cash transactions are still dominant in agriculture payments in Uganda. However, as digital finance innovation, including use of mobile banking, expands in Uganda and other parts of East Africa, mobile money transactions are increasingly used to make non-agriculture payments (e.g., for utility bills and school fees). This change is driven by the clear benefits of digital payments, such as security and low-transaction costs. Accordingly, some agribusiness companies have been trying to use mobile money in their bulk payments to their smallholder suppliers. One of the notable efforts is a United Nations Capital Development Fund project that covered five value chains (coffee, dairy, maize, seed oil, and tea). By involving a wide range of stakeholders—from mobile network operators, fintech service providers, and traders—the project successfully opened mobile accounts and facilitated digital payments to more than 34,000 farmers in maize and seed oil value chains, among others (UNCDF 2018). The key success factors included mobile connectivity and agent network in the project areas, acceptance of mobile money in the local shops, and financial literacy training and support to the farmers. While the mobile money tax introduced in 2018 disrupted the shift toward mobile money transactions, in the long run the trend is expected to continue. Transaction information that accumulates in farmers' mobile accounts will allow financial institutions to identify creditworthy borrowers for savings and credit products.

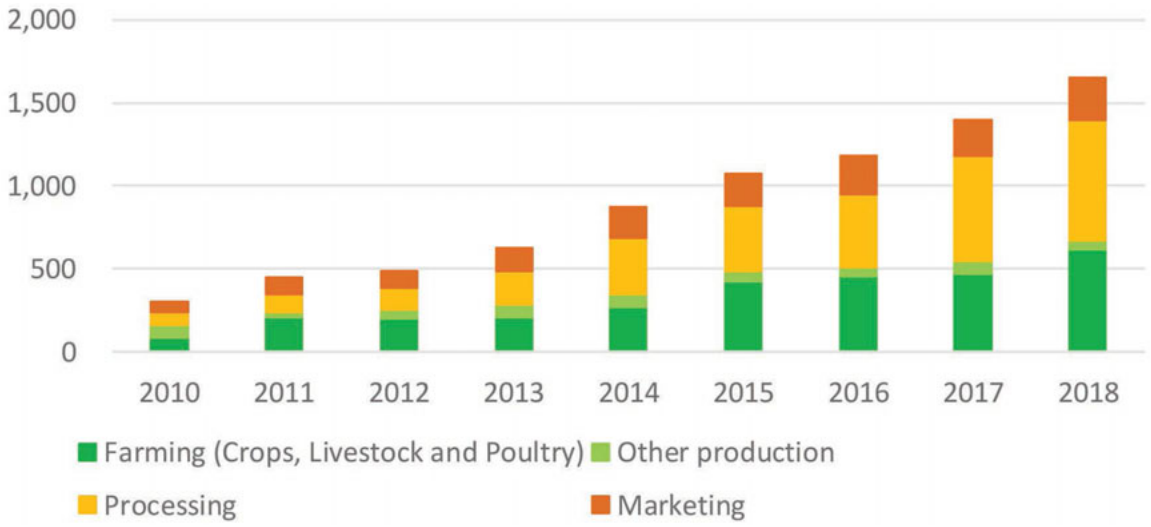
Agriculture Credit

The growth of agriculture credit has been faster than that of private sector credit. The formal finance to the agriculture sector (including marketing and processing) increased from UGX 301 billion (6.4% of the total private sector credit) in 2010 to UGX 1,654 billion (12.3%) in 2018 (figure 3.1). The compound annual growth rate (CAGR) of agriculture credit during this period was 23.7%, while that of the private sector credit was 14.0%. Within the agriculture sector, credit for processing recorded the fastest growth (CAGR of 33.0%), followed by farming (crops, livestock, and poultry) (27.6%). The rapid expansion of agriculture processing credit coincides with the increasing demand for processed food products and the agriculture transformation agenda that gained prominence in government policies. The data from 2014 suggest that 43% of the agriculture credit was short-term (up to one year), 37% was medium-term (one to three years), and the rest (about 20%) was long-term loans, mainly for agricultural processing companies. Leasing is extremely limited, representing only 1% of the total credit (BoU, MAAIF, and EPRC 2015).

Despite the fast growth of agriculture credit in recent years, the amount of financing is still inadequate compared to the potential demand. Formal credit to agriculture production stood at UGX 670 billion in 2018. This figure suggests that only 2.8% of the agriculture GDP is financed by formal financial institutions. Although the ratio has been increasing, formal financing for agriculture production remains low compared to that for the overall economy (13.3% is financed by formal institutions). While banks feel relatively comfortable in lending to large farms, smaller farms are largely left unfunded due to real or perceived risks and high transaction costs. Only 10% (0.36 million farm households) had access to credit in the past five years, according to the last Agriculture Census in 2008 (UBoS 2010a). The formal credit to processing and marketing seems to be expanding in the well-organized value chains such as coffee and tea, but only 6.3% of small-scale agribusiness companies have access to a loan or line of credit, as opposed to 44.1% in Kenya (Walker et al. 2018).

Commercial banks are by far the largest providers of agriculture credit in terms of value. Their share in formal agriculture financing (including processing and marketing) has slightly declined since 2010, but still remains very high, at 92% of formal lending in 2018. Credit institutions and microfinance deposit-taking institutions finance about 4% each. These institutions are more active in lending to agricultural production, representing about 16%, leaving commercial banks with a sizable share of about 85% in 2018. Although precise

Figure 3.1. Agriculture Credit Provision by Subsector in Uganda (UGX billions)



Source: BoU statistics.

data are not available, non-bank institutions are the primary lenders in terms of the number of loans for small farming (DANIDA 2014).

Leading commercial banks in the agriculture sector offer tailored products supported by risk management mechanisms and dedicated loan officers. These commercial banks identify and lend to creditworthy borrowers mainly in the well-organized value chains, including coffee, tea, maize, dairy, beef, and edible oil. For example, Centenary Bank lends to coffee farmer organizations that aggregate and sell coffee beans to the National Union of Coffee Agribusinesses and Farm Enterprises.[23] These leading banks employ dedicated agriculture loan officers who can appraise loan applications and assess potential risks. Lending products include input loans, post-harvest loans, and long-term loans for farmers, farmer organizations, and agribusiness companies, including small and medium enterprises (SMEs). The input loans are backed by the transactions in the value chains and often recovered after the harvest directly from the buyers that bought produce from the borrowers. Compared to credit institutions and MDIs, most banks tend to focus on larger loans, reaching UGX 250 million (US$67,500); however, some banks, such as Finance Trust Bank, make smaller loans, less than UGX 370,000 (US$100). Agribusiness loans are much larger, ranging from hundreds of millions to billions in Ugandan shillings; for example, the maximum agribusiness loan covered by the Agricultural Credit Facility (ACF) is UGX 2.1 billion (US$567,000). Major commercial banks such as Stanbic Bank and DFCU Bank are active in this space. The lending rates are usually the prime rate (currently about 20%) plus a risk premium that can go beyond 5%. The exceptions are the ACF-funded loans that are 12% per year.

The agriculture sector is the largest source of nonperforming loans in the commercial bank portfolio. In 2017, agriculture loans accounted for 12.4% of commercial bank credit, but their NPLs represented 24.3% of the total NPLs (BoU 2017). This gap indicates that the agriculture NPL ratio is much higher than that of the total commercial bank loans (5.6%). The high NPL certainly suggests risks involved in the agriculture loans, but at the same time, it may also highlight limited technical and operational capacity among the lenders, as some leading agriculture lenders maintain agriculture NPLs in the low single digits.

Some credit institutions are more sophisticated than others in agriculture lending. The leading institutions such as Opportunity Bank have been expanding their lending operations in the agriculture sector by allying themselves to value chains. Demand-side interventions that empower farmer organizations and link

[23] Additional information on Centenary's agriculture finance and insurance activities is in section 5.6.

them to the markets open up lending opportunities for these non-bank institutions. On the other hand, some institutions seem to offer traditional consumption loans for agriculture borrowers. For the most part their loan size remains small, but some institutions provide relatively larger loans of over UGX 3.7 million (US$1,000), thus overlapping with commercial bank loans. Non-bank institutions generally apply higher interest rates, which can exceed 35% (flat rate) to compensate the loans' high transaction and borrowing costs.

SACCOs collectively have extensive rural coverage and are a potentially significant delivery channel for agriculture finance products; but many of them seem to have significant structural issues. The tier 4 financial institutions, mainly represented by a large number of small SACCOs, possess much wider rural outreach than that of formal financial instructions. They already deliver critical financial services to the rural population. While the SACCOs would benefit from technical support in agriculture finance, they would first need to address their structural issues related to governance, management information systems, and capital shortages.

Regardless of the lenders, agriculture loans are secured by immovable and movable assets in addition to some cash collateral (about 30% of the loan). Lenders prefer to take land as collateral, but most agriculture borrowers do not possess land titles. Moreover, anecdotal evidence suggests that physical assets are hard to secure and monetize, which highlights the importance of other risk mitigation measures such as value chain financing modalities. Some financial institutions depend on the partial credit guarantees from aBi Finance and the USAID Development Credit Authority. Lack of physical assets for collateral is cited as one of the biggest obstacles in agriculture finance, especially for small farmers and SMEs.

Long-term loans are scarce and available mainly for established agribusinesses, often facilitated by the ACF and other public schemes. Some commercial banks and credit institutions offer long-term loans (five to eight years) for their prime agriculture borrowers. Many lenders active in the agriculture sector rely on the ACF, a public facility offering loanable funds up to eight years, to extend long-term loans. The banks see potential demand for long-term loans from producer groups, SMEs, and agribusiness companies, which would require additional ACF resources. Investment funds such as the Yield Uganda Investment Fund and AgDevCo provide equity and long-term debt to agribusiness companies, although the amount of financing appears to be rather limited. The Uganda Development Bank Limited (UDBL) also offers long-term debt financing, and it intends in the future to make equity investments in start-up companies.

Agribusiness companies and traders actively respond to producers' funding requirements in some well-organized value chains, filling the space left by formal lenders. For example, small traders provide seasonal credit to coffee farmers in their community assuming that coffee beans are sold to them. A processor provides inputs on credit to about 2,000 farmers in a palm oil value chain. The effective interest rate for such lending can be much higher than that of formal finance, but farmers still rely on the informal credit from agribusiness companies due to the ease of the transactions and other embedded benefits, such as technical assistance and high-quality inputs. Although precise data are not available, it is likely that such credit provided by the agribusiness companies far exceeds that from formal financial institutions, as observed in other countries and regions (Dalberg 2016).

Warehouse receipt financing has been piloted several times in the country but has not been able to gain traction. The system, if it is established, would allow crop producers and traders to store their produce at certified warehouses and sell when the crop price goes up; credit secured by the crop inventory (proved by warehouse receipts) covers the finance gap. The past pilots, which covered various crops such as coffee, cotton, and maize, confronted numerous challenges, including (among others) low awareness of the program among stakeholders, especially farmers; limited volume of stored crops; high storage costs and interest rates, which reduced the profit margin; and limited interest from lenders (Katunze et al. 2017). The Uganda Warehouse Receipt System Authority, a public promoter of warehouse receipt financing and an issuer of the receipts, is currently leading and designing another pilot. In addition, the Uganda Securities Exchange (USE) and the Grain Council of Uganda are starting yet another pilot by focusing on maize. The crops will be stored in the warehouses of the council member traders and managed by a specialized warehouse manager, and the USE will issue receipts. Several banks have already shown interest in providing financing.

Enabling Environment and Public Initiatives

The Government of Uganda (GoU) is making progress in building critical infrastructure to expand financial services, but additional efforts are required. Recent notable achievements include expansion of the coverage of the credit bureau and establishment of the regulatory framework for agent banking. On the other hand, rural areas' limited physical infrastructure (electricity, road, and mobile networks) hampers access to financial services. Although the government does not take any restrictive approach to facilitate access to finance, the introduction of the mobile money tax in 2018, a 1% tax on the value of mobile money deposits, withdrawals, transfers, and payments, effectively discouraged the use of mobile accounts. In turn, the GoU removed the taxes (other than 0.5% on the value of withdrawals) later in the same year.

To overcome financial access and usage challenges, the GoU launched the National Financial Inclusion Strategy (NFIS) for the period 2017–2022. The NFIS is Uganda's holistic strategy for promoting financial inclusion and is based on five pillars:

- Reduce financial exclusion and barriers to accessing financial services
- Develop credit infrastructure
- Build the digital infrastructure
- Deepen and broaden formal savings, investment, and insurance usage
- Protect and empower individuals with enhanced financial capability (Republic of Uganda 2017a).

The NFIS articulates a vision for Uganda in which all Ugandans will have access to, and use, a broad range of high-quality and affordable financial services by 2022.

To address the challenges in agriculture finance, the Ministry of Finance, Planning and Economic Development (MoFPED) is drafting an Agriculture Finance Policy. In line with the Policy Implementation Strategy document, the ministry intends to establish the comprehensive policy and guiding principles to promote access to and usage of agricultural finance products and services. One of the concerns of the government is whether or not the existing policies incentivize financial institutions to provide affordable and suitable financial services to smallholder farmers and SMEs. The Agriculture Finance Policy is expected to strengthen the coordination and complementarity of existing public schemes and help scale up efforts to transform the sector.

Recognizing the critical role of agricultural finance in the agricultural transformation agenda, the GoU is supporting several initiatives in this space. These include the Agricultural Credit Facility and the Microfinance Support Centre (MSC), both of which aim to enhance access to credit for the agriculture sector. In addition, aBi Finance, a donor-supported nonprofit organization, provides credit lines, partial credit guarantees, and technical assistance to promote agriculture finance.

ACF is a public funding facility managed by the Bank of Uganda that provides interest-free loans to participating financial institutions (PFIs) for on-lending to farmers and agro-processors at favorable terms. The scheme has 18 PFIs, mostly tier 1 commercial banks as well as UDBL. The PFIs match the government commitment; commercial banks and UDBL contribute up to 50%, while MDIs and credit institutions contribute no more than 30% of the value of each loan extended to the borrower. The maximum loan amount to a single borrower is UGX 2.1 billion for up to eight years. The annual interest rate to the final borrower is as high as 12%. Eligible loans under ACF include those for the acquisition of agricultural and agro-processing machinery and equipment, for working capital, and for infrastructure. Agricultural inputs required for primary production and working capital requirements are eligible but should not exceed 20% of the total project cost. In case of default, the ACF credit becomes a guarantee, and PFIs can use it to write off the loans. According to the Public Finance Management Act, however, this process requires approval by Parliament. Thus no loans have been written off to date.

Since its establishment in 2009, ACF has disbursed and committed over UGX 155 billion that financed a total of UGX 308 billion in loans to the agriculture sector. Agro-processing is the main funded activity in terms of the loan amount. On-farm activities represent more than 60% in terms of the number of loans, and the average loan size is about UGX 250 million, much smaller than for agro-processing, but larger than typical commercial loans for small farmers. Indeed, ACF's average end-loan value is about UGX 640 million, equivalent to medium to large SME loans that commercial banks usually offer (table 3.1). Over the 12 months ending in September 2018, the facility disbursed about UGX 22 billion for 69 loans amounting to UGX 35 billion. The total arrears are only UGX 189 million, about 0.1% of the cumulative ACF loans of UGX 145 billion (BoU 2018).

Table 3.1. ACF Portfolio Grouped by Activity Funded (as of September 2018)

Funded activity	No. of projects	Total loan amount (UGX millions)	Share (by loan amount)	Average loan size (UGX millions)
On-farm	299	75,756	24.6%	253.4
Financing working capital for grain trade	25	46,217	15.0%	1,848.7
Livestock	29	5,905	1.9%	203.6
Post-harvest management	35	24,001	7.8%	685.7
Agro-processing	92	152,031	49.4%	1,652.5
Total	480	307,910	100.0%	641.5

Source: BoU 2018.

ACF is expected to continue to play a primary role in expanding agriculture credit, especially long-term finance, but its rules and procedures need to be reviewed and improved for further scaling up. ACF's interest rate cap of 12% and the cumbersome loan write-off process may have created some unintentional incentives: the cap effectively squeezes the profit margin of the PFIs and deters some of the active lenders in this space from participating in the facility. Moreover, it is possible that PFIs are incentivized to lend to well-known and creditworthy borrowers rather than new and hard-to-reach farmers and SMEs. As ACF is an important source of long-term finance for agriculture lenders, revision of the current rules and procedures would be warranted to maximize the reach and usage of the credit line.

In 2010, under the Agricultural Business Initiative (aBi), the governments of Uganda and Denmark established the nonprofit entities aBi Trust and Finance to support agribusiness development and agriculture finance. The Trust handles grant-funded programs for value chain development and capacity development of financial institutions. It supported 23 financial institutions, mostly SACCOs, in increasing the availability of financial services to agribusiness users, including smallholders. (This function was moved to aBi Finance in 2016). With funding by the Danish International Development Agency (DANIDA), aBi Finance provides a line of credit to PFIs to facilitate micro-loans to agribusiness SMEs and farmers. In 2016, a total of 17 PFIs disbursed about 40,000 loans amounting to UGX 94 billion. Most PFIs are tier 1 institutions, but recently more tier 4 institutions (SACCOs) have been participating. PFIs are charged the Treasury bill rate plus 0.5–2.0% by aBi Finance and then on-lend to the end borrowers at their own lending rates. The duration of the loan is up to seven years. In addition, aBi Finance offers partial credit guarantees that cover 50% of the agriculture loans (both portfolio and individual) from 17 PFIs. As of 2016, about 22,000 borrowers had benefited through guaranteed loans of UGX 75 billion (the average loan size was about UGX 5 million). The exposure of aBi was UGX 38 billion. The payout ratio rose in 2016 from 0.4% to 1.7% due to the increase in NPLs but still remains very low. Thanks to the low payouts, lean management, and investment income, the guarantee operation has been making profits (aBi 2016).

The MSC, a government entity for the promotion of MFIs and cooperatives, provides wholesale and retail loans to SACCOs, MFIs, primary cooperatives and unions, VSLAs, and SMEs. The agriculture sector is one of the priorities of the organization, and there are sector-dedicated loan products. The center's annual

loan disbursement to financial institutions and retail borrowers is about UGX 40 billion. The wholesale lending accounts for about 60% of its portfolio of about UGX 100 billion. The average size of the wholesale loans is about UGX 150 million. The center charges 13% to the financial institutions, which lend to the end borrowers at a maximum rate of 25%. It also provides financial institutions with technical support in areas such as governance, financial management, and savings mobilization.

Through aBi, FSD Uganda, and other entities, development partners have been promoting innovation in agriculture finance by offering technical assistance and grants, but the potential demand for such assistance seems to exceed the supply. While aBi focuses on capacity development of financial institutions in agriculture finance, FSD Uganda works with financial institutions and fintech companies to facilitate innovation in financial product development and delivery optimization. Interviews with stakeholders revealed that there are financial institutions, fintech companies, and agribusiness companies that are not currently supported, but that are potentially interested in upgrading their activities related to agriculture finance.

The Uganda Development Bank Limited, a government-owned development bank, actively provides mid- to long-term loans to the priority sectors, including agriculture. The UDBL once suffered from a very high level of NPLs but has improved its loan portfolio quality in recent years. The loan disbursement to the agriculture sector (including agro-processing) was UGX 48 billion in 2017, most of which was retail loans to farmer organizations and agribusiness companies. UDBL's exposure to the agriculture sector is about 40% of the total loan portfolio of about UGX 225 billion. The maximum loan duration is 15 years, with up to three years of grace period. The primary funding sources of agriculture credit include the ACF and the Kuwait Fund. The interest rate, supported by the public funding sources, is much lower than that of commercial finance, around 12–16% regardless of the loan duration. According to the strategic plan, the annual disbursement to the agriculture sector is expected to exceed UGX 70 billion by 2022, mainly through retail lending (UDBL 2018).

These public support schemes contributed to the recent increase in agriculture credit, especially long-term finance and loans for small farmers and SMEs. However, the overall contribution of the public schemes to agriculture credit is relatively small. The total annual loans facilitated by ACF and aBi Finance are estimated at UGX 130 billion, just 10% of the total agriculture loan disbursement in 2018 (UGX 1,315 billion). Even with the aBi guarantees that cover the loans of UGX 75 billion, and the UDBL loans of UGX 48 billion, the contribution to the total loans remains relatively modest.[24] Although precise data are not available, one can reasonably assume that these schemes are facilitating credit to hard-to-reach borrowers such as smallholders and agro-processors in addition to long-term loans to the sector in general. As summarized in table 3.2, both schemes provide long-term loanable funds, but aBi credit targets small loans, while ACF mainly addresses larger funding requirements of SMEs. Also, technical assistance support from aBi and MSC is indirectly supporting the expansion of agriculture financial services, including credit.

Table 3.2. Comparison of Major Public Wholesale Lending Schemes in Uganda

	Annual disbursement (end loans facilitated) (UGX billions)	Partner financial institutions	Target borrowers	Average loan size (UGX millions)	Interest rate and duration (end loans)
ACF	35	18 (tier 1 and UDBL)	Acquisition of agricultural and agro-processing machinery and equipment	641.5	12% Up to 8 years
aBi (credit line)	94	17 (largely tier 1; includes tier 4)	Agribusiness and agriculture production	2.3	Up to FIs Up to 7 years

Sources: Based on stakeholder interviews; BoU 2018; aBi 2016.

[24] The private credit data do not include UDBL. Given that the UDBL's loan disbursement is relatively small compared to the total loan disbursement and that some of the loans are covered by ACF and aBi, the possible double counting is ignored in this discussion.

3.2. Improving Access to Agriculture Finance Services: Challenges and Recommendations

In recent years, Uganda has made commendable progress in expanding both financial inclusion of the rural population and agriculture credit, but further efforts are needed to effect agriculture transformation. The mobile network has significantly increased people's access to financial services, and formal financial institutions have increased their lending activities in the agriculture sector. However, significant gaps remain in delivering financial services in rural areas, especially to smallholder farmers and agribusiness SMEs.

Financial institutions face important challenges to serving Uganda's agriculture sector:

- **Farmers and SMEs have few assets to use as collateral.** The problem is amplified by a lack of property rights; as most farmers do not have formal land titles, they cannot use land as collateral.
- **Small farmers and SMEs still face high transaction costs and limited access to banking.** They are remote and widely dispersed, and there is limited physical presence of banking facilities in rural areas. Mobile banking and bank agents can reduce the access gap, but limited rural infrastructure (electricity, road, and telecommunications) needs to be addressed at the same time.
- **There are various demand-side challenges.** These include limited organization of farmers and coordination with other value chain actors such as processors and traders; the proliferation of counterfeit inputs; and limited public extension.
- **Covariant risks are high due to variable rainfall and price risks.** These issues are expected to become more disruptive due to climate change.

On the other hand, there are solid foundations in Uganda on which further efforts can be built:

- Financial institutions exist that possess agriculture finance knowledge and that provide dedicated financial services to the sector, including smallholder farmers and SMEs.
- Several well-organized and growing agricultural value chains provide stable access to markets, inputs, and sometimes finance to a large number of farmers and farmer organizations.
- Public support schemes such as credit lines, guarantees, and technical assistance have helped achieve recent expansion of agriculture finance.
- Strong mobile money penetration has significantly increased access to finance in the country and could in future stimulate innovations in the fields of agriculture and rural finance.

Proposals to Scale-up Agriculture Finance and Investments

1. A Comprehensive Program to Support Agricultural Finance, Investments, and Insurance

The GoU should ensure that the current MoFPED initiative to develop an Agriculture Finance Policy and Policy Implementation Strategy aims for a broad agenda to transform the agriculture sector. The draft documents contain fundamental guiding principles based on international best practices that advocate private sector–led financial services supported by a conducive enabling environment. In this context, the existing and proposed government initiative should be structured to address the key bottlenecks that hamper agriculture transformation and, more specifically, provision of affordable and suitable financial services to smallholder farmers and SMEs.

The agriculture finance program should be guided by evidence and backed by strong human and institutional capacity. The Policy Implementation Strategy suggests data collection and capacity development as initial activities. The agriculture finance data, especially the credit data, need to be strengthened. While the government targets smallholder farmers and SMEs, the current credit data do not indicate that loans are sufficiently flowing to these segments. Better data will enable policy makers to assess in detail the impact of initiatives such

as AFC and to design necessary interventions that address the remaining gaps. At the same time, human and institutional capacity needs to be strengthened within the ministries, other public agencies, financial service providers, and smallholders and SMEs.

The government inverventions in agriculture finance should build on the assessment and experience of the existing public schemes. Indeed, the Policy Implementation Strategy calls for an assessment of blended finance tools (credit lines) and rationalization of public financial institutions (UDBL, ACF, MSC, etc.). The agriculture transformation agenda requires continuous promotion of commercialization and value addition as well as upgrading of smallholder farmers. To meet these dual objectives, the government should apply suitable policy instruments and promote close collaboration between the ministries and public/private stakeholders. Based on the initial assessment by the World Bank, the following points suggest immediate actions going forward:

2. A Scale-up of Public Support to Promote Agriculture Finance and Insurance

Given the challenges that financial institutions face, especially in reaching smallholder farmers and SMEs, existing support schemes should be adjusted to address critical bottlenecks. Commercial banks possess ample liquidity, but such excess funds are not necessarily translated into smallholder and SME lending due to perceived risks and high transaction costs. On the other hand, long-term finance is still scarce, partially due to limited wholesale funding. Accordingly, the following schemes should be strengthened:

- **The Agricultural Credit Facility should increase the supply of much-needed longer term finance** for on-lending to agribusiness companies, including SMEs, and potentially to farmers and farmer organizations. Leading financial institutions in the agriculture sector heavily rely on ACF to provide long-term loans (over five years). Other funding sources, including deposits, are not suitable for this purpose. The growing demand from food processing companies and farmer organizations suggests that financial institutions require additional long-term funds, and ACF is well positioned as a main supplier. In addition, ACF can potentially play a larger role in smallholder financing. ACF's average loan size indicates that its credit has not been used for smallholders, the least served segment in agriculture finance (formal credit uptake by farmers is only 10% of total loans, as noted in section 3.1); meeting this need is critical to advancing the agriculture transformation agenda. For further scale-up, the ACF's procedures should be reviewed and adjusted. For example, the current appraisal process, in which the Bank of Uganda approves every single loan, could further slow down disbursements as the number of applications increases. Alternatively, the ACF should establish more detailed eligibility criteria for PFIs and borrowers and should monitor PFIs' lending activities. For smaller borrowers, a separate funding window may be required with a unique set of eligibility criteria, given that smallholders and SMES have different risk profiles. The interest rate ceiling of 12% should be reviewed to allow PFIs to recover their operational costs and ensure sustainability of the service delivery while the facility promotes competition and operational efficiency among PFIs. Lastly, the current guarantee arrangement in case of default could be removed, as it has not been used by the PFIs.
- **Capital used by aBi Finance for partial guarantees should be increased.** The recent evaluation of aBi Finance suggests that its capital for financial services, including guarantees, needs to be increased to respond to the growing demand from existing and new partner institutions. The guarantees are widely used by financial institutions, especially for smallholder lending, where lack of physical assets for collateral is one of the major obstacles. Thus the increase will offer additional security in lending to smallholders and SMEs and help unlock the liquidity in the financial institutions. The guarantee scheme has been well managed, and as one of aBi's founders, the GoU should consider a capital injection to aBi to expand its guarantee operation. In addition, aBi's operational capacity and procedures may need to be strengthened for further scale-up.
- **Other public sector initiatives need to be strengthened and scaled up, including the warehouse receipt pilots led by the Uganda Warehouse Receipt System Authority** as well as **technical assistance and credit lines from the Microfinance Support Centre.** Detailed assessments would be required to identify specific actions to take on these schemes. **Agriculture insurance** is another essential public support that would allow financial institutions to manage risks in small farmer financing. Chapters 4 and 5 of this report discuss agriculture insurance provision in Uganda and suggest some actions to strengthen the Uganda Agricultural Insurance Scheme (UAIS).

3. Acceleration of Digital Financial Services in the Agriculture Sector

To enable cost-effective service delivery and outreach to smallholders in rural areas, leveraging digital technology for agricultural finance is critical. Given the high costs of servicing smallholder farmers, innovative and efficient means of extending financial services to these farmers are required. Further leveraging of technology including fintech will be critical in driving down the costs of service delivery, financing, and insurance—important ingredients in agricultural transformation in Uganda. Indeed, according to a study conducted by McKinsey Global Institute (2016), digital technologies cut the cost of providing financial services by 80–90%. To support innovation in agricultural finance and investment, GoU can promote digital payments in agriculture value chains and facilitate innovation in agriculture finance by leveraging mobile technology (56% of adults now use mobile money in Uganda) and further expanding it.

Holistic support would be required to test, scale up, and sustain innovative agriculture financial services. The recent change in the mobile money tax (reduced to 0.5% and applied only to withdrawals) may bring an opportunity to create momentum, scale up the existing innovations, and test new ideas. In this context, the necessary interventions would include the enhancement of the regulatory framework, technical assistance for scaling up and testing new concepts, and facilitation of partnerships among financial institutions, mobile network operators, agribusiness companies, farmer organizations, and input providers, among others. One of the public instruments for consideration is a partial grant facility that could convene and facilitate collaborations between the key stakeholders. The grant would partially cover the necessary expenses and investments to trigger scale-up of the newly developed financial services or the introduction of new services to farmers and SMEs.

While this report focuses on the supply side, demand-side interventions are equally important. Key interventions will require close collaboration with relevant stakeholders such as the MAAIF and will include enhancing production, developing value chains, promoting access to high-quality inputs and markets, promoting climate-smart agriculture, and organizing farmers for aggregation and commercialization. These activities would make the sector more resilient and productive and would create healthy demand for financial services, facilitated by the supply-side actions in a coordinated manner.

Focusing on the actions suggested above, the required agriculture finance investments are estimated to be around US$40 million to US$55 million for ACF, US$20 million to US$40 million for aBi, and US$6.2 million for the partial grant facility. Estimates of the investments related to ACF and aBi entail several key assumptions:

- Agriculture loans disbursed and outstanding will continue to grow in Uganda at the same pace as they have since 2010 (CAGR of 23.7% and 15.2%, respectively) till the end of the project period (2020–2024). Conservative scenarios with half of the respective growth rates were also considered. On the other hand, the estimate does not include more optimistic scenarios, given that Uganda's agriculture credit levels relative to private sector credit are among the highest in Sub-Saharan Africa and that Uganda's agriculture lending has been growing much faster (23.7%) than that in neighboring countries (e.g., 12% in Kenya and 7% in Rwanda) in recent years.
- The share of ACF credit disbursement (GoU contribution) in the total agriculture loan disbursement will remain constant, at the level in 2018 (1.7%).
- PFIs' repayments to ACF are not considered.
- The share of aBi guarantees in the total agriculture loans outstanding will remain at the same level as in 2016 (3.2%). Since the duration of the guaranteed loans is unknown, aBi guarantee funds are estimated against the loans outstanding.
- PFIs remain active in the agriculture sector and continue to rely on ACF and aBi guarantees. ACF may require additional PFIs if the scope of the lending is reduced to long-term finance and/or smallholder finance. Table 3.3 shows the assumptions and the estimates of the investments as a result.

Table 3.3. Cost Estimate of Agriculture Finance Investments (ACF and aBi)

(in USD million)	Scenarios	Growth rate	2019/20	2020/21	2012/22	2022/23	2024/25	ACF funds required
Total Ag lending (Disbursement)	Conservative	7.6%	411.2	442.4	476.1	512.3	551.2	
ACF (GoU contribution)			6.8	7.3	7.9	8.5	9.1	39.6
Total Ag lending (Disbursement)	Baseline	15.2%	471.3	543.0	625.5	720.6	830.1	
ACF (GoU contribution)			7.8	9.0	10.4	11.9	13.8	52.8

Share of ACF (GoU contribution) in the total ag lending disbursement: 1.7%

(in USD million)	Scenarios	Growth rate	Ag lending o/s and aBi guarantee funds in 2024	Existing aBi funds (2016)	Additional aBi guarantee funds required
Total Ag lending (Outstanding)	Conservative	11.9%	874.4		
aBi guarantee funds			28.1	10.3	17.9
Total Ag lending (Outstanding)	Baseline	23.7%	1,599.9		
aBi guarantee funds			51.5	10.3	41.2

Share of aBi guarantee funds in the total ag lending outstanding: 3.2%

Source: World Bank estimates.

The partial grant facility contains the grant to support five initiatives and partnerships, plus some additional costs for facility management. Additional funding would be necessary to improve the enabling environment, including capacity development for public and private actors as well as rural connectivity, both of which directly influence the success of the pilots. The total estimate is around US$6.2 million (table 3.4).

Table 3.4. Cost Estimate of Agriculture Finance Investments (partial grant facility)

(in USD)	Unit	Number	Sub total
Grant support	700,000	5	3,500,000
Facility management	200,000	lumpsum	200,000
Enabling environment (capacity development etc.)	500,000	5	2,500,000
		Total	6,200,000

Source: World Bank estimates.

The above assumptions and estimates will need to be revised based on detailed data and discussions with the stakeholders.

4. Agricultural Insurance Provision and Natural Disaster Relief Programs in Uganda

4.1. Overview of the Insurance Legal and Regulatory Framework, Market, and Taxation

Insurance Legal and Regulatory Framework

Insurance companies in Uganda operate under the terms and conditions of the Insurance Act 2017 (Act 6 of 2017), which was brought into force on March 30, 2018. This new act replaces the Insurance Act of 2000. The Insurance Regulations 2002, published under the terms of the Insurance Act, (Cap 213) Laws of Uganda 2000, will remain in force with all other regulations (AXCO 2018) until draft regulations under the Insurance Act 2017 are issued.

In Uganda the insurance market is supervised and regulated by the Insurance Regulatory Authority (IRA). Under the Insurance (Amendment) Act of September 2011, the Uganda Insurance Commission was renamed the Insurance Regulatory Authority of Uganda. An autonomous agency under the Ministry of Finance, Planning and Economic Development (MoFPED), the IRA is tasked with licensing of insurance companies, reinsurance companies, health membership organization companies and their intermediaries, loss adjusters and assessors, risk inspectors, and valuers. Other functions include inspecting and reviewing companies operating in the insurance market, operating a complaints bureau, approving policy and proposal form texts, approving minimum premium and maximum commission rates, and advising the Government of Uganda (GoU) on insurance protection and security of national assets and properties. The IRA is funded by a 1.5% compulsory level on insurers' gross written premiums (AXCO 2018).

Many insurance companies in Uganda are undercapitalized. In May 2018, 41 companies, including insurers, brokers, and consultancy firms, were blacklisted for not meeting the required minimum capital requirements; they were given a 30-day grace period to comply with the required share capital. This notice was issued jointly by the IRA and the Uganda Registration Services Board (AXCO 2018).

Most classes of non-life insurance in Uganda are subject to minimum tariffs. Minimum premium rates were first introduced in 2008 by the Uganda Insurers Association (UIA) with official approval from the IRA (then the Uganda Insurance Commission). The initial set of minimum rates was further supplemented in late 2008, 2009, and 2010, and the most recent revision came into effect in July 2013. Minimum rates now apply across most classes of property, motor, and casualty insurance. Under section 36 of the Insurance Act, the IRA has

the right to cancel a policy if the insurer appears to have lowered an approved premium without its authority (AXCO 2018). Minimum premium rates were introduced to prevent market competition from forcing rates down to actuarially unsound levels, which would prejudice the financial stability of the insurance market. However, minimum premium rates could affect competition and weaken underwriting skills; as insurers are not able to compete on price, they have less incentive to develop new products or distribution channels. One solution would be to apply minimum premium rates as a pure technical premium to protect the insurance companies while enabling competition and innovation.

The local industry association is the UIA, and membership is obligatory for all insurers and reinsurers under section 94 of the insurance legislation. Formed in 1965, the UIA is consulted by government on legislative changes and acts as the spokesperson for the whole industry. The association is funded largely by a subscription plus a charge for the use of the association's logo (AXCO 2018).

New regulations under the Insurance Act 2017 are under discussion, including those for microinsurance, risk-based capital supervision, takaful, and bancassurance (AXCO 2018).

Overview of the Non-Life Insurance Market

The number of licensed insurers operating in the Ugandan market in 2017 was 29; of these, 9 were life companies and the remaining 20 were non-life companies. There was one locally registered reinsurer. The number of non-life insurance companies has declined from a peak of 26 in 1997 to the current level of 20 companies. There are no state insurers in Uganda; all are private limited companies. There is one state reinsurer, the Uganda Reinsurance Company Limited (Uganda Re).

In 2015, total gross written premium amounted to UGX 612.2 billion (US$188.9 million). The non-life insurance market accounted for the greater share of total market premium at 76%, or UGX 464.4 billion (US$143.3 million); life insurance accounted for a 16% share, or UGX 99.9 billion (US$30.8 million); and health insurance written by the health membership organizations accounted for an 8% share, or UGX 47.9 billion (US$14.8 million). The non-life insurance industry has shown major expansion over the most recent five years reported, averaging about 20% growth in written premium between 2011 and 2012, followed by a decline to 12% in 2013, a 9% growth rate in 2014, and an increase to 21% in 2015 (AXCO 2018).

In 2015 the top-10 non-life insurance companies in Uganda had an 86.45% share of non-life market premium (figure 4.1.) The three largest non-life insurers by premium income in 2015 were Jubilee, UAP, and AIG Uganda, and their combined share of premium was greater than 50% of total non-life premium.

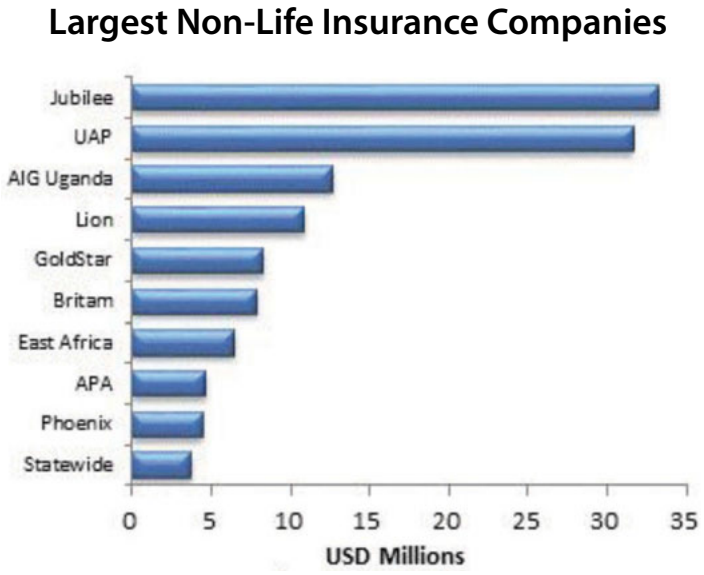
Insurance market penetration is very low in Uganda, equivalent to 0.77% of gross domestic product (GDP) and only US$4.84 per capita. The only East African country with a lower insurance penetration rate in 2015 was Tanzania, at 0.68% of GDP; insurance penetration was considerably higher in Kenya (2.83% of GDP, with expenditure of US$38.5 per capita) (table 4.1). Reasons for the very low insurance penetration in Uganda include the fact that only 1 million people are in salaried employment, and that most people are not aware of insurance as a concept. The low penetration rate may change, however, with the development of microinsurance and bancassurance (AXCO 2018).

The most important class of non-life insurance is motor (24.5% share of non-life premium), followed by construction and engineering (18.1%), personal accident (13.5%), and health care (8.1%). Agricultural insurance is included under miscellaneous insurance (20.6% share) (AXCO 2018).

Coinsurance Pools

An oil and gas coinsurance syndicate led by Uganda Re has been formed to make capacity available to the developing industry.

Figure 4.1. Top 10 Non-Life Insurance Companies in Uganda by 2015 Written Premium (US$ millions)



Source: AXCO 2018.

Table 4.1. Insurance Market Penetration in 2015 (percentage of GDP and expenditure in US$ per capita)

Country	Life		Non-Life (P&C)		PA and Healthcare		Total	
	% of GDP	US$/Capita	% of GDP	US$/Capita	% of GDP	US$/Capita	% of GDP	US$/Capita
Uganda	0.12%	0.75	0.54%	3.37	0.11%	0.72	0.77%	4.84
Kenya	1.01%	13.17	1.28%	17.34	0.55%	7.43	2.83%	38.50
Tanzania	0.08%	0.65	0.49%	4.20	0.11%	0.97	0.68%	5.81

Source: AXCO 2018.

In August 2016 the Ugandan government introduced the Uganda Agricultural Insurance Scheme (UAIS) as an insurance subsidy program for small- and large-scale farmers as well as farmers in high-risk areas of Uganda. The UAIS is implemented by the UIA in conjunction with the Agriculture Insurance Consortium (AIC), consisting of 11 (originally 10) coinsurers: APA Insurance, Goldstar, Lion Assurance, Phoenix, Jubilee, UAP-Old Mutual Insurance, CIC General, First Insurance Company, NIC, Pax Insurance, and Sanlam. It is notable that the AIC members that underwrite the UAIS are nearly all included in the list of top-10 insurance companies in Uganda (figure 4.1).

Reinsurance Arrangements

In 2015 total non-life premium ceded was UGX 217.06 billion (US$66.98 million), representing 46.74% of 2015 premium income, compared to 42.30% in 2014.

Uganda Re became operational in June 2013, and 15% of all reinsurance cessions (treaty and facultative, life and non-life) must be offered to the company. This is in addition to the existing compulsory cessions that must be offered to African Reinsurance Corporation (Africa Re) and Preferential Trade Area Reinsurance Company (ZEP Re) of 5% and 10%, respectively. There is no requirement that such cessions must be

accepted by each of these reinsurers, but the IRA now requires signed slips showing that the reinsurers declined to participate before the reinsurance can be placed elsewhere (AXCO 2018).

The UAIS is currently being supported by SwissRe under a quota share treaty reinsurance agreement. One of the world's largest reinsurance companies, SwissRe has a major market position, very strong business and geographic diversification, and strong balance sheet in terms of capital and financial flexibility; these strengths are reflected in its 2017 financial ratings (Moody's AA3 stable, Standard & Poor's AA-, and A. M. Best A+).[25]

Insurance Taxes and Stamp Duty

Nearly all classes of non-life insurance, including agricultural insurance, are subject to taxes on the commercial premiums. All policies are subject to a stamp duty of UGX 35,000 (about US$9.50) per policy, plus a value added tax (VAT) of 18% on the gross premium. In addition, all policies bear a training levy of 0.5% (table 4.2).

Table 4.2. Insurance Premium or Policy Taxes and Charges

Insurance Class	Description of tax or charge	% (unless otherwise stated)	To be paid by
Motor	Stamp duty	UGX 35,000 per vehicle	Insured
Marine cargo	Stamp duty	UGX 35,000 per certificate and UGX 35,000 for an open policy	Insured
Insurance performance bonds	Stamp duty	UGX 50,000 per bond	Insured
Microinsurance	Stamp duty	UGX 15,000 per policy	Insured
All other (including PA and health but excluding microinsurance and bonds)	Stamp duty	UGX 35,000 per policy	Insured
All (excluding life, health, microinsurance and reinsurance)	VAT	18 of gross premium	Insured
All	Training levy	0.5 of gross premium	Insured
All (including PA and health)	Supervisory levy	1.5 of premiums	Insurer

Source: AXCO 2018.

Note: PA = Personal Accident.

The UAIS consortium underwriters expressed concern that the stamp duty of UGX 35,000 per policy, plus VAT of 18% of the gross premium, is deterring many smaller farmers from buying crop insurance. For smallholders the addition of the stamp duty and VAT could double the cost of the premium that they would pay for insurance cover. Table 4.3 shows the effect on a smallholder farmer with sum insured of UGX 1 million and gross premium of UGX 50,000. In the absence of the premium subsidy, adding the Insurance Training Levy (IIU), Stamp Duty, and VAT would nearly double the cost of the policy to UGX 94,250. With a 50% premium subsidy for small farmers, the farmer's share of premium would be UGX 25,000, but with the inclusion of these taxes the final cost would be more than doubled, at UGX 64,625. Finally, without taxes the small farmer would only pay UGX 25,000. UIA-AIC have therefore appealed to the GoU to reduce the stamp duty from UGX 35,000 per policy to UGX 5,000 per policy, and to consider exempting agricultural insurance from VAT.[26] So far Parliament has not yet ratified these changes.

[25] SwissRe, "Financial Strength Ratings," https://www.swissre.com/investors/solvency-ratings/financial-strength-ratings.html.
[26] Personal communication with AIC underwriter, August 20, 2018.

Table 4.3. Implications of Taxes, Stamp Duty, and VAT for the Costs of Crop Insurance Premiums

Sum insured (UGX)	Premium (5%) (UGX)	Govt. 50% premium subsidy	Farmer's share of subsidized premium	IIU (0.5% of premium) (UGX)	Stamp duty (UGX/policy)	VAT 18% on premium (UGX)	Total premium with taxes (UGX)
1,000,000	50,000	—		250	35,000	9,000	**94,250**
1,000,000	50,000	25,000	**25,000**	125	35,000	4,500	**64,625**
1,000,000	50,000	25,000	**25,000**				**25,000**

Source: UAIS-TWG n.d.

4.2. Past Agricultural Insurance Initiatives: Results, Lessons, and Experience

Kungula Agrinsurance Scheme (KAS)

Agricultural insurance is a relatively new class of insurance in Uganda, and the earliest formal industry initiative, the Kungula Agrinsurance Scheme (KAS), was launched with the approval of the IRA only in 2013. The KAS represented an initiative by a consortium of eight Ugandan insurance companies, led by Lion Assurance Company Limited and including APA Insurance Limited, UAP Insurance Co. Limited, First Insurance Co. Limited, National Insurance Corporation Limited, NIKO Insurance Limited, Trans Africa Assurance Limited, and Phoenix Assurance Limited, with support from Agricultural Business Trust (aBi Trust) and SwissRe (PARM 2015).

KAS offered two Kungula insurance products, Weather Index Insurance (WII) for crops and livestock, and Kungula Livestock All Risks Mortality (ARM) cover for cattle:

1. **Kungula Crop Indexed Insurance** was designed to protect crop and livestock producers against drought and excess rainfall affecting crops and pasture. It used a composite index based on (i) rainfall as measured by the nearest weather station, and (ii) remote sensing satellite data collected by the Dutch environmental monitoring company EARS (Environmental Analysis & Remote Sensing).[27] The crop policy was designed as a stand-alone product or linked to bank loans. The product was targeted at farmer associations or individual farmers growing a minimum of five acres of the insured crops (maize and beans); the sum insured was based on a pre-agreed value or linked to the value of the loan; and the premium rates varied between 2% and 5% according to the risk zone.[28]
2. **Kungula Livestock (Cattle) All Risks Mortality (ARM) Cover** provided traditional individual animal accident and mortality cover for cattle aged six months to seven years. The cover was designed for large-scale livestock producers with more than 50 head of cattle; cover was subject to each animal being identified by tagging or microchipping and having a qualified veterinarian certify the animal's health and vaccination record. The policy sum insured was based upon an agreed value or linked to the value of the loan, and a premium rate of 2.0% was charged.[29]

[27] EARS is a remote sensing company based in the Netherlands, which started FESA (Food Early Solutions for Africa) microinsurance in order to develop low-cost, satellite-based microinsurance for all farmers in Africa. EARS uses historical data from 30 years of Meteosat hourly images of 10-daily relative evapotranspiration (RE) and cold cloud duration (CCD) data fields. These data serve as the insurance index for agricultural drought and excessive rainfall, respectively. They cover the entire African continent at a resolution of 3 km and are thus available for all types of farms, ranging from the large commercial farms to the small-scale rural plantations.

[28] Lion Assurance, "Kungula Crop Indexed Insurance," http://www.lion.trueafrican.com/our-products/kungula-agrinsurance/kungula-crop-indexed-insurance.

[29] Lion Assurance, "Kungula Livestock (Cattle) All Risk Mortality (ARM) Insurance," http://www.lion.trueafrican.com/our-products/kungula-agrinsurance/kungula-livestock-cattle-all-risk-mortality-arm-insurance.

The KAS commenced operations in 2014 with a planned investment of UGX 350 million to help farmers cope with devastating weather shocks, but its uptake was slow. In addition to the Crop WII and Livestock ARM Cover, KAS has also introduced Multi-Peril Crop Insurance (MPCI). The premium rates vary from about 2% (for WII) to 16% (for MPCI) of the sum insured, according to the product type, insured perils, and location of the farmer; to date policy sales have been slow (>5,000). Reasons for the low uptake include the high cost of insurance premiums coupled with the high start-up investment costs: the Kungula Consortium's expenditure to develop the drought insurance product was over UGX 1 billion more than the premium collected (UAIS-TWG n.d.). On account of the disappointing performance, in 2015 several leading companies left the KAS to launch their own agricultural insurance products and programs.

The KAS did not attract premium subsidies, and this was identified as one of the reasons for low demand and uptake by farmers. In 2014, GoU agreed in principle to set aside a UGX 5 billion premium subsidy fund for 2014 with a further UGX 5 billion the following year: farmers with less than 5.0 acres would receive a 50% premium subsidy, and those with more than 5.0 acres would receive a 25% premium subsidy (Khisa 2016).

UAP and Jubilee Agricultural Insurance Initiatives (2015)

UAP opted out of the KAS and launched its own agricultural insurance products in 2015. Building on the experience of its parent company in Kenya, UAP started underwriting four products: MPCI, Crop WII, livestock insurance, and greenhouse insurance.

Jubilee Insurance developed two insurance products, MPCI and livestock insurance. Jubilee started to underwrite its own agricultural insurance in 2015.

Neither of these initiatives carried premium subsidies (PARM 2015). The premium rates charged on these programs were assessed per risk, but on average were 8.0%. To date 800 farmers have been insured (UAIS-TWG n.d.).

4.3. Uganda Agricultural Insurance Scheme: Overview

GoU Rationale and Objectives for UAIS

The rationale for the UAIS stems from GoU's recognition of the need to de-risk the agricultural sector in order to stimulate investment by financial institutions and increase farmers' access to credit, thereby increasing agricultural productivity, output, and incomes and at the same time reducing rural poverty. Traditionally, agriculture has been starved of investment, so that the agricultural sector's growth of 3% to 4% a year has been well below the National Development Plan annual growth target of 5.6%. Agricultural insurance provides the potential for both farmers and their lending institutions to transfer production-related risks to a third party (the insurance company), thereby providing the banks and other financial institutions with the confidence to increase their lending to farmers and in turn enabling the farmers to invest in production-enhancing technology.

International experience shows that in emerging markets, private sector insurers seldom have the capacity and resources to develop sustainable agricultural insurance programs for smallholder farmers and that the most successful models are usually built on some form of public-private partnership (PPP) (Mahul and Stutley 2010a). In Uganda the mainly private sector crop and livestock initiatives between 2012 and 2015 failed to take off and to achieve scale and sustainability.

In 2016, GoU agreed to enter into a PPP agreement with interested private insurance companies to implement a partnership program for up to five years, under which GoU would provide the following financial and other support:

- **Farmer awareness and education programs** on the role and benefits of agricultural insurance, to be provided through government ministries and development partners

- **Premium subsidies** to make agricultural insurance more accessible and affordable to farmers, thereby increasing uptake, with the goal of achieving scalability and financial sustainability by the end of the five-year project
- **Data support** for insurers, especially agricultural data from the Ministry of Agriculture, Animal Industry and Fisheries and meteorological weather data from the Uganda National Meteorological Agency (UNMA)
- **Fostering of lending by the financial institutions** to the agricultural sector by introduction of UAIS (UAIS-TWG n.d.)

The UAIS was launched in August 2016. The scheme aims to protect Ugandan farmers against the effects of agriculture risks (especially production risks) by introducing measures that ensure an indemnity sufficient to keep the farmer in business. The specific objectives of the UAIS are (i) to make agriculture insurance more affordable to farmers in Uganda; and (ii) to increase farmers' access to credit by protecting agriculture loans disbursed by financial institutions from the effects of specified agriculture risks.

The crop and livestock insurance products and services of the UAIS are intended to benefit key UAIS stakeholders, including the government, smallholder farmers, and financial institutions.

Memorandum of Understanding, UAIS Objectives, and UAIS Governance

The UAIS is governed by a Memorandum of Understanding (MOU)[30] signed on 27 June 2017 between the key stakeholders: GoU, represented by MoFPED; Bank of Uganda (BoU); Insurance Regulatory Authority (IRA) of Uganda; and the Uganda Insurers Association (UIA) acting on behalf of the Agriculture Insurance Consortium.[31] The following details of the MOU are salient:

- GoU has committed to set up UAIS to run on a pilot basis for not more than five years to insure farmers against natural calamities beyond their control for both crops and livestock.
- The UAIS is to be implemented as a PPP between GoU and UIA, as well as BoU, IRA, and other partners.
- GoU committed in 2016/17 to fund farmer premium subsidies of UGX 5 billion in respect of all UAIS policies issued by participating insurers, and in the subsequent four years to make an annual budgetary provision of UGX 10 billion to cover the premium subsidy contribution, subject to UAIS's performance in the preceding year.

The MoU defines the insured perils for crops, livestock, and aquaculture; specifies the exclusions and the basis of the sums insured; and lists a number of eligibility criteria:

- All (non-life) insurance companies in Uganda are deemed eligible to participate in UAIS.
- The UAIS will be used primarily to provide premium subsidies to eligible farmers.
- Eligible crops will include coffee, tea, maize, rice, beans, bananas, fruits, and vegetables.[32]
- Eligible livestock will include cattle, pigs, and poultry as well as fish (under aquaculture).[33]
- Both small and large farmers are deemed to be eligible participants.
- All regions of the country are deemed eligible for the scheme.
- The premium rates charged for agriculture insurance should not exceed 6% (Republic of Uganda 2017b).
- All participating insurance companies will subject farmers to uniform premium rates and to the same products, terms, and conditions; and all claims will be settled in accordance with agreed and standard practices.

[30] The Republic of Uganda Memorandum of Understanding to govern operations of the UAIS, signed 27 June 2017 between GoU/PoFPED, BoU, IRA and UIA.
[31] The MOU also refers to the AIC as the "Agro Consortium."
[32] It is noted that the MOU also incorrectly includes as eligible crops, "Fish, Meat, Milk."
[33] It is noted that currently under the UAIS, sheep and goats (small ruminants) are not insurable.

The MOU also specifies the administration of the scheme:

- MoFPED designates UIA as the administrator of the scheme responsible for operationalizing UAIS through participating companies in the AIC.
- UIA will provide GoU/MoFPED and the National Committee for Agricultural Insurance with reports on UAIS implementation status on a quarterly basis or as requested by the parties.

The MOU sets out the roles of the institutions—specifically MOFPED, BoU, IRA, and UIA. These roles are discussed further below and in section 5.8.

Finally, the MOU explains payment of the premium subsidy and sets out further terms:

- IRA is responsible for conducting a thorough verification of the underwritten UAIS policies and for advising BoU, through MoFPED, on the subsidy premium amounts due to be paid to the AIC.
- Further terms cover events of force majeure and of severance (Republic of Uganda 2017b).

As indicated in section 4.1, the UAIS is underwritten by a consortium of 11 leading private commercial insurance companies termed the Agriculture Insurance Consortium: APA; Gold Star Insurance; Lion Insurance; Phoenix Insurance; Jubilee Insurance; UAP Insurance; CIC General; First Insurance Company; National Insurance Company; Pax Insurance; and Nova Insurance Company (Sanlam group).

The objectives of the AIC include the following:

1. Standardize premium rate cover for crop and livestock covered under the national scheme (premium rates before subsidy ranged between 8% and 15%, but with the subsidy are now averaging 2.5%).
2. Standardize the procedure for approval and settlement of subsidy and farmer claims.
3. Ensure that the same insurance products, terms, and conditions are provided to participating farmers and that all claims are settled in accordance with agreed and standard practices.
4. Consolidate technical and financial capacity essential to developing suitable products.
5. Ensure a cost-effective approach to product development, policies, and claims handling.[34]

Implementation of the UAIS is managed by the UIA, which acts on behalf of the AIC members. The MOU between GoU and the UIA makes the UIA ultimately responsible for administration and implementation of the UAIS (Republic of Uganda 2017b).

The 11 AIC insurers have formed an Agro Consortium Secretariat (ACS), which is housed in the offices of the UIA. The ACS currently has four full-time staff members: secretariat technical manager, consortium officer, administrator, and data analyst. The ACS also employs four agricultural inspectors, one per region of Uganda (Central, Western, Eastern, and Northern). The inspectors are responsible for coordinating field-level operations, including (i) farmer awareness and education campaigns; (ii) marketing and sales programs; (iii) implementation of the field pre-inspections, mid-season inspections, and harvest inspections on the MPCI policies; and (iv) planning and implementation of the in-field crop and livestock loss assessments. The ACS is financed by a 15% deduction (commission) from the UAIS agricultural insurance premiums, which has been agreed with the AIC insurers. The ACS reports to the **Board** of the AIC, which consists of the executive officers of the 11 consortium insurance companies. There is also a **Technical Working Committee** that consists of four members of the AIC and the ACS technical manager.

Under the MOU, the UIA is responsible for providing GoU/MoFPED and the National Committee for Agricultural Insurance with quarterly reporting on the status of implementation of the UAIS. The National Committee for Agriculture Insurance (which is also referred to as the **Technical Working Group**) is chaired by

[34] See the AIC website at www.aic.ug.

a senior member of MoFPED and is composed of representatives from MAAIF BoU, IRA, UNMA, ACS, several AIC insurance company representatives, and USAID. The committee meets on a quarterly basis to review the quarterly reports prepared by the UIA and ACS and to discuss issues and challenges that require attention.

UAIS Products and Programs

The UAIS offers a broad range of crop, livestock, and aquaculture insurance products.

For crops, UAIS provides both traditional indemnity-based and new index-based insurance covers, including the following:

1. **Multi-Peril Crop Insurance.** The main crop insurance product offered is individual grower MPCI. This is a traditional indemnity-based product that offers farmers loss of crop yield protection against a wide range of perils.
2. **Drought Weather Index Insurance.** The product is a satellite-based WII cover that uses a Relative Evapotranspiration Index to provide rainfall deficit (drought) and excess rainfall cover for maize and bean producers in Uganda.
3. **Area Yield Index Insurance.** In 2017/18 AIC started a pilot AYII program with One Acre Fund (1AF) for maize farmers located in four selected districts in the Eastern region.

For livestock, the UAIS insures cattle, pigs, and poultry against death of the individual animal (or bird) due to named perils. The cover is a standard accident and mortality indemnity-based policy.

The UAIS aquaculture policy insures both offshore and onshore fish farms, fingerling grow-out operations, and hatcheries against loss of the fish stock and also loss or damage to the installations, cages, ponds, and equipment.

The UAIS crop, livestock, and aquaculture products are reviewed in detail in chapter 5.

Government Support to UAIS

GoU committed to providing premium subsidies of UGX 5 billion (US$1.33 million) in 2016/17 and in 2017/18 and in principle up to UGX 10 billion per year for the four subsequent years 2020/21 to make cover more affordable to farmers and to assist uptake and penetration of crop and livestock insurance in Uganda (UAIS-TWG n.d.). GoU's priority is to help small-scale farmers and livestock producers access insurance, and it has agreed to the following premium subsidy levels for each category of farmer:

- Large farmers: 30% premium subsidy
- Small farmers: 50% premium subsidy
- Farmers in high-risk regions: Up to 80% premium subsidy (high-risk and disaster-prone areas include Kasese, Arua, Isingiro, Ngora, and Mount Eldon region) (UAIS-TWG n.d.)

Currently it is understood that GoU does not apply any upper limit on the size of farmer that is eligible for premium subsidies. In most countries where agricultural insurance is subsidized, governments do not cap the maximum area (or number of animals) that may be insured. However, a few countries, including Brazil and Kenya, do cap the maximum farm size or number of animals that qualify for premium subsidies to ensure that very large farmers do not end up capturing a disproportionately high share of the subsidies. In Kenya, for example, under the government-subsidized Kenya Livestock Insurance Program, component 1 (fully subsidized cover) is provided only for five Tropical Livestock Units (TLUs), irrespective of the owner's herd size; for component 2 (voluntary cover) that attracts partial premium subsidies, the 50% premium subsidy is available for a maximum of 10 TLUs, and owners are required to pay the premium in full for additional animals over and

above 10 TLUs that they wish to insure. Likewise, for the subsidized crop insurance programs in Kenya, the maximum area any one farmer can insure with 50% premium subsidy is five acres.

Classification of Small-Scale and Large-Scale Farmers

For the purposes of the UAIS program, large-scale and small-scale farmers are classified as follows:

- **Large-scale farmer** is one with a farm of five acres (2.5 hectares) or larger, or a farm that generates income of UGX 20 million or more every season
- **Small-scale farmer** is one with a farm of less than five acres (2.5 hectares), or a farm that generates income of less than UGX 20 million every season (UAIS-TWG n.d).

For the purposes of the UAIS program, large-scale and small-scale livestock producers are classified as follows:

- **Large-scale livestock producer is one owning more than**
  - 30 head of cattle, or
  - 50 head of pigs, or
  - 2,000 head of poultry
  - For fish farming, only large farms (as determined by UIA-AIC) accepted
- **Small-scale livestock producer is one owning**
  - 1–30 head of cattle or
  - 1–50 head of pigs or
  - 500–2,000 head of poultry
  - For fish farming, small farms are not accepted (UAIS-TWG n.d).

4.4. National and Provincial Disaster Management Programs

In Uganda there is a potential to explore synergies between public sector natural disaster risk management and compensation programs on the one hand and the public-private agricultural insurance programs and services provided under UAIS on the other. In many countries, including Uganda, the government acts as the insurer of last resort in the event of major natural disasters, providing short-term disaster emergency relief and compensation to the affected population and then medium-term reconstruction and development assistance. Aid agencies are also often involved in the provision of humanitarian assistance in the aftermath of a natural disaster. Agricultural insurance can complement and support governments' natural disaster programs by compensating or indemnifying farmers for the loss of their crops or livestock, thereby smoothing consumption and incomes and enabling the farmers to get back into business for the next cropping season. Governments can support agricultural insurance by providing premium subsidies to make cover more affordable and accessible to farmers, or by purchasing agricultural insurance as part of their sovereign risk financing strategy for natural disasters (aiming to protect the most vulnerable small-scale farmers). In scaling up UAIS, the key stakeholders should work closely with the main government agencies responsible for managing the natural disaster mitigation program in Uganda; this approach will ensure coordination of their programs and avoid duplication of compensation payouts to the same farmers.

The GoU has a well-defined framework to manage natural disasters. Uganda's Constitution (article 249) provides for the establishment of a Disaster Preparedness and Management Commission "to deal with both natural and man-made disasters." In addition, the National Development Plan recognizes disaster management as one of the enabling sectors that needs to be developed in order to achieve sustainable development. Overall

responsibility for disaster management lies with the Office of Prime Minister (OPM) within the Department of Relief, Disaster Preparedness and Management (DRDPM). DRDPM acts as the leading institution and coordinates activities of the various line ministries, humanitarian agencies, and stakeholders concerned with victims of disasters in order to achieve a multi-sectoral and harmonized approach to disaster management. Its mission is to "minimize vulnerability levels of the people of Uganda against natural and human-induced hazards; and to save lives and livelihood assets when disasters occur" (DDPM-OPM 2011). In 2015, Uganda implemented the Sendai Framework for Disaster Risk Reduction and established a national resilience committee.

To fulfill their mandates, OPM and DRDPM are supported by two pillars, the National Platform for Disaster Preparedness and Management and the National Emergency Coordination and Operations Centre (NECOC). The National Platform for Disaster Preparedness and Management is an interagency technical committee composed of focal point technical officers from different line ministries, UN agencies, and nongovernmental organizations, as well as relevant stakeholders. It is responsible for the coordination of preparedness, prevention, mitigation, and response interventions in the country. NECOC is in charge of sudden-onset emergencies and is responsible for the coordination and networking of the various emergency response institutions of government, such as the fire brigade, Police Rapid Response Units, Emergency Support Units of the Uganda Peoples' Defence Force, Uganda Red Cross Society, and hospital emergency units, as well as private emergency firms. NECOC has developed and published multi-hazard risk profiles and maps for 116 districts in Uganda.

Ugandan policy considers disaster risk management at all levels of the administration and across stakeholders, including civil society organizations and private sector entities. The National Platform for Disaster Risk Reduction meets regularly and is represented at the district level by the District Disaster Management Committees and at subcounty by Subcounty Disaster Management Committees. Currently, 75% of districts have a functional Disaster Management Committee.

The most dominant and widespread climatic shock in Uganda is drought. Drought particularly affects the agriculture sector, resulting in low production and productivity, food insecurity, and famine. The most drought-prone areas in Uganda are the districts in the cattle corridor stretching from the Western and Central to mid-Northern and Eastern regions of Uganda. In the 30 years from 1989 to 2018, Uganda recorded a total of 76 major disasters affecting 6.6 million people, including five major droughts that affected 5.15 million people, or 77% of the total number of people affected by disasters over this reporting period (table 4.4).

Table 4.4. Effect of Major Disasters in Uganda, 1989–2018

Hazard type	No. of events	No. of people affected	No. of deaths
Epidemic	37	345,227	1,668
Earthquake	4	50,590	11
Flood	20	1,072,859	285
Landslide	6	17,161	503
Drought	5	5,150,000	194
Storm	4	10,152	23
Total	**76**	**6,645,989**	**2,684**

Source: EM-DAT: The Emergency Events Database—Universite catholique de Louvain (UCL)—CRED, D. Guha-Sapir—www.emdat.be, Brussels, Belgium. Data as of January 23, 2019.

Droughts cause important financial damages and losses to Uganda's economy. The 2010/11 drought caused total damages and losses to the Ugandan economy of US$1.2 billion, or 7.5% of Uganda's GDP in 2010/11. According to the Post-Disaster Needs Assessment conducted by OPM, the value of damage and losses in the agriculture sector alone were estimated at UGX 2.2 trillion, or approximately US$907.0 million, accounting for 77% of total damage and losses across all economic sectors. Of the US$907.0 million, 5% was damage and 95%

Table 4.5. Estimated Damage and Losses for Agriculture in Uganda, 2010–2013 (UGX millions)

Subsector	Impact	Damage and Losses (million Shillings)				
		2010	2011	2012	2013	Total
Crops	Losses: production	547,250	460,479			1,034,729
Livestock	Damage: deaths	39,608	66,596			106,204
	Losses: production	256,755	590,778	52,248	35,097	934,878
	Losses: higher production costs	41,274	44,130			85,404
	Subtotal	337,637	701,504	52,248	35,097	1,126,466
Agriculture	**Total**	**884,887**	**1,161,983**	**52,248**	**35,097**	**2,161,195**

Source: OPM 2012.

was losses. For the four-year period 2010 to 2013, crops accounted for UGX 1.0 trillion, or 48% of the total damage and losses in the agricultural sector, while livestock accounted for UGX 1.1 trillion, or 52% (table 4.5).

The drought of 2016, due to an El Niño event, affected 1.3 million people and lowered Uganda's economic GDP growth forecast from 5% to 3.5%.

There is a high degree of variation in GoU's expenditure for natural disasters each year. That is, the annual amount spent by OPM in response to disasters varies considerably (table 4.6). GoU's expenditure on disaster preparedness, mitigation, and prevention is allocated into three major categories: recurrent budget for wages, recurrent budget for non-wages, and development budget. The major purposes of recurrent budget expenditures are to provide relief to disaster victims; coordinate clearance of mined and contaminated areas; return and resettle internally displaced persons and settle/voluntarily repatriate refugees; and undertake preparedness activities. The non-wage recurrent budget is allocated and used by OPM for day-to-day needs in disaster preparedness, mitigation, and prevention. The expenditures under development include interventions such as acquisition of land to resettle displaced persons; purchase of motor vehicles; and construction, maintenance, or acquisition of buildings. In addition to this budget, some ministries, departments, and agencies under the different sectors have mainstreamed disaster risk management in their respective development plans and budgets.

Table 4.6. Government of Uganda Expenditure on Disaster Preparedness, Mitigation, and Prevention (UGX billions)

Expenditure category	FY 2012/13		FY 2013/14		FY 2014/15		FY 2015/16		FY 2016/17	
	Budget	Outturn	Budget	Outturn	Budget	Outturn	Budget	Outturn	Budget	Outturn
Wage	0.41	0.38	0.39	0.18	0.41	0.41	0.41	0.36	0.558	0.558
Non-wage	7.42	7.32	8.53	8.54	7.24	7.24	7.11	11.74	6.999	32
Development	5.08	10.23	60.16	60.07	13.22	13.12	13.01	11.74	5.008	4.347
Total	**12.91**	**17.93**	**69.08**	**68.79**	**20.87**	**20.77**	**20.53**	**23.84**	**12.57**	**36.91**

Source: CSBAG 2018.

The government's efforts are complemented by those of external donors. Like the GoU, official development assistance from external donors varies from year to year. The majority of flows go to emergency responses. Reconstruction and rehabilitation activities received less financing from donors (table 4.7).

Table 4.7. Official Development Assistance Flows to Uganda: Commitment and Disbursement (US$ millions)

	2010		2011		2012		2013		2014		2015		2016		2017	
	Commitment	Disbursement	Commitment	Disbursement	Commitment	Disbursement	Commitment	Disbursement	Commitment	Disbursement	Commitment	Disbursement	Commitment	Disbursement	Commitment	Disbursement
Emergency Response	45.427	47.070	27.899	37.360	24.796	26.696	66.104	53.750	108.861	49.764	108.492	54.554	168.982	98.052	324.672	214.987
Disaster prevention & preparedness	4.834	5.359	6.155	0.938	4.578	1.524	0.794	1.733	3.076	2.499	0.366	1.458	1.325	2.362	0.921	1.179
Reconstruction Relief, Rehabilitation	0.413	0.465	0.961	0.515	0.922	0.784	0.317	0.631	..	0.228	0.109	0.109	0.709	0.173	..	..

Source: OECD.Stat Credit Reporting System database, https://stats.oecd.org/Index.aspx/Index.aspx?DataSetCode=CRS1, accessed January, 25, 2019.

GoU has a set of disaster risk financing (DRF) instruments. The 2010 national policy on disaster proposed a National Disaster Preparedness and Management Fund Bill with an annual allocation of 1.5% of the approved national budget. In addition, the Public Finance Management Act (PFM Act, 2015) provides for the establishment of the Contingencies Fund, which will be financed every financial year with an amount equivalent to 0.5% of the previous year's total appropriated national budget. Under the PFM Act, 2015 (as amended), the purpose of the Contingency Fund is to finance Uganda's disaster response. However, the fund has not yet been operationalized. Currently, with the support of the World Bank, OPM is implementing the Third Northern Uganda Social Action Fund Project (NUSAF 3), a safety net program for poor and vulnerable households. A US$130 million program to be carried out over five years (2016 to 2021) in 62 districts of the country, NUSAF 3 provides temporary public works opportunities (Labor-Intensive Public Works, LIPW) to poor and vulnerable households and provides grants to promote income-generating activities (Improved Household Income Support Program, IHISP, and Sustainable Livelihood Program, SLP). NUSAF 3 also includes a scalable public works mechanism that allows it to rapidly increase financial assistance to affected households immediately following a shock event. This DRF subcomponent is being piloted in Karamoja subregion and is triggered following drought to temporarily scale up the LIPW activities, rapidly provide additional support to core LIPW clients, and/or extend coverage to new beneficiaries. The DRF subcomponent targets 84,000 households in Karamoja region with an allocated budget of US$10 million. The DRF mechanism has been triggered twice, in August 2016 and December 2017; US$4 million was rapidly drawn from the US$10 million reserve fund, benefiting a total of 54,422 beneficiary households (table 4.8).

Table 4.8. Summary of DRF Instruments Available in Uganda

Instrument	Budget	Peril	Institution(s)
Budget for disaster response	Varies	All shocks	MoFPED OPM
NUSAF 3 scalability mechanism	US$10 million (UGX 34.5 billion)	Shocks in Northern Uganda	MoFPED OPM World Bank
Disaster Relief Emergency Fund (DREF) loans and grants[a]	Up to CHF 1 million (UGX 3.7 billion)	All humanitarian response; disbursed following approval of appeal	International Federation of Red Cross and Red Crescent Societies
UN Central Emergency Response Fund (CERF)—Rapid Response Window	Depending on nature of crisis, up to US$30 million (UGX 107 billion)/ year	Sudden-onset emergencies	UN CERF, UN agencies
Humanitarian Emergency Refugee Response in Uganda	GBP 70,999,996	All humanitarian response	UK Department for International Development (DFID)

Source: World Bank Group.

a. This funding is also available to other countries.

5. Situation and Gap Analysis of Uganda Agricultural Insurance Scheme (UAIS)

5.1. UAIS Technical Review of Crop Insurance Products and Services

Crop Insurance Product Types

It is conventional to classify crop insurance products as either indemnity-based or index-based. Indemnity insurance policies are contracts in which compensation is based on measured in-field crop loss or damage, while index insurance contracts pay out with reference to an indirect indicator intended to be a proxy for loss or damage.

The following are the main types of indemnity-based crop insurance products:

- **Named Peril Crop Insurance (NPCI).** This product can be either "single peril" (e.g., hail) or "combined peril" (e.g., hail + frost + wind); payments are made on the basis of the percentage of assessed damage to the crop.
- **Multi-Peril Crop Insurance (MPCI).** In this product, payments are established on the basis of loss of yield generated by a comprehensive set of perils (some exclusions may apply).
- **Revenue insurance.** In this product, the yield loss component of MPCI cover is complemented by a price coverage element.

There are two main categories for crop index insurance products:

- **Weather Index Insurance (WII).** These contracts for a specified area provide the same payouts to all farmers according to the value of an index based on a weather variable (e.g., rainfall, temperature, wind speed, etc.).
- **Area Yield Index Insurance (AYII).** These contracts for a specified Unit Area of Insurance (UAI) provide the same payouts to all farmers against an estimated reference average yield (the "yield index") of the area.

UAIS Crop Insurance Products and Key Data Requirements

Currently, the Agriculture Insurance Consortium (AIC) in Uganda offers three types of crop insurance policies to farmers under the UAIS scheme:

1. **MPCI.** This traditional indemnity-based crop insurance policy provides very comprehensive loss of crop yield protection to the individual farmer.
2. **WII.** This new parametric or index-based crop insurance policy pays out to farmers in a given area if a weather event is triggered at a ground-level weather station in the area. The weather index could also be constructed on satellite-based remote sensing imagery. AIC is currently offering a drought index insurance cover that uses a Relative Evapotranspiration Index (REI) designed by Environmental Analysis & Remote Sensing (EARS) in the Netherlands.
3. **AYII.** This product is based on an area yield index approach under which all farmers in a defined geographical area are protected against losses in the area average yield for each insured crop. Such a cover, however, does not insure individual farmers against crop yield loss on their own fields and farms.

Each of these crop insurance products has specific demands for data and statistics for designing the covers. In addition, each offers its own operational advantages and disadvantages and restrictions on use for different crop types, as listed in table 5.1.

In Uganda, the extremely limited access to necessary data—including (i) time series crop area, production, and yield data at individual farmer level and local (village, parish) level, and (ii) time series meteorological weather station data—poses a major challenge for the design and implementation of both indemnity-based and index-based crop insurance products. This limited access to data is explained below for specific product types.

- **Crop MPCI.** MPCI requires that individual farmers be able to provide their own farm-level historical crop yields for the past 7 to 10 years as the basis for calculating the long-term average yield and setting an insured yield guarantee or coverage level. (Currently in Uganda a 75% guarantee level is set for the MPCI program.) In Uganda very few farmers maintain records of their past production and yields, making widespread development of MPCI difficult (see section 5.2 for further discussion).
- **WII.** The Uganda National Meteorological Agency (UNMA) has a very restricted ground-based weather station network in Uganda which cannot provide the required density of coverage to support a WII program. Although there is a denser network of manual rainfall gauges, very few of these are able to provide uninterrupted time series daily data for the last 25 years or more, which are needed to support the design of WII covers. Under UAIS, the solution has been to develop WII products based on remote sensing satellite-based indexes measuring relative evapotranspiration. (See section 5.3 for further discussion.)
- **AYII.** In order to design and rate an AYII cover, it is necessary to have historical area yield data for a minimum of 10 to 15 years at a localized level (e.g., village, parish, or subcounty). Historically, Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) field extension officers routinely collected yield data at parish and subcounty levels, and these were collated for official reporting purposes at district levels. However, this system has broken down, and in the past decade the main source of data has been the 2008/09 National Census of Agriculture, which includes yield data only at the district level for the first and second seasons. This limitation poses a major challenge for the development of AYII in Uganda. (See section 6.3 for further discussion).

Table 5.1. Key Crop Insurance Product Types in Uganda and Data Required to Construct Policies

Item	Individual grower MPCI cover	WII	AYII
Type of policy	Individual farmer protection	Any farmer in a defined geographical area	Any farmer in a defined geographical area
Basis of insurance & indemnity	Indemnity—loss of physical crop yield	Weather index–based payouts	Area yield–based payouts
Insured perils	Natural, climatic, and uncontrollable biological perils causing loss of crop yield at the individual farmer level	Usually single perils, e.g. rainfall deficit (proxy for drought), excess rainfall (proxy for flood)	Natural, climatic, and uncontrollable biological perils causing loss of crop yield at the area level
Data required to construct policy	Minimum 10 years of annual crop yield data for each farmer's own fields/farm for calculating the long-term average yield (LTAY)	Minimum 20 to 25 years of daily weather data—e.g., daily rainfall data	Minimum 10 to 15 years of average crop yield data for the defined geographical area (UAI)

Source: World Bank Group.

5.2. Review of UAIS Crop MPCI Product

MPCI: Overview

MPCI is the most comprehensive yield shortfall guarantee policy that farmers can buy. An MPCI cover provides individual-farmer tailor-made loss of yield shortfall guarantee cover against natural, climatic, and biological perils. It is a product that has been designed and operated for large-scale cereal, oilseed, and horticultural producers in North America (United States and Canada), parts of Europe, and parts of Latin America (Mexico, Brazil) for many decades. MPCI can be offered only where farmers can provide their own historical yield data for the past 7 to 10 years or more as the basis for calculating their long-term average yield (LTAY) (table 5.2).

Many voluntary MPCI programs suffer from severe problems of adverse selection and moral hazard, as well as from extremely high administrative and operating costs. Adverse selection arises when farmers in low-risk areas tend not to buy MPCI, while those in high-risk areas do purchase it. Moral hazard typically arises in relation to MPCI programs when farmers elect to reduce their management and husbandry and input costs

Table 5.2. MPCI: Preconditions for Operation, Advantages, and Disadvantages

Preconditions	Advantages	Disadvantages
• Detailed information required on crop yield history (minimum 10 years of data to establish LTAY) and on farming practices at individual farm level • Need for trained personnel in the field to conduct pre-inspections, mid-season inspections, and yield-based loss adjustment	• Provides comprehensive "all risk" loss of crop-yield guarantee at individual farm level • Tends to be the type of crop insurance product preferred by farmers • Does not entail basis risk (except in the case of imprecise determination of LTAY and insured yield) • Is simple to design, with limited technical adaptation required for different crops	• Contains a systemic (catastrophic) risk component that is difficult for insurers to handle • Is subject to adverse selection and moral hazard • Has high transaction and inspection and loss adjustment costs; generally cost-effective only on large farm units • Has high premium rates (so is likely to be unsustainable unless heavily subsidized by government) • Not suited to smallholder farming environments, where farm-level crop yield data are rarely available and individual farmer insurance is very challenging to administer

Source: World Bank Group.

(e.g., for weed, pest, and disease control) because any resulting yield shortfall can be claimed on their MPCI policy. In order to attempt to minimize their exposure to moral hazard, MPCI insurers will not agree to inception of coverage until a qualified inspector visits the farm to confirm that the insured crop has been sown at the correct seed density and that the crop has successfully emerged. A further mid-season visit is required to confirm that the farmer is adopting the correct management and husbandry standard, and a third visit is required at harvest to sample the crop and confirm the actual yield—and determine whether an indemnity payment is due or not. The comprehensive nature of coverage and high administration and operating (A&O) costs mean that MPCI policies typically carry premium rates of between 7.5% and 10% or more and are too expensive for most farmers to purchase. Governments typically subsidize the premiums on MPCI programs in an attempt to make cover more affordable (Hazell, Pomareda, and Valdes 1986; Mahul and Stutley 2010a).

International experience shows that it is extremely difficult for insurance companies to offer MPCI cover to smallholder farmers with less than five acres of insured cropping. This is because most smallholder farmers cannot provide the historical yield data needed as the basis for the LTAY, and because the costs of pre-inspections, mid-season inspections, and harvest-time in-field yield loss assessment are prohibitively high for such small units. Typically, MPCI is best suited to large-scale farms such as those in the United States, where the average famer has several hundred hectares of crops insured under an MPCI cover.

UAIS MPCI Policy Features

The UAIS MPCI policy is a standard MPCI policy form that has been provided by its lead reinsurer. Key features of the MPCI policy are summarized in box 5.1 and are detailed more fully in the MPCI policy wording.[35] Key points include the following:

1. **Insured perils.** In common with all MPCI covers, the UAIS policy provides very comprehensive loss of yield protection against a wide range of systemic perils (e.g., drought) and idiosyncratic perils (e.g., hail). Cover is also provided against uncontrollable pests and diseases, including uncontrollable birds and wild animals, subject to proof that the insured tried by all means to keep the pests and diseases at bay.
2. **Basis of insured/guaranteed yield.** The guaranteed yield is calculated at 75% of the LTAY; in other words, the policy carries a first loss yield shortfall deductible, borne by the farmer, of 25% of the LTAY. This means that for all insured farmers, crops, and regions, a uniform yield guarantee of 75% of LTAY will operate under UAIS. While some MPCI programs establish the yield guarantee according to the individual farmer's yield variability, UAIS has sought to standardize the program and make the messaging more understandable to farmers, and so has adopted a single yield guarantee level.
3. **Premium rates.** In order to simplify the MPCI policy, a fixed premium rate of 5% applies to most crops for 75% yield guarantee, irrespective of the farmer's own yield record and management and husbandry standards, and without consideration of the different agroclimatic and soil conditions in different regions of Uganda. There are exceptions: cotton carries the maximum agreed rate under the MOU of 6%, and rates for tea vary by region (4% in the Western region and 6% in the Central region).
4. **Basis of indemnity.** The assessor is required to visit the insured farm/field(s) to establish the actual yield harvested for the insured crop. Where the actual harvested yield falls short of the guaranteed yield, the percentage shortfall is applied to the sum insured (either on an agreed value basis or based on the costs of production).

[35] WBG is grateful to the Agro Consortium Secretariat for providing a copy of the MPCI wording for review in November 2018.

Box 5.1. Summary of UAIS MPCI Policy

WHAT IS COVERED?

Indemnity against physical loss or damage to growing crops caused directly by drought, hail, fire, excessive rainfall, flooding, frost damage, uncontrollable pests and diseases, malicious damage, and windstorm

BASIS OF COVER

Sum insured for the crop is based on production costs or pre-agreed nominated value of the harvested crop based on the LTAY:

Planted area (ha) × long-term average yield (tones/ha) × pre-agreed value (UGX/ton)

Cost of input or costs incurred in running that enterprise—e.g., seed, fertilizer, ploughing, weeding, agrochemicals, etc.

EXCLUSIONS

Harvested crops and crops in transit; any crop that has been harvested prior to inspection by our (AIC's) loss assessor; a result of consequential loss whether or not caused by a defined peril; where recognized good farming and harvesting practices have not been followed; controllable diseases, weeds, and/or controllable insect infestations

CROPS TO BE INSURED

Coffee, maize, beans, rice, cotton, bananas, oilseeds, fruit trees, tea

IN CASE OF PROBABLE LOSS

Consortium must be given a written notice within 48 hours after the occurrence.

If a probable loss is determined after harvest begins on an insured crop, notice must be given immediately and a representative sample of the unharvested crop (at least two rows and the entire length of the field) must remain unharvested, unless the consortium gives the insured his written consent to harvest the representative sample.

Prompt notice to the consortium if, during the period before harvest, the insured's crop is damaged to the extent that the insured does not expect to further care for the crop or harvest it, or if the insured wants the consortium's consent to put the field to another use, or additional damage occurs after consent to put the field to another use is given.

Leave intact any field that is not to be harvested until the consortium makes an inspection of the same. The settlement of claims should take place within six weeks from claim inception.

PREMIUM RATES

Crop	Premium rate	Yield guarantee
Maize	**5.0%**	**75%**
Beans	5.0%	75%
Coffee	5.0%	75%
Bananas	5.0%	75%
Tea	4 (Western region) 6% (Central region)	75%
Cotton	6%	75%
Sunflower & oilseeds	5%	75%

Source: Agriculture Insurance Consortium, www.aic.ug.

Key Issues and Challenges for MPCI in Uganda

This section highlights some of the key issues and challenges of operating an MPCI cover for mainly small-scale farmers in Uganda and draws on the international experience of the World Bank Group (WBG).

MPCI cover is best suited to annual cereals (maize, rice, etc.), oilseeds, and field beans, which are harvested at maturity in a single moment of time, but NOT coffee, tea, bananas, cotton, and cassava, which are all multiple-harvest crops. MPCI is relatively feasible for cereals and oilseeds because actual yields can be assessed at a single inspection at the time of crop maturity—i.e., immediately before harvest. It is notoriously difficult to operate MPCI for crops such as bananas, which are harvested on a continuous basis throughout the year, and where under a loss of yield program damage to a banana mat can only be assessed nine months later, when the banana bunch would have been fully mature. Thus nearly all insurance for bananas is based on a percentage damage named peril policy (e.g., against windstorm and or excess rain/flood). It is also very difficult to operate an MPCI cover for coffee, tea, and cotton, which have multiple harvests. In the United States, MPCI can be purchased for cotton, but very specialized crop loss assessment procedures must be adopted.

MPCI requires data on a minimum of 7- to 10-year yields at individual farmer levels for each crop type, but historical crop yield data for smallholders is not common in Uganda. During the review of UAIS, both MAAIF management and the UAIS Agro Consortium Secretariat (ACS) confirmed that very few small-scale farmers in Uganda are able to verify or provide formally recorded evidence of their historical crop yields. This is a major constraint to the operation of MPCI in Uganda. For this reason, the ACS advised that in most cases it has adopted Weather Index Insurance for small-scale farmers over the past two years (2016/17 and 2017/18).

MPCI is best suited to single-stand cropping, but most Ugandan smallholders intercrop their fields with several crop types. Section 2.4 showed that a very high proportion of plots/farms in Uganda are intercropped. While it is theoretically possible to operate MPCI on farms with mixed stands of crops, doing so would require establishing an insured yield for each crop and separately adjusting the yield for each crop type at harvest. Indeed, the WBG does not know of any commercial MPCI schemes in the world where MPCI is offered to small-scale farmers with one or two acres of mixed cropping.

The UAIS stakeholders' decision to adopt single flat MPCI rates for each crop for 75% coverage (yield guarantee) throughout the country is of very questionable technical (actuarial) soundness. Potentially this decision will lead to huge anti-selection: farmers in drought-, flood-, or hail-prone areas of Uganda will purchase underrated MPCI cover, while farmers in low-risk regions will consider MPCI cover too expensive to purchase. Where the objective is to offer standard premium rates (e.g., 5.0%), the more conventional approach would be to adjust the yield guarantee level to achieve the target price: for example, farmers in a high-risk region with very variable LTAY would be offered a guarantee yield of say 60% to match the 5.0% premium rate; conversely, farmers in a low-risk region adopting high husbandry standards and with very low variation in their LTAY could be offered an 85% yield guarantee at the 5.0% premium rate. This is an issue that Uganda Insurers Association (UIA)-AIC needs to monitor very closely.

The administrative costs of MPCI (pre-season, mid-season, and harvest inspections) are too high to feasibly offer cover to small-scale Ugandan farmers with less than five acres of an insured crop. For a typical small-scale farmer with sum insured of UGX 1 million and 5% premium rate, the gross premium for an MPCI policy would be UGX 50,000 (US$13.50). Assuming 65% of premium is reserved to pay expected claims, this would leave about UGX 17,500 (US$4.73) to pay for all A&O expenses and acquisition costs (brokerage/commissions). This amount is clearly inadequate to cover the costs of a qualified crop inspector/loss adjuster visiting the average small-scale farmer up to three times to conduct these individual field-level inspections.

The UIA-AIC does not have sufficient numbers of field staff or expertise in MPCI crop loss adjustment to operate MPCI on a large scale. The Agro Consortium Secretariat currently has a very limited number of permanent staff (four based in Kampala plus four regional inspectors), so it would be difficult to contract, train,

and supervise the large numbers of specialist field inspectors and MPCI loss adjusters that would be required to mount a large-scale MPCI program throughout Uganda.

Typically, MPCI can be implemented cost effectively (profitably) only with medium- to large-scale farmers having 25 to 50 acres or more of an insured crop(s). Chapter 2.3 indicated that 96% of Ugandan farmers have farms of less than five acres, and it is not possible to envisage offering these farmers individual grower MPCI cost effectively.

5.3. Review of Drought Index Insurance Policy

Weather Index Insurance Products: Advantages, Issues, and Challenges

Since the start of the 21st century, significant efforts have made to develop WII as an alternative to traditional indemnity-based crop insurance and as a product that can overcome many of the drawbacks of MPCI policies. In most developing countries, traditional crop yield indemnity-based insurance cannot be developed because suitably accurate time series crop yield data are lacking. In these situations, WII may offer an alternative so long as there is an adequate density of meteorological weather stations that can provide uninterrupted time series daily data for a minimum of 20 to 25 years for key variables such as rainfall (for drought or excess rainfall covers); daily minimum and maximum temperatures (to design frost or excess temperature covers); and other variables including relative humidity, evapotranspiration, wind speed, and soil moisture content (table 5.3).

WII offers the potential to overcome many of the problems associated with MPCI, including moral hazard and anti-selection by individual farmers, and it also has the potential to be operated much more cheaply. As WII does not insure against crop production or yield loss on individual farmers' fields, there is no potential for insured farmers to select against the insurer or to indulge in moral hazard. Furthermore, because payout is triggered by a weather variable measured at the weather station, no in-field inspections or loss adjustments are required, and the cover can be provided at much lower A&O costs. A further advantage is that WII payouts can usually be made very quickly following the end of the cover period (table 5.3).

Table 5.3. WII: Preconditions for Operation, Advantages, and Disadvantages

Preconditions	Advantages	Disadvantages
• Strong correlation identified between agricultural production and the weather variable to be indexed • Availability of sufficient data for designing the weather index and of objective ways for measuring the insured variable	• Makes use of data (time series weather data) that are usually available on a daily basis for 25 years or more from government weather stations • Eliminates most of the asymmetric information problems (moral hazard and adverse selection) of traditional insurance products • Does not require loss assessment • Is objective and transparent • Offers simplified claim process and timely payouts • Reduces administrative costs • Facilitates risk transfer outside of the local community and insurance market (international reinsurance)	• Basis risk—i.e., possibility of a difference between the payout, as measured by the index, and the actual loss arising from the peril covered by the policy (e.g., missed payouts in drought conditions for a deficit rainfall index contract) • Complexity in design and explanation • Coverage of only specific weather perils, leaving farmers potentially exposed to risks that are not the object of the coverage (i.e., other weather risks and risks such as pests and diseases) • In the context of Uganda, very low density of ground weather stations and resulting need to use remote sensing indexes

Source: World Bank Group.

The key drawback of WII (and any form of index insurance) is basis risk. Basis risk may arise where the recorded weather variable (e.g., accumulated amount of rainfall in the cover period) at the weather station level does not correspond with the actual weather (amount of rainfall) at the individual farm level within the insured unit (e.g., a radius of 10 km of the weather station). This is termed spatial basis risk and can to a certain extent be reduced by increasing the density of weather recording stations. Basis risk may also arise when the onset of rainfall and distribution within the cover period(s) differs from the contract design parameters; this is termed temporal basis risk. Finally basis risk may be the result of a product design flaw—for example, where the contract triggers are mis-specified such that despite significant crop production and yield losses, no payout is triggered (table 5.3).

A further issue, particularly in subtropical East Africa, including Uganda, is that rainfall indexes are mainly designed to insure against drought and/or excess rainfall and thus do not protect against/cover pest and disease losses. Pests and disease are a major cause of loss in cereals (e.g., stem borer, army worm, maize lethal necrotic disease)[36] and in cash crops (e.g., boll worm in cotton). The analysis by PARM (2015), presented in section 2.9, shows that crop pests and diseases are the largest single cause of losses in agriculture in Uganda.

Weather Station Density in Uganda

The Uganda National Meteorological Authority is a government authority charged with the management of weather information in the country. In 2015 UNMA had a network of 39 weather stations throughout Uganda (figure 5.1), including automatic weather stations, backed up by manual recording stations. However, some of the stations are not operational, suffering from lack of staffing and maintenance as well as vandalism. In addition, various private organizations have established their own weather station networks.[37] **Unfortunately, the current density is far too low to operate ground-weather station WII products and programs in Uganda.**

Remote Sensing Indexes as an Alternative to Ground Weather Stations

Index insurance can also be designed on the basis of data collected through remote sensing devices (satellites, aircraft, drones), and use of this method is becoming more common in agricultural insurance programs. Remote sensing data can be used to develop pure weather index products (e.g., rainfall index products based on precipitation levels estimated via satellites), or to develop products that measure variables directly related to the growing conditions of the crop (hence resembling more closely an area yield index).

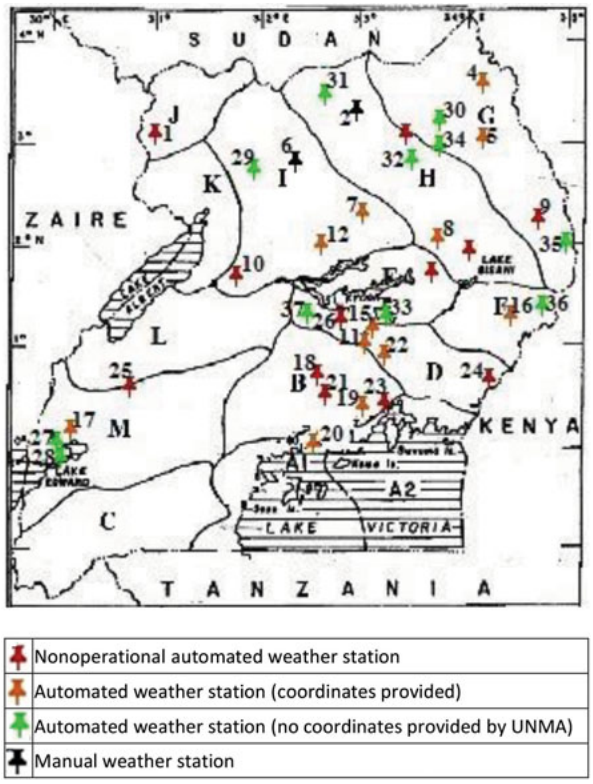
The following are the most common remote sensing approaches adopted in index insurance for agriculture:

- Rainfall estimates
- Vegetation indexes—normalized difference vegetation index (NDVI), fraction of absorbed photosynthetically absorbed radiation (FAPAR), leaf area index (LAI), etc.
- Evapotranspiration estimates (actual and relative evapotranspiration)
- Soil moisture
- Crop monitoring through synthetic aperture radar (SAR) data

[36] Maize lethal necrotic disease (MLND) is a new disease in East Africa, first reported in Kenya in 2011. It has since spread to Tanzania, Uganda, Rwanda, and Ethiopia. It develops from synergistic co-infection by sugarcane mosaic virus and maize chlorotic mottle virus.

[37] Byamukama et al. (2015) note that "Due to insufficient coverage of the country by weather stations and other challenges, various institutions whose operations rely on weather information have resorted to installing their own stations. These include, among others, agricultural organizations, such as NARO [National Agricultural Research Organisation], state authorities such as UWA [Uganda Wildlife Authority] and Academic institutions. WIMEA-ICT, a NORHED [Norwegian Programme for Capacity Development in Higher Education and Research for Development] project, being implemented by four academic institutions, namely Makerere University, Dar-es-Salaam Institute of Technology (DIT), University of Bergen, and the University of Juba, in collaboration with their respective National Meteorological Authorities, aiming to improve the weather information management through the use of Suitable ICTs."

Figure 5.1. Location of UNMA Weather Stations in Uganda



Source: Byamukama et al. 2015.

Remote sensing applications are relatively new to agricultural insurance, and the industry is still on a steep learning curve. There is clearly very strong potential for these applications to address some of the key problems in the implementation of crop insurance, in particular the chronic lack of data and the challenges in ground-based monitoring of remote areas. However, their ability to capture variations in productivity to an acceptable degree is not entirely proven (Oxfam 2018).

Design Features of UAIS Drought Index Insurance Cover

In 2017, UAIS launched a Crop Weather Index Insurance policy, a satellite-based drought index policy that uses relative evapotranspiration rather than satellite rainfall alone. The REI technology has been developed by the Netherlands company EARS, which specializes in remote sensing applications, including for Crop Weather Index insurance. EARS has developed index insurance products that cover drought-related crop yield losses in over 18 different countries, many in Africa, covering (among other crops) maize, beans, wheat, coffee, sesame, and sorghum, as well as pasture. EARS has developed its own proprietary Energy and Water Balance Monitoring System that uses data from Meteosat satellites and provides evapotranspiration, radiation, and precipitation data on a daily basis to estimate relative evapotranspiration. Meteosat data are available at 3 km and 5 km square resolution.

EARS index insurance products use the Relative Evapotranspiration Index. The REI has a strong relation to crop yields because biomass and yield (produced using CO_2 entering the plant) are proportional to evapotranspiration (water exiting the plant). The opening and closing of the plant stomata as a result of drought affect these both equally, therefore making the REI highly suitable for estimating drought-related crop yield

Box 5.2. UAIS Drought Index Insurance (REI crop insurance policy)

WHAT IS COVERED?

Drought and excessive rainfall

HOW IT WORKS

In the past, drought insurance has been based on precipitation. Indemnification of farmers would then take place if precipitation during the growing season did not meet certain pre-defined levels. However, Uganda has few rainfall stations. A very dense and costly network would be required to adequately represent the spatial variability. Moreover, adding rain gauges would not provide for the long precipitation history that is required to assess the drought.

Another limitation of relying on rainfall data is that rainfall is not a good measure of actual crop water use. A considerable part of rainfall may run off or may percolate into the subsoil. It is also possible that rainwater is stored in the soil for considerable time and used by the crop with months of delay.

The timing—not just the amount—of rainfall during the various growth phases of a plant is very important for satisfying the soil water balance and therefore the ultimate yield. Dry spells or deficits over the main phases of crop growth can cause yield loss, even if cumulative season rainfall is adequate. Drought index insurance monitors crop water availability to determine drought and has a linear correlation with crop yield. It is therefore a much more suitable indicator of agricultural drought than rainfall. The drought index insurance product is based on innovative satellite technology and provides an affordable alternative to expensive traditional loss-based crop insurance.

Using 33 years of Meteosat data and near-real-time data reception, drought insurance indexes determine drought payouts per season and continuously monitor drought across Uganda. When there is a drop in the expected average yield of the district due to drought or excessive rainfall, a linear payout is triggered to the extent of the loss experienced due to the drought, as monitored by the drought index.

EXCLUSIONS

Harvested crops and crops in transit; any crop that has been harvested prior to inspection by the loss assessor; a result of consequential loss whether or not caused by a defined peril; where recognized good farming and harvesting practices have not been followed; controllable diseases, weeds, and/or controllable insect infestations

PREMIUM RATE

5.5% with yield guarantee of 90%

NOTE

Rates applicable except in Kasese, Arua, Isingiro, and Ngora, where premium rates of 10% would be applicable

CROPS COVERED

Crops covered under the national agriculture insurance scheme (UAIS)

Source: Agriculture Insurance Consortium, www.aic.ug.

losses.[38] EARS therefore sees the REI as a much more accurate indicator of rainfall deficit (drought) yield loss in crops than a conventional rainfall deficit index. A summary of the UAIS drought REI insurance cover terms and conditions is presented in box 5.2.[39]

To date the UAIS drought index insurance policy is being marketed to extremely small-scale farmers in Uganda. According to figures provided by UIA-AIC, as of June 30, 2018, a total of 5,317 WII policies had been

[38] EARS, "Data Products for Climate, Water, and Food," https://www.ears.nl/products-and-services/data-products-for-climate-water-and-food.
[39] WBG is grateful to the Agro Consortium Secretariat for kindly providing a copy of its Crop Weather Indexed Insurance Policy: Relative Evapo-Transpiration Indexed (REI) Crop Insurance Policy (General Terms and Conditions).

sold to individual farmers, with average sum insured of UGX 376,392 (about US$100 per policy) and average premium of UGX 1,940 per policy (US$5.00). See section 5.5 for further details.

During this review, it has not been possible to discuss with the UIA-ACS whether the REI drought crop insurance program for maize and beans could be subject to basis risk. In the start-up phase of any new crop index insurance program, it is extremely important to monitor how closely the satellite-based index correlates with actual drought conditions on the ground. It is not known whether the ACS has the resources to invest in monitoring and evaluation (M&E) of the potential for basis risk in their REI program.

5.4. UAIS Technical Review of Livestock and Aquaculture Insurance Products and Services

Livestock and Poultry Policies

The UAIS is currently offering standard individual animal mortality insurance for livestock and poultry producers.[40] In the case of cattle and pigs, the insurance cover is an individual animal accident and mortality policy with a minimum of one animal insured, but for poultry it operates as a whole-flock policy with a minimum of 500 insured birds. The Livestock policy wording contains a specific clause for banks and/or financial institutions to cover situations where the insured has taken out a loan to purchase one or more animals; the clause enables the financial institution to claim its own rights and interests (i.e., the outstanding value of the livestock loan) in the event of the animals' death. A summary of the cover provided under this policy is presented in box 5.3.

The premium rates vary from a low of 3.5% for local breeds of cattle to a high of 6.0% for pigs and poultry. These premium rates are within the mid-range of rates that typically apply to individual animal accidental death and disease covers around the world. However, such rates tend to be sustainable only if the administration and operating costs of the livestock insurance program can be kept down.

The UAIS livestock insurance policy for cattle and pigs does not carry any form of policy excess, which is very unusual for an individual animal livestock insurance policy.[41] Such policies usually include a coinsurance on the market value of the animal at the time of death or on the sum insured, whichever is lower, in order to reduce the risk of moral hazard: typically, the coinsurance is between 10% and 20% of the value of the loss.[42] Because the UAIS policy does not include any form of policy excess/coinsurance, it may be open to fraudulent claims: for example, if an insured cow contrasts mastitis so that the producer cannot market its milk, he/she may elect to cause the accidental death of the animal and claim the full market value of a replacement healthy cow from the Agriculture Insurance Consortium. This is an issue that should be closely monitored by the ACS.

Conversely, the UAIS poultry (chicken) insurance policy does carry an excess in the form of a deductible.[43] The policy deductible varies from between 3% and 5% of the number of insured birds in each batch or the total population of insured birds, according to their age and use (broiler versus layer, etc.).[44] The number of dead birds (based on the agreed percentage) is deducted before any claim can be made—that is, the insured farmers have to bear this loss for their own account. Claims are indemnified only in cases where the number of dead birds exceeds the deductible level. This is a very sound feature of the UAIS policy, as it eliminates frictional

[40] WBG is grateful to the Agro Consortium Secretariat for providing copies of the UAIS Livestock Insurance policy wording and the UAIS Poultry policy wording.
[41] At review the ACS underwriter confirmed that the livestock policy for cattle and pigs does not carry any form of first loss excess. This is in contrast to the AIC website, which incorrectly states that a 10% excess applies to all insured classes of cattle (dairy cattle, exotic beef, and local cattle) and a 15% excess for pigs—see box 5.3. ACS could usefully update and correct the AIC website.
[42] The UAIS policy does specify, however, that any salvage value from the sale of the animal carcass accrues to the insurer alone.
[43] "Deductible" means the amount stated in the schedule, which is borne by the insured in respect of each and every claim made under the policy. The company's liability to make any payment under the policy is in excess of the deductible.
[44] The poultry policy wording—excess of 3% to 5% of the insured numbers of birds—is again different to that stated on the AIC website of 15% for poultry (see box 5.3). It would again be useful if ACS could update and correct the AIC website.

Box 5.3. Terms and Conditions of UAIS Livestock Insurance Policy for Cattle, Pigs, and Poultry

WHAT IS COVERED?

Death of animal as a consequence of: fire, lightning, flood, rainstorm, snake bites, windstorm, hailstorm, snow, hurricane, earthquake, landslip, diseases, inundation, surgical operation and impact, accidental damage by animals, trees or vehicles, aircraft or motorized machinery. The policy also covers theft or burglary following forcible or violent entry.

BASIS OF COVER

Sum insured for the animal is based on production costs or pre-agreed nominated value of the animal as at end insurance period

Determined market value by a registered veterinarian and farmer, in case of poultry layer birds, the value of the bird as per the farmers' investment can be considered.

EXCLUSIONS

Willful misconduct, feed poisoning, culling, prior accidents or diseases, mysterious disappearances, famine and malnutrition, infertility or impotence, poor production like milk and eggs, bird flu, or avian influenza

IN THE EVENT OF A POSSIBLE CLAIM

On happening of any event likely to give rise to a claim, the Insured shall immediately notify the insurer by telephone (to be followed by written communication).

The client will access veterinary personnel to conduct a post-mortem. The post-mortem report together with claim forms are submitted to the insurance company within 72 hours on happening of an event likely to give rise to a claim. The insured shall in the meantime take necessary steps to minimize the loss. In case of theft of insured livestock a 60-waiting period will apply before claim settlement.*

Settlement of claims should take place within three weeks from claim inception.

PREMIUM RATES

Animal	Premium rate	Excess
Dairy cattle	5%	10%
Exotic beef	4%	10%
Local cattle	3.5%	10%
Aquaculture	6%	15%
Pigs	6%	15%
Poultry	5%	15%

Sources: Agriculture Insurance Consortium, www.aic.ug; UAIS livestock policy wording.

Note: The livestock policy excess levels shown on AIC's website differ from those advised by the ACS.
**The authors assume this means a 60-day waiting period.*

small claims that would make the policy very expensive and permits insurers to reserve capacity to pay large claims only—e.g., those due to epidemic disease outbreak.

In low- and middle-income countries, only large-scale commercial farmers can meet the standard preconditions for the operation of individual animal livestock accidental death and disease insurance. The main preconditions are discussed below and are summarized in table 5.4.

- **Individual animal identification** (e.g., through branding, ear tagging, microchipping, photographs) and **registration** of all animals. It is understood that in Uganda, very few livestock (cattle and small ruminants) owned by small-scale livestock producers (with perhaps two or three cattle and a dozen sheep and goats)

are routinely tagged and registered. Significant investment would likely be required to educate small-scale livestock owners about the need to tag their animals for insurance purposes.

- **Animal health verification.** Individual animal insurance requires the contracting of qualified veterinarians to certify that each animal is in sound health and to issue a health certificate for presentation to the insurance company. It is not known how many small-scale livestock producers in Uganda can afford to contract veterinarians to carry out health checks and certification of their animals.
- **Up-to-date record of vaccination against insured diseases.** The same veterinarian must also ensure that each animal is properly vaccinated as a precondition of disease cover and must include this information in the health certificate that is presented to the insurer. It is not known whether small-scale livestock producers in Uganda can afford to have their animals routinely vaccinated against class A and class B notifiable diseases.
- **Presence of qualified veterinarians to inspect and adjust livestock losses.** In the event of the death of an insured animal, insured producers are required to report the loss to the insurance company within 48 hours and to keep the carcass so that a qualified veterinarian (appointed by the insurer) can inspect the carcass to confirm that death was caused by an insured peril. The insured is often expected to contribute toward the costs of the post-mortem inspection.

These preconditions for the operation of individual animal mortality insurance are often extremely expensive for a small-scale livestock producer to meet. Where the costs for tagging, inspections, vaccinations, and loss adjustment are borne by the insurance company, the costs have then to be included in the premiums charged; typical final commercial premium rates are then in the order of 7.5% to 10% or even higher—too high for small-scale farmers. Where costs are borne by the livestock producer, they are usually too high for small-scale livestock owners, who then elect not to purchase the cover.

Table 5.4. Preconditions for Operating Individual Animal Mortality Insurance and Typical Issues Faced by Small-Scale Livestock Producers in Developing Countries

Key pre-conditions for traditional indemnity-based livestock mortality insurance	Issues facing provision of traditional indemnity-based livestock insurance in many developing countries
Commercially managed livestock and poultry enterprises.	Many small herds are managed on a purely subsistence basis.
Individual animal identification (tagging) and registration.	No national system of individual animal tagging or livestock registration system exists for livestock.
Veterinary pre-inspections to certify animal is in sound health.	Often no cost-effective system for conducting pre-inspections of animals.
Animals must be contained within farm boundaries and free-range grazing is not permitted.	In many developing countries livestock production is not enclosed and free range grazing on communal lands applies. Livestock may be migrated on a seasonal basis in the dry seasons in search of grazing.
Loss notification and inspection procedures must be in place and animal pathology services available.	Often there are no systems for Insureds to report losses of their livestock in a timely fashion (< 48 hours) nor cost-effective procedures to permit a certified veterinarian to travel to the site where the dead animal is located to perform a loss inspection and verification that the animal(s) died as a result of an insured peril.
Time-series Individual producer livestock mortality data is essential for product design and rating.	No formal livestock mortality databases exist for individual pastoralists in many countries.

Source: World Bank Group.

In the first 18 months (January 1, 2017, to June 30, 2018) of UAIS operations, the livestock insurance policy has been purchased by very few livestock producers and poultry producers (35 and 36 respectively). The poultry policy is being marketed to and purchased by very large poultry producers, as evidenced by the average sum insured of UGX 880 million (US$234,734). It appears that the livestock policy is being

purchased by relatively small-scale cattle (and possibly pig) producers, as the average sum insured is only UGX 9.2 million (US$1,592). (See section 5.5 for further details).

Going forward, efforts should be made to ensure that UAIS offers livestock and poultry insurance products that the majority of small-scale livestock producers can access and afford. Currently, livestock insurance cover is restricted to dairy and beef cattle and pigs, which tend to be owned by larger commercial producers, and cover is not provided for sheep and goats, which are usually owned by small-scale livestock producers. There is, however, a growing body of literature from India, Nepal, and Bangladesh showing how insurers, often working with nongovernmental organizations and microfinance institutions (MFIs), have been able to adapt traditional indemnity-based individual animal livestock insurance products and programs and to offer cover to very small cattle, sheep, goat, and poultry producers at affordable rates of 3% to 5%. These programs employ local community-based para-veterinarians to conduct pre-inspections, animal identification (tagging), vaccinations, and loss assessment, and their costs are very much lower than those of graduate veterinarians. The programs are often linked to livestock credit on a compulsory basis and are closely monitored by the financial institutions, which minimizes moral hazard (see for example, FAO 2011; World Bank Group 2009, 2010, 2015a). Some of the lessons and experiences from these programs may be applicable to Uganda. In addition, among companies such as Acre Africa that have been designing indemnity-based livestock insurance programs for small-scale cattle producers in East Africa, innovative technology such as microchipping has greatly reduced issues of moral hazard and enabled commercial insurers to offer insurance at affordable rates, even to very small livestock producers with only one or two head of cattle.

Aquaculture Policy

The UAIS aquaculture insurance policy insures against the loss of fish stock; based on an aquaculture policy wording designed by international reinsurers, it covers both on-shore and off-shore fish farms.[45] The fish stock policy insures against the loss/death of fish stock reared in on-shore tanks, ponds, or raceways; off-shore fish reared in floating cages in the sea; and grow-out operations and hatcheries.[46] Cover does not extend to loss or damage of the installations and equipment. The aquaculture policy protects against the death or loss of the fish stock due to a wide range of named perils (listed in table 5.5).

Farmed fish stock is extremely susceptible to losses, especially due to pests and diseases, and for this reason the policies usually carry high deductibles. The UAIS policy carries extremely high deductibles of between 15% and 25% of the total value at risk at the time of loss, for each and every loss[47]—a reflection of the high levels of risk involved in fish farming in Uganda.

A fixed 6% premium rate for 15% to 25% deductible applies to aquaculture (box 5.3; see also UAIS-TWG (n.d.). It is not possible for WBG to advise if this is an actuarially determined premium rate based on industry-level fish stock mortality data, or if the single fixed rate is adequate to cover expected losses. However, the high deductible for each and every loss should ensure that underwriters are liable to indemnify only major loss events.

Aquaculture insurance is an extremely specialized class of livestock insurance, and it is highly dependent on the maintenance of very high sanitary, husbandry, and management standards that can usually be met only by large-scale commercial fish-farming enterprises. The UAIS product that has been launched by the Agriculture Insurance Consortium is designed for large-scale commercial operators as opposed to small-scale family-operated ponds, and is being offered only to the former.

To date only five aquaculture policies have been sold to large-scale operators, with an average sum insured of UGX 220 million and average premium of UGX 9.4 million (see section 5.5 for details).

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[45] WBG is grateful to the Agro Consortium Secretariat for providing a copy of the UAIS aquaculture policy wording for fish stock.
[46] It is not known whether this cover also extends to fish farms located in freshwater lakes in Uganda (e.g., Lake Vitoria).
[47] The UAIS-TWG (n.d.) report advises a premium rate of 6% for a 15% deductible for aquaculture insurance; the schedule attached to the aquaculture policy wording advises a deductible of 25% of the values at risk.

Table 5.5. UAIS Aquaculture Insurance Policy: Insured Perils

Covered Perils on-Shore Farms	Covered Perils Off-Shore Farms
Pollution	Pollution
Theft and malicious acts, predators	Theft and malicious acts
Storm damage, subsidence, landslip, structural failure, breakage or blockage of any part of the water supply system	Jellyfish
Drought, fire, lightening, explosion, earthquake	Predation or physical damage by predators or other aquatic
Freezing, frost damage, frazil ice	Organisms (but not sea lice or other ectoparasites)
Mechanical breakdown or accidental damage to machinery and other installations	Storm, lightening, tidal wave (tsunami)
Electrical breakdown, failure or interruption of the electricity supply, electrocution	Collision, sudden and unforeseen structural failure of equipment
Deoxygenation due to vegetation, microbiological activity or high water temperature	Freezing, supercooling, ice damage
Any other change in concentration of the normal chemical constituents of the water, including supersaturation with dissolved gases and change in pH or salinity	Deoxygenation due to competing biological activity (bloom) or from changes in the physical or chemical conditions or the water, including upwelling and high water temperature
Disease	Any other change in concentration of the normal chemical constituents of the water including change in pH or salinity
	Disease

Source: UAIS aquaculture insurance policy.

5.5. UAIS Review of Coverage and Financial Performance

Between January 2017, when UAIS first became operational, and the end of June 2018, UAIS has sold 64,318 policies. As of June 30, 2018, the total sum insured (TSI) amounted to UGX 365 million (US$97.4 million), with total premium of UGX 8.6 billion (US$2.3 million), declared claims of UGX 4.0 billion, and corresponding loss ratio of 47% (table 5.6).[48] Since the program has been operating for only 18 months (as of June 30, 2018), the level of uptake and number of policy sales represents a very considerable achievement for the AIC underwriters: typically the uptake rates are much slower for new agricultural insurance pilots of this nature in Africa, at 5,000 to 10,000 farmers in the first two to three years of implementation. It is noted that the number of UAIS policy sales has exceeded the year 1 performance guideline of 45,000 insured farmers (UAIS-TWG n.d.; UIA 2018).

[48] The loss ratio is a measure of underwriting performance used by the insurance industry. It is equivalent to the ratio of total claims to total premium and is expressed as a percentage. A loss ratio of less than 100% indicates that the insurer has collected more premium than it has paid out in claims; a loss ratio greater than 100% means that the insurer has incurred a negative underwriting result or financial loss prior to including operating and administration expenses.

As of March 28, 2018, over 42,000 farmers had bought MPCI policies;[49] this represents 66% of total policy sales, and accounts for 90% of TSI and 88% of total premium. AYII accounted for 11% of all policy sales, and Crop WII accounted for 8%. To date the number of livestock, poultry, and aquaculture policy sales has been very low compared to the sales of crop insurance policies (table 5.6).

The average premium rates charged by the UIA-AIC underwriting unit are considerably lower than the published premium rates, with an overall average premium rate of 2.35% for all programs. In the case of the MPCI program, the actual average premium rate has been 2.30%, which is less than half of the guideline, which states that for MPCI, a flat rate of 5% will apply to all crops grown throughout Uganda (save for cotton, which carries a 6% premium rate). In the case of Crop WII (drought insurance), the actual premium rate is 4.74%, compared to the stated rate of 5.50%. Similarly, the actual average premium rate for poultry insurance of 2.48% is much lower than the declared rate of 5.00%; for fish farms the average rate of 4.29% compares with the state's rate of 6.00%; and finally for livestock, where stated rates vary from a low of 3.5% for local cattle to a high of 6.00% for pigs, the actual average rate to date has been only 3.2%.

The value of premium subsidies declared by the UIA-AIC as of June 30, 2018, after 18 months of UAIS operation, stood at UGX 5.7 billion, or 67% of the total premium of UGX 8.6 billion. This is equal to 57% of the 2017 and 2018 premium subsidy allocations of UGX 5 billion per year that the Government of Uganda (GoU) has made available for the UAIS. GoU has agreed to pay 30% premium subsidies to large farmers, 50% premium subsidies to small farmers, and 80% premium subsidies to farmers in high drought-risk zones. The fact that to date premium subsidies amount to 67% of the total cost of premiums can only suggest that most of the business is currently being underwritten in high-risk regions of Uganda.

As of June 30, 2018, the UAIS had paid out UGX 4.0 billion in claims, equivalent to a loss ratio of 47%. As the cover period has not yet been completed, it is not possible to determine from these figures which programs have now run off (expired) so that the underwriting results are final, and which programs are still current and on risk. It is likely, for example, that many of the livestock policies, which are typically 12-month covers, are still on risk. The interim results show that the poultry program has incurred net underwriting losses, as shown by the loss ratio of 104%.

The One Acre Fund (1AF) AYII pilot program for maize farmers in four districts experienced very poor underwriting results, with a 355% loss ratio that suggests catastrophic maize crop losses at district levels. According to the Agriculture Insurance Consortium underwriter, the maize seeds purchased by 1AF for its loanee farmers were of very poor quality, and widespread germination failure occurred. Poor-quality seed is a moral hazard risk, and crop insurance programs do not intend to protect against poor-quality seed.[50] In addition the ACS highlighted two concerns: (i) 1AF had set its expected yields and thus the insured yield threshold far in excess of the normal average maize yields experienced by farmers, thereby exposing the policy to payouts even when severe losses had not occurred; and (ii) 1AF had insisted on using its own field inspection teams to conduct the crop cutting experiments (CCEs) as the basis for area yields (and hence payouts if the actual yield falls short of the insured yield). It will be very important for all parties concerned to review the 2017/18 AYII pilot experience and to ensure these issues are not repeated going forward.

[49] It is understood, however, that this very much overstates the number of MPCI policies sold, as it includes 40,000 clients of Centenary Bank who were in fact sold a hybrid WII-REI cover against drought coupled with indemnity-based cover against idiosyncratic risks such as flood and landslide.
[50] Indeed, an individual grower MPCI policy cover incepts only after germination, once the seedlings are properly established and stand density is confirmed by in-field inspection. Thus the MPCI policy does not insure against germination failure.

Table 5.6. UAIS Underwriting Results, January 1, 2017 to June 10, 2018 (UGX)

SN	Product	No of Insured Farmers [1]	Sum insured (UGX)	Premium (UGX)	Average Premium rate (%)	Claims (UGX)	Loss Ratio (%)
1	Aquaculture Insurance	5	1,098,824,735	47,133,305	4.29%	18,175,158	39%
2	Area Yield Index Insurance	6,932	1,538,904,000	76,552,849	4.97%	272,128,636	355%
3	Crop Weather Index Insurance	5,317	2,326,931,451	110,225,434	4.74%	22,332,466	20%
4	Livestock Insurance	35	322,650,000	10,314,084	3.20%	4,000,000	39%
5	Multi-peril Crop Insurance	42,263	328,323,700,959	7,542,836,106	2.30%	2,874,805,271	38%
6	Poultry Insurance	36	31,689,120,012	785,575,464	2.48%	817,650,375	104%
TOTAL		**64,318**	**365,300,131,157**	**8,572,637,242**	2.35%	**4,009,091,906**	47%

Source: UIA 2018.

Note: [1]. The number of insured farmers (policies) for SN3 Crop Weather Index Insurance and SN5 Multi-Peril Crop Insurance are as reported on March 28, 2018, and require updating to June 30, 2018.

GoU's primary targets for the UAIS are small-scale crop and livestock producers. Table 5.7 shows the average size of policy for each product line in terms of the average sum insured per policy and the average premium per policy (figures are shown in Uganda shillings and U.S. dollars). The overall average sum insured is UGX 5.7 million (US$1,151) per policy, with average premium of UGX 133,285 (US$36) per policy; these figures suggest that the majority of the insureds are small- to medium-scale farmers, but there is considerable variation across each product type. The AYII and WII programs appear to be reaching very small and marginal farmers, as shown by the respective average sum insured per policy—UGX 222,000 (US$59) for AYII farmers and UGX 376,392 (US$100) for WII farmers. The corresponding premiums per policy for AYII farmers and WII farmers are very small, and it would only be economical for the UIA-AIC to sell these policies through a risk aggregator. For MPCI farmers, the average sum insured is considerably higher, at an average of UGX 6.0 million (US$1,592) per policy. At the other end of the scale, the UAIS is currently insuring a few very large aquaculture producers (five policies with average policy size of UGX 220 million) and poultry producers (36 policies with average TSI of UGX 880 million/policy). As there is no cap on the size of policy for premium subsidy purposes, these very large aquaculture and poultry farmers are capturing a disproportionately high share of the premium subsidies. One option would be for UAIS stakeholders to agree to put a cap on the maximum amount of premium subsidy any one farmer can obtain.[51]

Table 5.7. Average Size of UAIS Policy: Sum Insured and Premium

Class of Insurance	Average S.I per policy (UGX)	Average Premium / Policy (UGX)	Average S.I per policy (US$)	Average Premium / Policy (US$)
Aquaculture Insurance	219,764,947	9,426,661	58,604	2,514
Area Yield Index Insurance	222,000	11,043	59	3
Crop Weather Index Insurance	376,392	19,480	100	5
Livestock Indemnity Insurance	9,218,571	294,688	2,458	79
Multi-peril Crop Insurance	5,971,446	178,474	1,592	48
Poultry Insurance	880,253,334	21,821,541	234,734	5,819
Total	5,679,594	133,285	1,515	36

Source: Calculations based on UIA 2018 data on UAIS at June 30, 2018.

[51] In Brazil, the government publishes caps on the amount of premium subsidy any one farmer can obtain in a calendar year. The premium subsidy caps are set for food and commercial crops and livestock separately and in total.

The UIA-ACS quarterly progress reports could usefully include details by product line on the number of small-scale and large-scale farmers who are purchasing cover and their corresponding sums insured, premiums, and premium subsidies. This information would enable GoU to understand better which types of farmer are benefiting from the program subsidies.

5.6. UAIS Marketing and Sales Strategy

The UAIS underwriters are currently marketing most of the crop insurance policies as a bundled product linked to seasonal crop loans provided by regional risk aggregators such as banks and MFIs. This applies both to the crop AYII policies sold to the 6,932 farmers receiving crop loans from the 1AF program, and also to the bulk of the MPCI policies, which were sold to 40,000 clients borrowing agricultural production credit from Centenary Bank. Typically, under a bundled approach a single master policy is issued to the risk aggregator, and all farmers who borrow seasonal credit from the financial institution are insured under the policy on a mandatory basis. The sum insured for each farmer is usually set according to the amount of loan per acre that each farmer has borrowed from the financial institution. The financial institution usually accepts responsibility for collecting premiums from its borrowing members and paying the premium over to the insurer; in some cases it may be willing to add the costs of premiums to the loan and to recover the premium at harvest and on repayment of the loan.

The Agriculture Insurance Consortium identifies two main routes for farmers to access bundled credit and agriculture insurance from financial institutions. These are described below and illustrated in figure 5.2.

- ***Under the first route,*** farmers access credit after they have secured an agricultural insurance policy for the broker/agent/insurer. In the case of an insured event, the indemnity is paid directly to the farmers to enable them to repay their loan with the financial institution.
- ***Under the second route,*** farmers can access the credit without an agriculture insurance policy, but the financial institution approaches the broker/agent/insurer for an agriculture insurance policy against that loan. In case the farmers are unable to repay their loan due to an insured event, the indemnity is paid directly to the financial institution to cancel the outstanding loan amount owed by the farmers (UAIS-TWG 2016).

In both cases, the farmer pays the insurer only the unsubsidized amount of premium, and the Insurance Regulatory Authority (IRA) is responsible for auditing the UAIS premium bordereau that is submitted to it by the AIC and for passing it on to the Ministry of Finance, Planning and Economic Development (MoFPED) for approval of settlement. Once approved the details are passed to the Bank of Uganda (BoU) for payment of the subsidy amount(s) to the AIC's members.

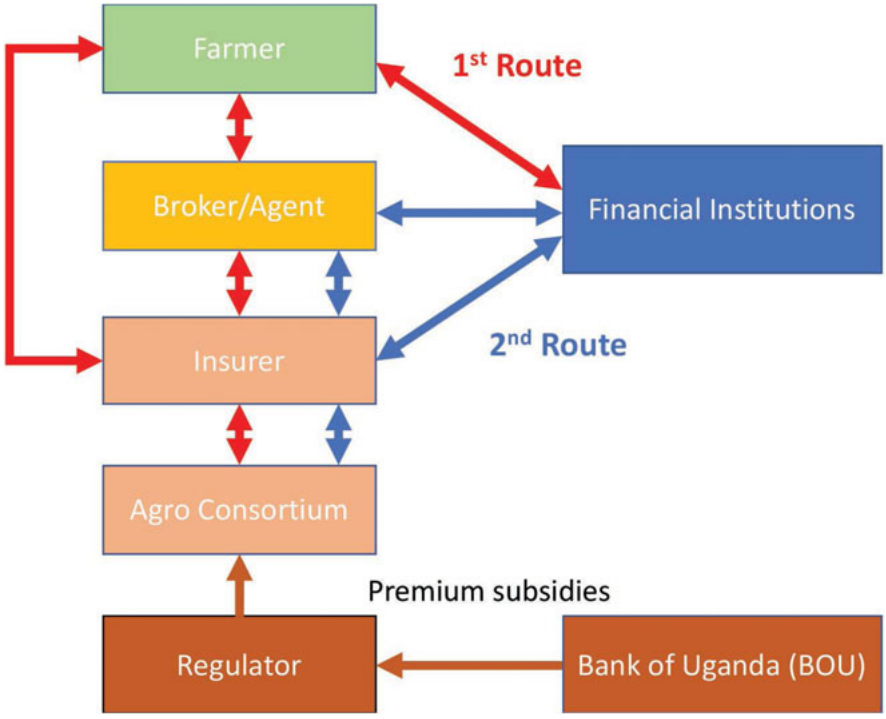
One Acre Fund Area Yield Index Insurance Policy 2017/18

Operating throughout East Africa, One Acre Fund provides small farmers with a package of improved seeds and fertilizers on credit, along with crop extension and advisory services; it also requires its borrowers to be insured under a suitable crop insurance policy. As individual farmer MPCI cannot be implemented on a cost-effective basis with very small farmers of one acre or less, 1AF farmers in both Kenya and Uganda are being insured under an AYII policy.

Centenary Bank MPCI Cover 2017/18

Centenary Rural Development Bank Limited started as an initiative of the Uganda National Lay Apostolate in 1983 as a credit trust. It began operations in 1985 with the main objective of serving the rural poor and contributing to the overall economic development of the country. In 1993, Centenary Rural Development Bank Limited was registered as a full-service commercial bank.

Figure 5.2. AIC Sales of Agriculture Insurance through Financial Institutions



Source: Adapted from UAIS-TWG n.d.

Today Centenary Bank is the leading microfinance commercial bank in Uganda, serving over 1.4 million customers. Its services can be accessed across 69 branches, 172 ATMs, and the phone banking (CenteMobile) platform.

Agriculture is the foundation of Uganda's economy, and Centenary Bank fully supports it. Centenary lends to a range of agricultural clients, including those engaged in agro-processing, primary agriculture, fisheries, and livestock. Centenary offers two types of agricultural loans: (i) agricultural production loans; and (ii) revolving crop production loans:

- **Agricultural production loans** are designed to finance business activities in the agricultural production, processing, and marketing value chain. They have attractive interest rates, and the loan period and repayment plan depend on the nature and season of the agricultural activity to be financed. Such loans have thus allowed farmers to invest in and nurture their crops and animals without worrying about funding.
- **Revolving crop production loans help** finance cultivation expenses and ensure that farmers have sufficient money for raising crops—e.g., to purchase inputs like crop seeds, fertilizers, etc. Such loans serve all farmers in that there are no fresh credit appraisals needed, and grace periods are offered. These features allow farmers to cut down on the expenses of loan documentation while giving them attractive interest rates.

Centenary Bank also participates in the Agricultural Credit Facility (ACF). The Government of Uganda, through the central bank and in partnership with commercial banks, Uganda Development Bank Limited, and microfinance deposit-taking institutions (MDIs), created the Agricultural Credit Facility. The ACF was created to provide medium-term credit facilities to agriculture and agro-processing projects on more favorable terms than those offered on the open market. The credit facilities are advanced to customers at an interest rate of 12%. The facility also seeks to promote commercial agriculture, increase access to finance by agribusinesses, increase agricultural production and thus food security, and boost the confidence of financial institution in lending to agriculture (Centenary Bank 2018).

Centenary Bank's agricultural loan portfolio has grown considerably in recent years. In 2013 agricultural loans amounted to UGX 40 billion; by 2016 this had risen to UGX 219 billion (17.2% of total lending); and by 2017 the sum was UGX 226 billion, or 16.5% of the total loan portfolio of UGX 1.372 billion (Centenary Bank 2018). Centenary estimates that its agricultural loan portfolio was about UGX 250 billion (US$7 million) in 2018. The agricultural loan department is staffed by a team of 10 at headquarters level, and five regional supervisors and 14 branch supervisors deal directly with the loan officers in the 69 branch offices. Centenary lends mainly to five agricultural value chains: coffee, maize, sunflower, dairy cattle, and beef cattle. Back in 2012/13, the bank's nonperforming loans for all credit lines were in the order of 10% of total loan value, but this fell to 2.7% in 2016, and then increased in 2017 to 4.6% of total loans due to unfavorable weather conditions affecting agriculture (Centenary Bank 2018).

Since 2013, Centenary has required that all its agricultural loans to agro-processors and primary producers must be protected by a combination of crop and livestock credit insurance and credit life insurance. Centenary therefore purchased a **"credit-portfolio protection insurance cover"** from Liberty Insurance Company on its entire agriculture loan portfolio, under which Liberty charged a flat rate of 0.85% across the entire portfolio—both to provide protection against catastrophe losses in agriculture due to perils such as pests, diseases, and flooding, and also to provide credit life insurance to the borrower. This account was subsequently insured by the Cooperative Insurance Company (CIC), and in 2016/17 was outside the UAIS scheme.

In 2017/18 the UAIS-Agriculture Insurance Consortium insured about 40,000 Centenary Bank clients under the EARS REI drought policy with additional individual farmer indemnity protection against flood and landslide losses.[52] Centenary indicates that it has insured its total agricultural loan portfolio of about UGX 250 billion and has paid the consortium an agreed premium rate of 1.25% for its 50% share of premium, with the understanding that the government is subsidizing the remaining 50% of premium (implied premium rate of 2.5%). Centenary understands that the cover provided includes both crop and livestock insurance. Separate credit life insurance cover has been placed by the ACS for Centenary Bank's clients. The average size of its loan portfolio is about UGX 5 million (US$1,333) per borrower. The loan portfolio is divided as follows: maize is the main value chain (25% to 26% of loan portfolio), followed by coffee (23% to 24% of total loans) and beef cattle trading and beef fattening (20% of loans); the remaining 25% of the loans are divided between sunflower, tea, potato, and rice producers.

In 2017/18 Centenary advised that it had received crop claims payouts from the AIC underwriters of more than UGX 600 million by end June 2018. Most of the claims had arisen from flood damage to insured crops growing in western regions. Maize and Irish potato crops in Kirsoro and Kibari had also incurred losses. Centenary advised that when claims occurred, the loanee farmers were responsible for reporting the losses immediately to the local bank branch office, which would then notify Centenary Bank headquarters in Kampala, which in turn would advise the AIC. The AIC would then appoint inspectors to visit the farmers who had incurred damages to adjust the losses. Several issues were identified under the program: (i) some farmers had planted their crops very late and outside the optimal window recommended by the MAAIF, and (ii) in some cases the damaged crops were not the same as the crops for which loans had been taken—for example, some farmers took out coffee loans and then diverted these loans into growing different crops.

The following points are noted regarding the Centenary agricultural loan portfolio insured by the AIC in 2017/18:

- The decision to enter into a single insurance contract with a major agricultural bank such as Centenary is very logical, given that the AIC does not have a network of field agents to promote and market the policies for crop, livestock, poultry, and aquaculture.
- Centenary Bank is able to provide the AIC with a schedule of its 40,000 borrowing clients by location, commodity, and loan amount (which forms the sum insured). However, some or many of the borrowers

[52] However, the Centenary Bank's 40,000 clients are listed as insured under the MPCI policy in the UIA quarterly report for March to June 2018.

who are listed under the MPCI policy (but in fact insured under the EARS REI drought policy) are involved in agro-processing and agro-trading—that is, they are not farmers and the insurance cover does not afford them any protection per se. In addition, Centenary advises that about 20% of its agricultural loan portfolio is loans to cattle producers and cattle traders, and it would appear these risks have been incorrectly booked under the MPCI cover.

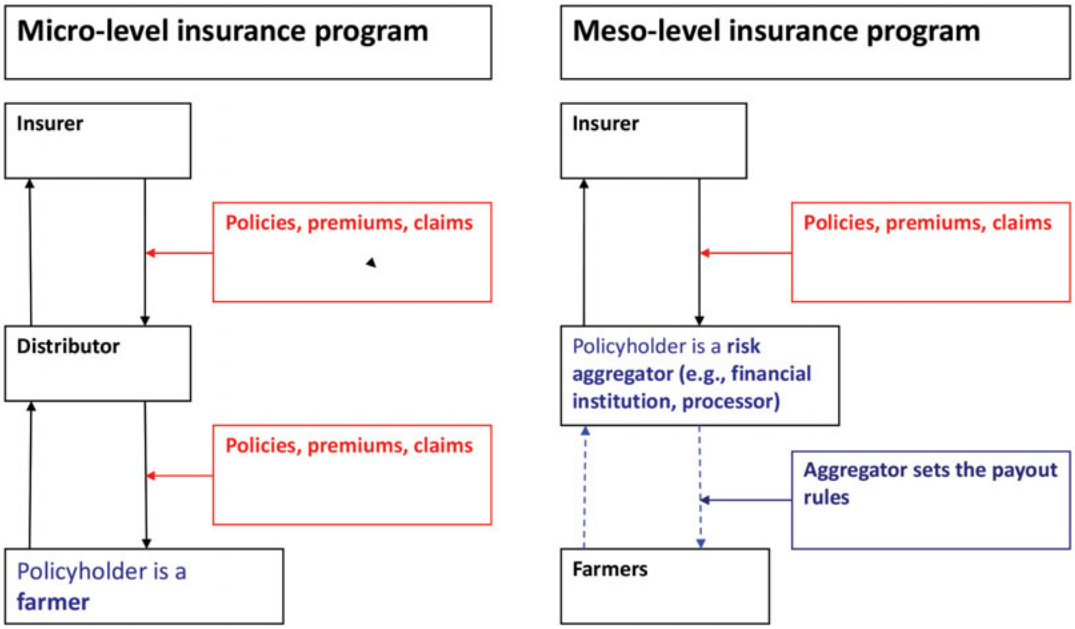
- In order to capture this account, the AIC has agreed to a commercial premium rate of 2.5%, of which the bank has been responsible for paying 50%, while government is subsidizing the remaining 50% of premium. This assumes that all Centenary clients are small farmers and are eligible for a 50% premium subsidy.
- The Centenary Bank risk is by far the largest risk that the AIC bound in 2017/18: the liability of UGX 250 billion is about 68% of TSI of UGX 365 billion. The negotiated premium rate of 2.5% is only half the published flat rate of 5.0% that applies to most crop and livestock insurance business and that presumably was agreed by the 10 Consortium insurance companies and their lead reinsurers. This means that the program is at least 50% underpriced. While the program has to date incurred a loss ratio of only 47%, 2017/18 was not a severe loss year in most of Uganda: if major floods, droughts, or pest and disease outbreaks had occurred, the result might have been huge financial losses by the AIC.

5.7. Option to Design a New Meso-Level Crop Insurance Bank Assurance Portfolio Protection Cover for Financial Institutions

Based on the experience with Centenary Bank thus far, it is strongly recommended that UIA-Agro Consortium Secretariat meet with the bank prior to the next renewal to sort out the agricultural credit insurance requirements of the bank and to design a suitable cover for the bank to meet its risk transfer needs. Centenary Bank's 40,000 borrowing clients—including farmers, livestock producers, and small-scale traders—cannot continue to be included in name under the MPCI policy when in practice they are protected under a hybrid drought REI product coupled with indemnity-based adjustment of flood and landslide damage in crops. If major claims were to arise and Centenary Bank were to challenge the cover being provided to their clients, UAIS stakeholders would be very exposed to potential litigation. There appear to be two main insurance transactional models going forward:

1. **Offer Centenary Bank *micro-level individual farmer* drought index insurance, based on the existing REI policy designed by EARS and registered with the IRA, and combine this with indemnity-based insurance for flood and landslide.** The premium rates for this combined drought index and indemnity-based product would need to be established. (See left-hand chart in figure 5.3 for the typical transactions involved in a micro-level insurance program, with policy sales to individual farmers who are the insured policy holders, who are responsible for payment of premium, and who receive claims payouts.)
2. **If Centenary insists that its primary interest is crop credit portfolio protection, design a suitable *meso-level* crop credit portfolio protection policy, which could be offered to each of Centenary's branch lending offices.** For this option, it is likely that UIA-ACS would need to seek assistance from their lead reinsurer SwissRe to design the meso-level bank assurance cover. The underlying cover could be based on the EARS REI policy being used to insure individual farmers. (See right-hand chart in figure 5.3 for the typical transactions involved in a meso-level insurance program, with a policy sale to a risk aggregator such as a bank or microfinance instution that acts on behalf of a group of members or borrowers (beneficiaries) and that decides on the rules for charging premium to the beneficiaries and for sharing payouts with the beneficiaries.)

Figure 5.3. Structural Features of Micro-Level Insurance for Individual Farmers versus a Meso-Level Insurance Program for Risk Aggregators (financial institutions)



Source: Dick 2009.

There is considerable flexibility both in the objectives of and in the design of a meso-level weather index insurance cover. The options include:

1. **Pure portfolio protection for regional risk aggregators such as commercial banks, rural banks, non-governmental organizations, MFI cooperatives, or input suppliers.** The "risk aggregator"—as termed by Miranda and Milangu (2016)—typically purchases meso-level WII cover to protect its crop loan portfolio against catastrophic climatic risk that results in crop failure and inability of farmers to repay their loans. Farmers do **not** participate in the insurance cover, they do not contribute to premiums, and they do not receive payouts. In these cases, farmers are usually not made aware that the financial institution has purchased a Weather Index Insurance cover to protect it against crop losses and farmers' ensuing inability to repay their loans, as this might encourage moral hazard and default by farmers. The benefit of such a meso-level protection is that if the risk aggregator/lender incurs a major loss, it will receive a payout to inject needed financial liquidity. This allows the risk aggregator/lender to (i) reschedule loans and interest payments for small borrowers who have lost their businesses or crops and cannot repay their loans; and (ii) extend new loans to businesses so they can resume production and to farmers so they can purchase seeds and other inputs and plant their crops for the new season. In this way clients of the risk aggregator/lending institution indirectly benefit from such a meso-level cover. Also, such a cover would potentially be attractive to regional banks and other financial institutions, as well as to input suppliers that provide seeds and fertilizer on credit against repayment by the farmers at time of harvest.
2. **Purchase of meso-level WII cover by a regional risk aggregator and distribution of part or all of the payout to its small farmer members or borrowers.** In this case the aggregator purchases a single policy from the insurer on behalf of large numbers of small farmers whom it works with, and who typically have borrowed crop input credit. These farmers are deemed to be "direct beneficiaries" and not "the insured." The aggregator sets its own rules, which may include making its clients responsible for paying part of the premiums, and these payments may be bundled with the interest payments due on credit. If a payout is

received, the risk aggregator may elect to distribute part or all of the payout to its clients (borrowing farmers). Under this second model, farmers are usually provided with index insurance awareness education and training, so they understand how the insurance program works and how claims payouts are calculated and paid to them.

It appears that Centenary Bank is seeking option 1, meso-level pure portfolio protection, for its short-term lending operations through its regional branch offices. In this case, the underlying product offered to each bank branch could be the EARS REI, which protects against drought and excess rain. This product would be suitable for protecting the bank against major shocks (e.g., drought) that lead to severe regional crop losses and yield reduction and that render farmers who have taken out seasonal crop credit unable to repay their loans.

For Centenary borrowers taking out livestock investment loans and loans for trading, the EARS REI is not suited to the bank's risk management requirements and alternative covers would have to be designed for these borrowers.

It is recommended that the Uganda IRA be closely involved in the design and rating of any meso-level cover for Centenary Bank, as it is ultimately responsible for approving and registering any new insurance product that is launched into the Ugandan market.

5.8. UAIS Stakeholder Roles and Responsibilities in Scheme Management and Implementation

Ministry of Finance, Planning and Economic Development (MoFPED)

MoFPED is responsible for deciding the budget for financial support (premium subsidies, farmer awareness creation) and for overseeing implementation of UAIS. The MOU (Republic of Uganda 2017b) states the full roles of MOFPED including:

1. Budget and release/disburse the premium subsidy funds.
2. Advise BoU to open up a UAIS account into which the subsidy funds will be transferred.
3. Oversee and approve the overall implementation of scheme at all levels.
4. Develop a monitoring and evaluation framework.
5. Ensure the sustainability of the scheme.
6. Undertake sensitization, awareness creation, and data collection for the scheme, in collaboration with the parties and other relevant stakeholders.
7. Develop an agriculture insurance policy.
8. Approve names and signatories to the UAIS account.
9. Authorize BoU to effect premium subsidy payments to the AIC.

Since the UAIS was first launched, MoFPED has assumed an active role in overseeing scheme implementation, in approving the timely settlement by BoU of premium subsidies to the consortium insurers, and in providing start-up budgetary allocation for sensitization and awareness creation for farmers. In November 2017, the AIC through UIA acquired a grant from aBi Trust for increased sensitization and awareness campaigns for the next 12 months; it notes, however, that going forward major additional funding is required to educate farmers on the role of agricultural insurance (UIA 2018).

One activity that has yet to be finalized is number 4, develop a monitoring and evaluation framework for UAIS. An M&E system is essential if government is to assess UAIS inputs, outputs, and impacts, such as number of crop, livestock, and aquaculture producers receiving education and training on agricultural insurance;

the degree of basis risk being encountered with the crop drought REI and AYII programs; the degree to which insurance helps farmers gain access to formal credit (seasonal loans); and the impact of insurance on smoothing of consumption/reduced need for asset depletion following a loss, adoption of new technology, and increased production/yield and incomes. In addition, development of a national agriculture insurance policy (number 7) is in draft stage.

Bank of Uganda

BoU's roles center on the opening of a special UAIS premium subsidy account and on effecting timely premium subsidy payments to the Agriculture Insurance Consortium members (11 insurance companies). Since September 2016, BoU has made seven subsidy payments to the consortium valued at UGX 5,704 million, equivalent to 67% of the total premium of UGX 8,573 million (table 5.8). A high proportion of the UAIS portfolio must therefore be located in the high-risk regions of the country, where the maximum premium subsidy is 80%.

Table 5.8. Premium Subsidy Payments by BoU, September 2016 to June 2018

Category of farmers	No. of farmers	Subsidy amount (UGX)
Subsidy claimed for September–December 2016	8	92,785,927
Subsidy claimed for January–April 2017	17,287	308,133,864
Subsidy claimed for May–June 2017	6,547	291,344,671
Subsidy claimed for July–September 2017	9,491	1,216,981,126
Subsidy claimed for October–December 2017	8,589	1,019,628,570
Subsidy for January–April 2018	17,354	2,105,284,155
Estimated subsidy April–June 2018	5,118	670,243,229
Total	**64,394**	**5,704,401,542**

Source: UIA 2018.

For 2018/19, the UIA-ACS is forecasting an increase in total written premiums to UGX11,217 million (a 30% increase over the period FY2016/17–2017/18), and premium subsidies of UGX 4,374 million (23% reduction from FY2016/17–2017/18) (table 5.9). In 2018/19, the projected premium subsidy amount represents only 39% of total premium. Given agreed premium subsidy levels (30% for large-scale farmers, 50% for small-scale farmers, and 80% for farmers in high-risk regions), it appears that the scheme underwriters plan to take the program away from high-risk regions and to split the portfolio equally between small-scale and large-scale farmers.

Table 5.9. Premiums and Premium Subsidies, FY2016/17–FY2017/18 and Projections for FY2018/19

Financial year	Details	Basic premiums (UGX)	Premium subsidy (UGX)
2016/17–2017/18	Policies taken up	8,572,637,241	5,704,401,542
2018/19	New policies expected	11,216,857,091	4,374,328,997
	Total	**19,789,494,332**	**10,078,730,539**

Source: UIA 2018.

Insurance Regulatory Authority of Uganda

The IRA is expected to play several key roles in the UAIS, from approving the crop, livestock, and aquaculture insurance products and wordings to auditing and approving the premium subsidy payments to the consortium insurers. As part of the audit process, the IRA is responsible for checking that the declared risks have actually been bound; that the insured is a small-scale farmer (eligible for 50% premium subsidy), a large-scale farmer (eligible for 30% premium subsidy), or located in a high-risk region (maximum 80% premium subsidy); and that the correct premium rates have been charged. Further details of the IRA's roles are listed below. Its wider role is to ensure consumer protection.

- Approve agriculture insurance products developed for purposes of the scheme.
- Conduct thorough verification of the underwritten insurance policies under the scheme.
- Advise BoU, through the MoFPED, on the subsidy premiums due for payment to the AIC. BoU will pay a subsidy only upon receipt of advice, in writing, from MoFPED, and written confirmation from IRA that all due verification has been done.
- Advise on names and specimen signatures of persons responsible for issuing premium subsidy instructions to MoFPED.
- Supply MoFPED with all information pertaining to the scheme.
- Effectively monitor uptake and ensure that the scheme does not commit government beyond the budgetary allocation for the premium subsidy.
- Copy GoU/MoFPED in all correspondence pertaining to the implementation of the scheme and related matters (for further details see UAIS MOU [Republic of Uganda 2017b]).

Uganda Insurers Association (UIA)

GOU has appointed UIA to administer the UAIS through the AIC. The AIC's 11 members have, in turn, created the Agro Consortium Secretariat (ACS). Staffed by four persons and housed in the UIA, the AIC seeks to promote and market the UAIS, as well as underwrite and settle claims made on the UAIS. Key functions for the UIA include undertaking sensitization and consumer awareness campaigns, submitting premium subsidy bordereau to the IRA on a monthly basis for processing, and keeping GoU/MoFPED informed of all activities relating to scheme implementation. The further roles of UIA on UAIS include the following:

- Administer the scheme.
- Establish the AIC, in consultation with GoU/MoFPED.
- Undertake sensitization and consumer awareness campaigns.
- Develop and standardize agriculture insurance products.
- Notify IRA of premium subsidy payments due to participating insurers on behalf of the AIC on a monthly basis, supported by the list of beneficiary farmers which list shall also be communicated to MoFPED on the same day.
- Copy GoU/MoFPED all correspondence pertaining to the implementation of the scheme and related matters.
- Supply GoU/MoFPED with all information pertaining to the scheme, as may be requested by GoU/MoFPED from time to time.
- Provide quarterly progress reports on the scheme (UAIS MOU [Republic of Uganda 2017b]).

The Agro Consortium Secretariat is responsible for product development, underwriting, claims administration, loss assessment, and subsidy management. The ACS manages the scheme from the private side on behalf of AIC. Each of the 11 member insurance companies markets the insurance products, issues policy,

and then shares business with other consortium members under a coinsurance arrangement. The company originating the business gets a commission of 5% on the premium raised, while the participating companies each get 2% of the risk share, totaling 22%, with the rest ceded to reinsurance companies. The secretariat manages its operations through a 15% commission charged on the total premium collected. The secretariat is expected to implement activities to raise awareness of the scheme among farmers and to undertake loss adjustment and other related activities.

UIA (with assistance from AIC-ACS) is responsible for preparing quarterly reports on UAIS implementational progress and submitting these to the Technical Working Group (TWG) (which is the same entity as the National Committee for Agricultural Insurance). Section 4.3 noted that the TWG is headed by a senior member of MoFPED and is represented by a broad range of public and private sector stakeholders. It appears that the TWG meets rather infrequently, and furthermore that UIA is falling behind in its submission of quarterly reports. For example, the second quarter 2018 report covering the period April–June was submitted on June 30, 2018, but at the time of the WBG's November 2018 mission visit, the September quarterly report had not yet been finalized or submitted to stakeholders.

5.9. Way Forward for UAIS

In its June 30, 2018, quarterly progress report, the UIA lists a series of issues and action points for the GoU to consider going forward into 2019/20. It has reiterated the request for government to remove the 18% value added tax (VAT) charged on agricultural insurance premiums and to reduce the stamp duty of UGX 35,000 to UGX 5,000 per policy; these changes would make cover more attractive and affordable to small-scale farmers. It has also requested additional funding for awareness creation and education of farmers and for capacity building for banks and other distribution channels. In addition, it has requested that agriculture insurance be bundled with agriculture credit on a mandatory basis. See box 5.4 for further details of changes requested by UIA.

5.10. UAIS Gap Analysis Conclusions and Recommendations

Overview of UAIS Progress

UAIS has been operational for 18 months, and in that time, the UIA, the AIC, and the ACS have made very significant progress in establishing a market presence in Uganda and in creating awareness of and demand for the program by farmers and rural financial institutions. By June 30, 2018, more than 64,000 crop, livestock, and aquaculture producers had purchased UAIS policies, thereby considerably exceeding the first-year target of 45,000 policy sales. This is a very commendable achievement for all stakeholders.

Who Benefits from the Program

The analysis of the average sums insured and premiums per policy shows that the vast majority of beneficiaries of the crop insurance program, including the Drought WII (REI) and AYII programs, are very small-scale farmers. This is in line with GoU objectives for targeting the program premium subsidies.

The MPCI and aquaculture covers, however, are more suitable for large-scale commercial farmers. This is also true to a certain extent of the individual animal livestock and poultry policies. To date the sales of poultry and aquaculture insurance have been to a handful of very large-scale commercial producers, who are thereby capturing a disproportionately high share of the annual premium subsidy budget and thus potentially restricting the number of sales to small-scale farmers. One option UAIS stakeholders may therefore need to consider is to cap the maximum amount of premium subsidies that any one farmer may benefit from in a calendar year.

Box 5.4. UAIS Way Forward and Assistance Requested from GoU

MoFPED has been asked to consider the following policy initiatives for purposes of driving the uptake of the UAI scheme:

- There should be no VAT on agriculture insurance policies submitted to MoFPED.
- The stamp duty should be reduced from UGX 35,000 to UGX 5,000.
- The ministry should set aside more funds for sensitization and awareness activities designed to reach the different subregions across the country.
- A mass communication campaign should run in parallel with the targeted and focused sensitization activities currently in place.
- The consortium should continue to aggressively market the scheme and raise awareness through various channels.
- Key contact points should be established to allow farmers to access the products. Concerning distribution, the consortium is working on establishing firm relationships within the existing institutional framework (aggregators/agents)—specifically with the Uganda Cooperative Alliance (UCA), Uganda National Farmers Federation (UNFFE), MAAIF, Sasakawa Global 2000—Uganda, and others.
- Local government district production officers should be designated as contact persons for agriculture insurance.
- The ministry should work to assist in disseminating information through various government arms (the commissioner indicated the ministry's willingness to fund sensitization activities).
- The ministry should persuade the relevant financial institutions to embed agriculture insurance in their agriculture loans, or alternatively require farmers to have insurance as a precondition for getting the loan. Farmers could then in turn use the agriculture insurance as collateral with the financial institution.
- The mid-term evaluation of the scheme should provide recommendations on further developments as necessary. Lessons learned from the pilot year of the scheme should drive production and transformation of the agriculture sector.

Source: UIA 2018.

Going forward, efforts should be made to ensure that the UAIS offers livestock and poultry insurance products that the bulk of small-scale livestock producers can access and afford. UIA-ACS currently lacks the staffing or distribution channels to promote and implement cover with small-scale poultry producers (with 500 to 1,000 birds). It currently does not offer cover for sheep and goats, which tend to be owned by small-scale livestock producers, and going forward UIA-ACS may wish to conduct research into cover for these small ruminants.

The UIA-ACS quarterly progress reports do not break down the number of small-scale and large-scale farmers who are purchasing cover, or the corresponding sums insured, premiums, and premium subsidies. Going forward, this information should be provided, as it would enable GoU to understand better which types of farmer are benefiting from the program subsidies.

Product Design and Rating

ACS has developed three crop insurance products and programs, including individual grower MPCI, Drought Index Insurance, and AYII, as well as livestock insurance (for cattle, pigs, and poultry) and aquaculture insurance. In designing these products, UIA-ACS has received major assistance from its reinsurers and from international specialists such as EARS and ARC (African Risk Capacity). On the basis of this review, it is apparent that the policy wordings conform to international best practice and are basically sound.

The main UAIS smallholder crop insurance cover at the present is the Drought Relative Humidity REI policy designed by EARS. This is essentially a drought protection policy and is suitable for farmers in areas

that are susceptible to seasonal drought. However, the REI cover does not provide broad-based risk protection against key perils such as pests and diseases, which are identified as the most serious cause of loss in Ugandan agriculture (PARM 2015; see section 2.7).

AYII is a multiple-peril area-based loss of yield cover that does include pests and diseases as well as any other perils that affect area yield; it is being implemented in several African countries as a smallholder cover linked to crop credit. Therefore, although the 1AF maize AYII pilot in four districts in 2017/18 produced very disappointing results (mainly due to poor design and implementation by 1AF), it is strongly recommended that UAIS stakeholders continue to test and develop this cover for Ugandan conditions going forward.

As indicated above, the average premium rates charged by the UIA-AIC underwriting unit are considerably lower than the published premium rates, with an overall average premium rate of 2.35% for all programs. To recap: for the MPCI program, the actual average premium rate has been 2.30%, compared to the 5% flat rate charged for all crops throughout Uganda (save for cotton, which is 6%); for poultry insurance, the average rate of 2.48% is much lower than the declared single rate of 5.0%; for fish farming, the average rate of 4.29% compares with the state's rate of 6.0%; and for livestock, where stated rates vary from a low of 3.5% for local cattle to a high of 6% for pigs, the actual average rate to date has been only 3.2%. Certainly some flexibility is required in underwriting risk, but an overall average premium rate of only 2.35% (or about 50% of the average published rate of 5%) over the first 18 months of the program leaves the program very exposed to loss. These rates are unsustainable, particularly for an MPCI policy. It should also be highlighted that this period coincides with generally favorable weather in Uganda and that bumper crop yields (e.g., of maize) were experienced in most regions of the country. Had this been a bad crop year, the loss ratio might have looked very poor on account of the program being severely underrated. It is recommended that the TWG conduct a review of the adequacy of the rates currently being charged on UAIS and then present proposals to GoU.

The UAIS stakeholders' decision to adopt single flat rates for every crop and region of Uganda is not technically (actuarially) sound. This applies especially to the crop MPCI cover with a 5% flat rate and the same 75% insured yield guarantee cover level for all crops throughout the country. Potentially this decision will lead to huge anti-selection by farmers in drought-, flood-, or hail-prone areas of Uganda purchasing underrated MPCI cover, while farmers in low-risk regions consider the policy too expensive to purchase. Where the objective is to offer standard premium rates (e.g., 5.0%), the more conventional approach would be to adjust the yield guarantee level to achieve the target price: for example, farmers in a high-risk region with very variable LTAY would be offered a guarantee yield of say 60% to match the 5.0% premium rate; conversely, farmers in a low-risk region adopting high husbandry standards and having very low variation in LTAY could be offered an 85% yield guarantee at the 5.0% premium rate. In addition, some crops are very much more susceptible to climatic and biological perils than others, necessitating the introduction of differential rates to reflect the different risk exposures. In the medium term, it is unlikely that UAIS will be able to maintain single rates for MPCI cover for all crops throughout the country, and likely that it will need to introduce actuarially based ratings that put a proper price on risk. Similar comments apply to both the drought REI cover and to the AYII programs, where premium rates should be calculated separately for each UAI based on the underlying pure risk rates for each UAI.

To date, the demand for and uptake of the UAIS livestock (cattle and pigs) and poultry mortality policies has been very low and mainly restricted to large-scale producers. One of the major challenges faced by underwriters of individual animal accident and mortality covers is the extremely high costs of animal pre-inspections, health checks, vaccinations, and identification (e.g., through ear tagging). The cost of sending a qualified veterinarian to a livestock producer's farm to conduct these pre-inspections, as well as post-mortem inspections in the event of a loss, is usually prohibitively high for smallholders with two to three head of cattle, and therefore insurers tend to target medium- and large-scale commercial enterprises with say 25 to 50 head of cattle where economies of scale can be gained. Going forward UAIS needs to identify suitable low-cost systems and procedures for delivering and administering livestock insurance to small-scale livestock producers. Here the MAAIF livestock veterinarians and extension officers could play a vital role in supporting activities

such as electronic livestock registration and identification (tagging or microchipping), health certification, and vaccination.

The UAIS livestock insurance policy for cattle and pigs does not carry any form of policy excess, which is very unusual in an individual animal livestock insurance policy. A livestock insurance policy typically includes a **coinsurance** on the market value of the animal at the time of death or the sum insured, whichever is lower, in order to reduce the risk of moral hazard; typically the coinsurance is between 10% and 20% of the value of the loss. It is recommended that the TWG review the loss experience with the UAIS livestock policy to date to determine whether claims are arising due to moral hazard and to decide whether a policy excess (coinsurance on the value of the animal) is required or not.

Need for Meso-Level Portfolio Cover for Financial Institutions Lending to Farmers

In 2017/18, the UAIS insured about 40,000 Centenary Bank clients under a hybrid EARS REI drought policy with additional indemnity-based protection against flood and landslide losses. It is understood that the policy is designed as a portfolio protection policy to protect Centenary Bank's short-term loans to 40,000 clients, who include crop producers, livestock producers, and small-scale traders, rather than as a policy to protect individual farmers. The 40,000 Centenary clients are, however, incorrectly reported as being insured under the MPCI policy in the UIA-ACS quarterly report for March–June 2018, and going forward this error should be corrected. Centenary Bank has insured its total agricultural loan portfolio of about UGX 250 billion with UAIS at an agreed premium rate of 2.5% (1.25% paid by Centenary, the other half being covered by the government premium subsidy). The policy carries an annual loss limit.

It is not clear that the current crop insurance cover being offered by UAIS to Centenary Bank is the most appropriate cover for its needs; possibly a meso-level crop credit portfolio protection cover might be more suitable. Such a product could be designed to protect Centenary Bank's short-term agricultural lending operations at the level of each of its regional and district branch offices. In this case, the underlying product offered to each bank branch could be the EARS REI, which protects against drought and excess rain. If a special meso-level crop insurance cover is designed to protect Centenary Bank's seasonal loans to small farmers, the process will likely require inputs from UAIS's lead reinsurers and from the IRA.

The benefit of such a meso-level protection is that if a branch office of Centenary Bank incurs a major loss, it will receive an insurance payout to inject financial liquidity, thus enabling it to (i) reschedule loans and interest payments for small farmers who have lost their crops and cannot repay their loans; and (ii) extend new loans to farmers to ensure they are able to purchase seeds and other inputs and to plant their crops for the new season.

Finally, UAIS stakeholders could explore options for developing a general meso-level portfolio protection cover for all financial institutions that are lending to farmers and livestock producers in Uganda.

Organization, Staffing, and Operating Systems and Procedures

The UAIS is a public-private partnership (PPP) between four main stakeholders: GoU, represented by MoFPED; BOU; IRA of Uganda; and the UIA acting on behalf of the AIC. The roles and responsibilities of each of these four stakeholders are clearly stated in the Memorandum of Understanding signed between these parties in August 2016, which led to the formation of the UAIS and to the launch of the scheme in the third quarter of 2016. However, the MOU does not define the roles and responsibilities, reporting lines, and accountability of the AIC, which is composed of 11 leading insurance companies that are coinsuring UAIS, or of the Agro Consortium Secretariat (ACS) that has been formed by AIC members to manage and underwrite UAIS. It is recommended that going forward, the stakeholders should review the adequacy or otherwise the accountability and reporting lines of the AIC and ACS and should strengthen these areas as necessary. Finally, the MOU does not define the role and functions of the Technical Working Group (National Committee for Agricultural

Insurance), and again it may be appropriate to review its mandate and to raise its profile in UAIS product and program design and implementation (See annex 3 for further details).

The MAAIF has very important roles to play in UAIS implementation. It should (i) strengthen data and statistics on crop area, production, and yield; (ii) facilitate the expansion of AYII in Uganda through CCEs; and (iii) assist with farmer training and education. Under the World Bank–funded Agriculture Cluster Development Project (ACDP), which is being implemented by MAAIF, seasonal data on crop area, production, and yields will be collected starting in 2018 in 40 districts for five major crop value chains (maize, beans, rice, cassava, and coffee). Yields will be estimated at parish levels using accurate measurement based on sample CCEs, which will be conducted by field staff from the National Agricultural Advisory Services (NAADS). UAIS could collaborate with ACDP to roll out AYII cover in the districts and parishes where the CCEs are being conducted by NAADS and trigger a payout according to the NAADS data. Concerning efforts to raise farmers' awareness of and promote UAIS, NAADS-MAAIF offered in November 2018 to help the TWG develop a farmers' awareness and training strategy using its daily faming radio broadcasts and offer training through its national network of agricultural extension officers.

The Agro Consortium Secretariat is the key implementing entity for UAIS; it is responsible for product design and rating, creation of awareness among farmers, risk acceptance and underwriting, and claims administration and loss adjustment. Currently the ACS is staffed by a core team of four who oversee UAIS implementation. This team is backed by a team of four regional inspectors. The 11 member insurance companies assist the ACS in marketing and sales and at times in loss adjustment activities. However, the ACS is insufficiently resourced to implement MPCI on a large scale, as it does not have a network of trained field staff to conduct the pre-season, mid-season, and harvest time field inspections. In the event of widespread crop losses, the staff would be stretched very thin to attend and adjust these losses. For these reasons, the ACS is concentrating on developing its drought REI, as this does not require any form of field-level inspections or loss assessment.

The Need for Agricultural Insurance Capacity Building and Potential Role of a Technical Support Unit

There is a need for technical capacity development of public and private stakeholders involved in UAIS design and implementation. Insurance companies and the ACS would benefit from training in product development, pricing, identification of appropriate delivery channels (partner agent model), and loss inspection and adjustment systems and procedures. Public sector stakeholders would benefit from increased capacity in UAIS implementation support activities: farmer registration and creation of crop and livestock data management systems for insurance purposes; fiscal management of premium subsidies; insurance awareness creation strategies; programs for field extension workers and farmers; training in the conduct of CCEs; and others. Furthermore, if UAIS stakeholders are to implement the ambitious large-scale investment projects identified in this report—strengthening access to agricultural finance through linkage with agricultural insurance (see chapter 2), scaling up of AYII for small-scale farmers borrowing seasonal credit (chapter 6), and researching, developing, and implementing Satellite-Based Pasture Drought Index Insurance (SPDII) (detailed in chapter 7)—they will need to invest heavily in capacity building and training in these products and programs.

In other countries, Technical Support Units (TSUs) have been established to support technical capacity development and training in the public and private sectors and to oversee scheme implementation, and this could be an option for UAIS stakeholders to consider. In Ghana, the Ghana Agricultural Insurance Program (GAIP) was launched in 2011 with a TSU that was housed in the Insurance Association and that was designed to manage the day-to-day implementation of the GAIP, as well as provide capacity building and training to the insurance pool and to the Ministry of Agriculture and Meteorological Agency field staff involved in implementing GAIP (operation of weather index stations, farmer awareness creation, and support for CCEs for AYII). In Kenya, through the Ministry of Agriculture, Livestock and Fisheries, the government elected to form Project Management Units in the state departments of livestock and agriculture rather than forming a central

TSU. In India, after nearly 40 years of PPP crop insurance (Pradhan Mantri Fasal Bima Yojana, PMFBY), the government decided in 2017 to form a national or central TSU housed in the Ministry of Agriculture, along with state-level TSUs in each participating state; these were to assist in the policy planning, implementation, and monitoring and evaluation of the national flagship PMFBY crop insurance program.

The GoU could establish a TSU to strengthen the capacity of government bodies and the private sector in the design and implementation of the UAIS program. The main roles of the TSU would be (i) capacity building and training; and (ii) oversight of the planning and implementation of the UAIS crop and livestock insurance programs and reporting on the programs to government. The TSU could also have a window dedicated to agriculture finance and linkages with insurance. The TSU could have specific responsibility for capacity building, training, and coordination of government support for the following:

- Capacity development of UAIS public and private sector stakeholders
- Agricultural finance bundled with UAIS agricultural crop, livestock, and aquaculture insurance
- UAIS awareness creation and sensitization activities for public sector field staff and farmers
- Identification and promotion of potential distribution channels for agriculture insurance and marketing strategies
- UAIS technology applications for CCEs (smart sampling, mobile phone technology, etc.)
- Development and management of crop and livestock insurance and premium subsidy databases
- Monitoring and evaluation of UAIS implementation, impacts, costs, and benefits.

GoU would need to decide whether to house the TSU in MoFPED or in MAAIF and would also need to staff and recruit the TSU and to establish a working budget for it. It is suggested that the TSU should be staffed by a minimum of five technical staff:

1. TSU manager (minimum BSc training in economics, finance, or business management) who would have a financial and/or insurance background and be able to link agricultural credit and insurance disciplines within the TSU
2. Crop agronomist (minimum BSc training) preferably with an insurance background, with product design and underwriting experience and/or field inspection and crop loss adjusting experience
3. Livestock specialist (minimum BSc training) with an insurance background, specifically in livestock insurance and/or in veterinary science and livestock production and husbandry
4. Agro-meteorologist (minimum BSc training) with strong background in data management and analysis
5. Data analyst and assistant to the TSU manager

An indicative start-up and operating financial budget for the TSU for the next five years is presented in table 5.10. The average annual cost for the TSU would be in the order of US$190,000 in year 1 because of the associated start-up costs (equipping the unit), and thereafter about US$170,000 a year, or a total over five years of US$860,000 (UGX 3,225 million). This budget would need to be refined and approved by stakeholders in due course.

Table 5.10. TSU Costs over Five Years (US$)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Office and Equipment (US$)[1]	50,000	15,000	15,000	15,000	15,000	110,000
Staff Costs (US$)	100,000	105,000	110,000	115,000	120,000	550,000
Operating and Adminstration Costs	40,000	40,000	40,000	40,000	40,000	200,000
Total TSU Costs (US$)	**190,000**	**160,000**	**165,000**	**170,000**	**175,000**	**860,000**
Total Costs UGX Million	**713**	**600**	**619**	**638**	**656**	**3,225**

Note: [1]. Office rent and equipment in year 1 including desks, computers, printers etc., plus 1 vehicle.

Source: World Bank Group.

It is recommended that the TSU report directly to the ministry it is housed in. The TSU would work very closely with both the UAIS TWG and the UIA, AIC, and ACS.

Monitoring and Evaluation

An M&E system is essential if government is to assess UAIS inputs, outputs, and impacts such as number of crop, livestock, and aquaculture producers receiving education and training on agricultural insurance; the degree of basis risk that is being encountered with the crop drought REI and AYII programs; the degree to which insurance helps farmers gain access to formal credit (seasonal loans); and the impact of insurance on smoothing of consumption/reduced need for asset depletion following a loss, adoption of new technology, and increased production/yield and incomes.

During this review it has not been possible to discuss with the UIA and ACS whether the REI drought crop insurance program for maize and beans could be subject to basis risk. In the start-up phase of any new crop index insurance program, it is extremely important to monitor how closely the satellite-based index correlates with actual drought conditions on the ground. It is not known whether the ACS has the resources to invest in M&E of the potential basis risk in their REI program.

If UAIS stakeholders elect to invest in a TSU, then one of the important roles that the TSU could perform would be to assume responsibility for M&E of UAIS. The TSU would conduct seasonal M&E studies (including farmer panel work and surveys) and provide routine reporting to government and the UAIS stakeholders.

Other Challenges

UIA-ACS have highlighted the issue of the very high costs of the VAT and stamp duty, which for small-scale farmers can double the costs of their agricultural insurance premiums; they note that this factor is keeping some small farmers from buying insurance. They have therefore requested that the government remove the 18% VAT charge on agricultural insurance premiums and reduce the stamp duty from UGX 35,000 to UGX 5,000 per policy to make cover more attractive and affordable for small-scale farmers.

6. Large-Scale Agricultural Crop Insurance Opportunities in Uganda

6.1. Crop Insurance Overview

The Uganda Agricultural Insurance Scheme (UAIS) is already offering a fairly wide range of crop insurance products to Ugandan farmers, including Multi-Peril Crop Insurance (MPCI), Weather Index Insurance (WII), and Area Yield Index Insurance (AYII). Therefore, apart from named peril crop insurance damage-based cover, the Uganda Insurers Association–Agriculture Insurance Consortium (UIA-AIC) is offering most of the traditional indemnity-based and index-based crop insurance covers that are internally available under UAIS.

MPCI has limited opportunities for development in Uganda given that the majority (>95%) of farmers are small and marginal, and this product is not well suited to their risk management needs. Most small-scale farmers cannot provide their historical yields, which are needed to design and rate an MPCI cover; in addition, many practice intercropping, for which MPCI does not work well.

In the case of the WII program, UAIS is working closely with Environmental Analysis & Remote Sensing (EARS) from the Netherlands and has successfully launched the Relative Evapotranspiration Index (REI) cover for maize and bean producers. It is hoped that EARS can provide UAIS stakeholders with the necessary technical and logistical support going forward.

In the case of the AYII program, however, there is a major gap in the UIA-AIC's knowledge and experience for the design and implementation of the cover. At the same time, a major potential opportunity going forward is to assist UAIS stakeholders in designing an AYII program linked to crop credit provision by financial institutions as part of the Government of Uganda (GoU) strategy for increasing small-scale farmers' access to rural finance.

6.2. Area Yield Index Insurance for Semicommercial Smallholder Farmers

Area Yield Index Insurance represents an alternative approach to MPCI and aims to overcome many of the drawbacks of traditional individual grower MPCI products. The key feature of this product is that it does not indemnify crop yield losses at the individual field or grower level; rather, an AYII product makes

indemnity payments to growers according to yield loss or shortfall against an average area yield (the index) in a defined geographical area (e.g., the region or the paddy production zone, termed the Unit Area of Insurance, UAI). An area yield index policy establishes an insured yield, which is expressed as a percentage (termed the "coverage level") of the historical average yield for each crop in the defined geographical region that forms the insured unit. Farmers whose fields are located within the insured unit may purchase optional overage levels, which typically vary between a minimum of 50% and a maximum of 90% of historical average yield. The actual average yield for the insured crop is established by sample field measurement (usually involving crop cutting) in the insured unit, and an indemnity is paid by the amount that the actual average yield falls short of the insured yield coverage level purchased by each grower.

The key advantages of the area yield approach are that moral hazard and anti-selection are minimized; in addition, because the costs of administering such a policy are much reduced, there is the potential to market this product at lower premium costs to farmers. As the policy responds to yield loss at the area level (e.g., a parish or district) and not at the level of the individual farmer, no farmer can influence the yield indemnity payments, thus minimizing anti-selection and moral hazard. Administration costs are also greatly reduced because there is no need for pre-inspections or loss adjustment on individual farms; loss assessment instead depends on a pre-agreed random sampling of crop yields on plots within the UAI. AYII policies provide comprehensive coverage against catastrophic natural and weather events and also major pest and disease attacks (e.g., locusts or viral diseases) that result in major yield reduction at the area level. This is an advantage over WII covers, which generally insure one or two weather-related perils only and which do not per se insure against pests and diseases. Furthermore, basis risk is usually lower for an AYII policy than for a WII policy. See table 6.1 for further potential advantages of AYII policies.

The main drawback of an AYII policy is basis risk, or the potential difference between the insured area yield outcome and the actual yields achieved by individual insured farmers within the UAI. Basis risk arises where an individual farmer incurs severe crop yield losses due to a localized peril (e.g. hail, or flooding by a nearby stream or drainage canal) that does not impact the area average yield in the UAI; under these circumstances the grower who has incurred severe crop damage does not receive an indemnity payment. An AYII policy is best suited to covariate risks such as drought that affect crop production and yields in a similar fashion over wide areas. It does not capture idiosyncratic risks such as hail that affect individual farmers (table 6.1.).

Table 6.1. AYII: Preconditions for Operation, Advantages, and Disadvantages

Preconditions	Advantages	Disadvantages
• **Homogeneous producing areas** with high correlation between yields of different farms (UAI) • **Minimum of 10 to 15 years of historical yield data** for the defined UAI • **Availability of an accurate system for measuring actual average yields** in UAIs, which requires a large number of trained professionals for conduct of crop cutting experiments (CCEs) at harvest time and an efficient data management system	• Policy offers **comprehensive loss of yield protection** against systemic risks at defined area level. • **Moral hazard** and **adverse selection** are minimized. • **Costs of administering the coverage are much lower than for MPCI** (no need for direct visits and loss assessments on individual farms, although yield sampling is needed in each UAI). • By directly estimating the average yield for the area, exposure to **basis risk is lower than for WII,** since it is limited to its idiosyncratic component (i.e., localized mismatches between the average yields of the area and yields of individual farmers).	• **The approach entails basis risk,** which in the case of AYII can be defined as the risk arising from the potential difference between the average yield in the selected area and the yields achieved by individual farmers. • Basis risk can arise due to localized perils (e.g., hail, flooding) that may affect only some of the farmers in the UAI, or by marked heterogeneities in the yields of the selected insurance areas.

Source: World Bank Group.

In India, AYII has been widely adopted for smallholder rice and wheat cropping and where crop insurance is linked to seasonal crop credit. India has operated a public sector Area Yield Index Insurance program for more than 30 years under its public sector National Crop Insurance Scheme (NAIS). Crop insurance is

compulsory for farmers who borrow seasonal production credit. Currently this program insures about 20 million Indian farmers each year. Other countries that operate area yield crop insurance include the United States and Brazil, and this product is being researched in parts of Africa and Asia.

In Kenya, the World Bank has been working closely with government, the Ministry of Agriculture, and a pool of insurance companies for the past five years to develop AYII cover for major cereals such as maize, wheat, and sorghum. The Kenya AYII program is closely linked to credit in the form of seasonal loans from financial institutions, including One Acre Fund, microfinance institutions (MFIs), and banks. The program has scaled up significantly since 2017/18 and now insures more than 300,000 Kenyans, mainly smallholder farmers. The Government of Kenya provides major support for (i) awareness creation and sensitization among farmers; (ii) 50% premium subsidies for up to five acres of insured crop per farmer; (iii) strengthening of crop yield data and statistics; and (iv) conduct of crop cutting experiments (CCEs).

6.3. Technical Considerations

Preconditions for the Operation of an AYII Program

Several preconditions exist for the operation of AYII for cereals and oilseeds in Uganda:

- **Definable homogeneous crop producing zones** (UAI), with low yield variation between farmers in the insured unit
- **Historical crop sown area, production, and average yield data for the past 15 years** or more **for the defined UAI,** as the basis for the insured yield and technical premium rates for the policy
- **An independent and statistically accurate system of measuring actual average area yields in the defined UAI,** as the basis for triggering of claims payments where actual yields fall short of the insured yield(s)

In Uganda there are major challenges in obtaining historical crop production and yield data at the local level (e.g., village or parish). In Uganda routine crop production data collection was formerly conducted by National Agricultural Advisory Services–Ministry of Agriculture, Animal Industry and Fisheries (NAADS-MAAIF), but this system broke down many years ago, due to internal instability and lack of resources and funding in NAADS. The Uganda Bureau of Statistics is also involved in agricultural data through the agriculture and livestock censuses conducted every 10 years, most recently in 2008/09.

In 2018, the World Bank with NAADS-MAAIF launched a major new initiative designed to strengthen the collection of crop production data and statistics. As mentioned above, the Agriculture Cluster Development Project (ACDP), funded by the World Bank and implemented by MAAIF, is starting to collect seasonal crop area, production, and yield data in 40 districts for five major crop value chains (maize, beans, rice, cassava, and coffee). Yields will be estimated at the parish level using accurate measurement based on sample CCEs, which will be conducted by NAADS field staff.

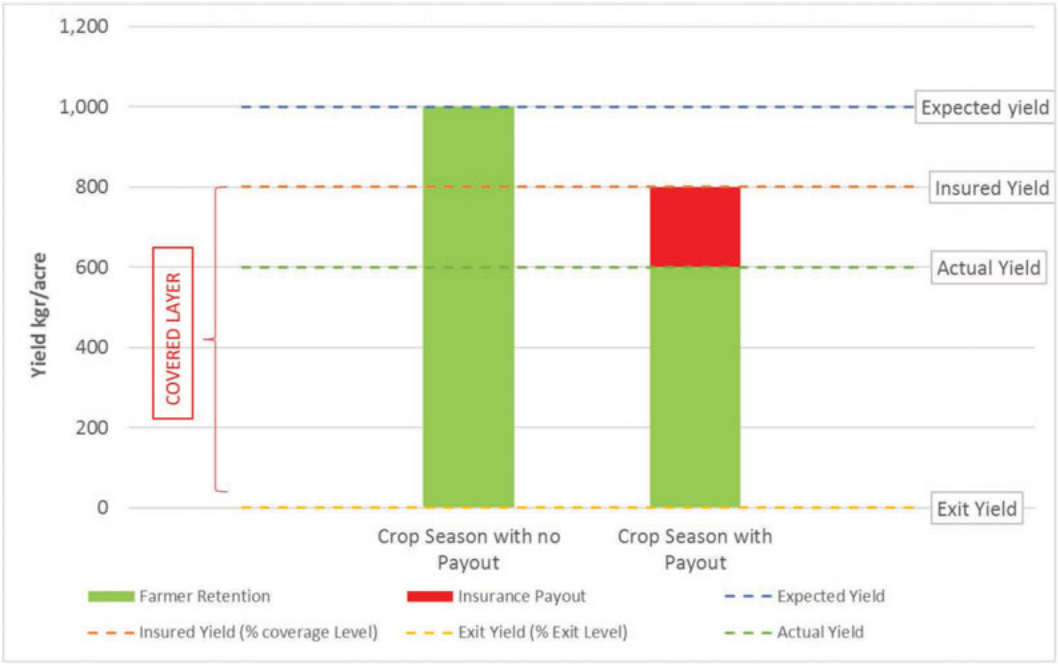
It is recommended that UAIS collaborate with ACDP to roll out AYII cover in the districts and parishes where NAADS is conducting the CCEs and to trigger payouts according to the NAADS CCE data.

How AYII Works

The key purpose of a crop AYII cover is to insure and indemnify farmers for losses against the average area yield in a defined geographic location such as a subcounty or parish where they farm. It is not an individual farmer yield policy that insures them against losses on their own farms and fields.

The operation of an AYII policy is illustrated for a hypothetical crop of maize (figure 6.1). In this example, Parish X has a farming population of about 10,000 small farmers and an area of about 50,000 acres of maize. The

Figure 6.1. Hypothetical Example of an AYII Contract for Maize in Parish X in Uganda



Source: World Bank Group.

average or normal expected yield of maize in Parish X is 1,000 kg/acre, which is similar to the average yield of maize in Uganda. This forms the area yield index.

AYII insurers typically offer insured yield coverage levels between 50% and 90% of the average area yield. In the example of Parish X, the insured yield (or threshold yield) is set at 80% of the average, or 800 kg/acre. The insured yield forms a guaranteed yield level such that if the actual area yield as measured at the time of harvest in Parish X falls below an average of 800 kg/acre, the insurer will pay all insured farmers the amount of yield shortfall (or loss per acre) times the agreed value (termed the sum insured) times each farmers acreage for the insured crop.

In the first season, crop growing climatic conditions are normal in Parish X, and the actual average maize yield as measured by the Department of Agriculture extension officers is 1,000 kg/acre; since this is above the insured yield of 800 kg/acre, no payout is due to the insured maize farmers. However, in the second season, severe drought conditions mean that the actual average yield in Parish X falls to only 600 kg/acre. This is equivalent to a yield shortfall of 200 kg/acre, or 25% of the insured yield. All of the insured farmers receive a payout based on this area yield shortfall (200 kg/acre) irrespective of the actual yields on their own farms. Each farmer is compensated for the 200 kg/acre yield shortfall times their individual insured area times the agreed sum insured.

Crops and Locations That Should Be Selected under an AYII Program in Uganda

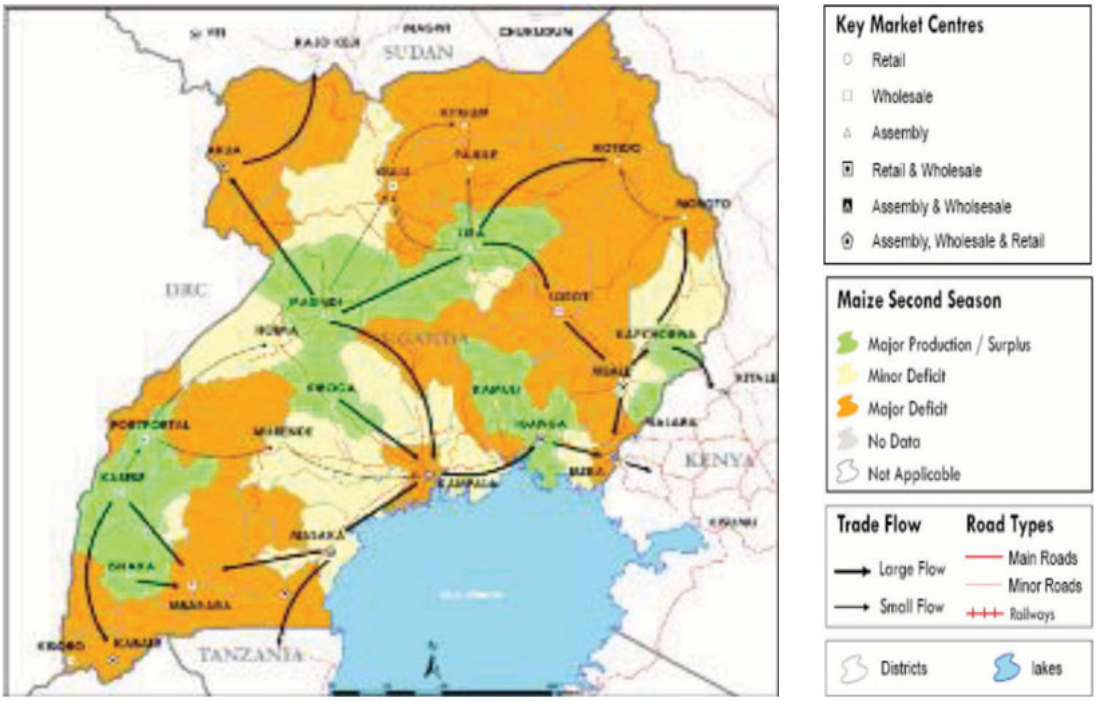
AYII is best suited to the insurance of annual cereal crops (such as maize, rice, wheat, sorghum, and millet) and oilseeds (such as soya beans). Such crops tend to be cultivated on a large scale by many farmers in a defined geographical area; they are sown and harvested in defined periods of the cropping season; and their area yields can be relatively easily measured. AYII is not well suited to perennial tree crops such as tea, coffee, and bananas, with multiple harvests through the year. Some AYII programs insure cotton, but as this crop is a multiple-harvest crop (harvested over several months), very exact methods are needed for establishing average area yields at harvest, including two or three (or sometimes more) rounds of CCEs as each set of cotton

bolls mature. AYII is also not very well suited to root crops (such as cassava, sweet potatoes, or Irish potatoes) because of the difficulties associated with establishing area average yields for these crops. Finally, AYII is not suited to short-duration horticultural, vegetable, and fruit crops.

In Uganda the selection of crops for the start-up of any AYII program will be influenced by (i) the crop's importance as a source of production and income for smallholder farmers; (ii) the crop's importance for government policy and investment in improved seeds and fertilizers and access to credit; and (iii) the crop's importance as a source of export earnings. As noted in section 2.4, maize is the most important food crop for most Ugandan smallholder farmers, and it is also the number one source of income from the sale of crops. It is also one of the major crops selected under the ACDP, and in the future maize yields will be estimated using CCEs in up to 40 districts and parishes. For these reasons, it is recommended that UAIS stakeholders select maize for the start-up of any future AYII program. (See figure 6.2 for distribution of maize-growing areas). Other crops that could be included in the start-up phase of an AYII program include beans, rice, and cassava,[53] as these are also priority crops that will be subject to CCE area yield estimation under ACDP.

In the context of Uganda, the availability of key data—for historical time series crop area, production, and yield—will also influence which crops are initially selected for the AYII program. If over time the national system of crop production and yield data collection is strengthened under the ACDP and other MAAIF programs, then it should be possible year by year to include more cereal and oilseed crops under the UAIS AYII program.

Figure 6.2. Maize-Growing Areas of Uganda



Source: FEWSNET 2012, reproduced in FAO 2014b.

[53] Coffee is also a priority crop under ACDP. In this case average parish yields for coffee will not be established using CCEs; rather, sampled farmers will report their actual yields and these data will be used to establish the actual average yield in each parish. As the UAIS gains experience with AYII, it may wish to consider insuring coffee using farmer yield estimates. Insurers and their reinsurers would have to approve such a decision.

Defining the Unit Area of Insurance

The UAI should ideally be defined as a homogeneous micro-agroclimatic zone where farmers grow the same varieties of the insured crop and adopt similar husbandry practices and input use so that normal average yields are similar for all farmers. In reality, UAIs are typically defined on the basis of administrative units for which crop area, product, and yield statistics are collected and reported. In India under NAIS, which is the world's largest AYII scheme, the UAIs were formerly based on the subdistrict block (tehsil/taluka), but farmers complained that this area was too large and that rainfall and crop conditions and yield outcomes were not uniform across the block, resulting in problems of basis risk. Therefore, under the modified NAIS and the Pradhan Mantri Fasal Bima Yojana (PMFBY) programs, the UAI is based on the village (gram panchayat). In the United States under the Group Risk Plan (GRP), the UAI is defined as the county; in Kenya, the UAIs are typically based on a cluster of adjacent wards or subdistricts for which time series crop area, production, and yield data are available from the county-level departments of agriculture.

The plan under the ACDP is to conduct a minimum of 10 CCEs per crop in each parish, and it is therefore recommended that the parish form the basis of the UAI for the operation of an AYII program in Uganda. The challenge would be for the UIA-ACS to meet with both the district and subdistrict departments of agriculture and the ACDP staff to attempt to construct historical yields for a minimum of 10 years on which to base the average or expected yields for each insured crop in each parish (the selected UAI), and also to use these data for rating purposes.

AYII Contract Design and Rating Considerations

Under this study it has not been possible to obtain 10 to 15 years of time series crop production and yield data at the subdistrict level or parish level, which could serve as the basis for illustrating the principles of AYII contract design and rating. When such data become available, UAIS stakeholders can be shown the principles of AYII contract design and rating, but in the meantime this section presents some guidelines based on the World Bank Group's recent experience with designing AYII cover in Pakistan.

Expected Yields and Insured Yield Coverage Levels

For each insured unit, it is necessary to establish the normal average or expected yield for the selected insured crop(s). AYII programs conventionally adopt one of two approaches for establishing the expected yield:

1. The simplest approach is to take an average of the **actual area yields** over the past three to five years. This is the approach adopted by NAIS in India, which averaged three out of five middle years (eliminating the highest and lowest annual yields) to calculate the expected yield.[54] India's PMFBY, on the other hand, averages the past seven years after eliminating up to two calamity years.
2. The alternative method is first to **de-trend** the time series yields using appropriate statistical curve-fitting procedures and to extend the de-trended yields to calculate the expected yield in the forthcoming insurance season. The reasons for de-trending yields are to avoid situations where (i) yields show an increasing technology trend over time due to increased adoption of improved seed and fertilizer technology, in which case the rating procedures will tend to underestimate the actual expected yield and overestimate the pure loss cost premium rates; or (ii) yields show a decreasing trend over time due to soil degradation/loss of fertility and other factors, in which case current expected yields tend to be overestimated and pure loss cost premium rates underestimated.

[54] However, in recognition that this relatively short period of only five years did not always represent the average yield, India is now using the middle five out of the most recent seven years of yield data to establish the expected yield.

Setting of Insured Yield Coverage Levels

AYII policies typically offer optional insured yield coverage levels between 90% and 50% of the average area yield. In India, for each insured crop in each UAI, the PMFBY offers three coverage levels, 70%, 80%, or 90% of the average yield over the highest five years of the past seven years (with the possibility of eliminating two calamity years with the lowest yields). The decision about which coverage level will apply in an insured unit is based on the coefficient of variation (CoV) around mean yield such that in UAIs with low CoVs, the maximum 90% coverage level will be applied, and in UAIs with a high CoV, only 60% coverage is offered.

Under the U.S. Group Risk Plan of the Federal Crop Insurance Program, farmers may select from optional coverage levels between 50% and 90% of the county average yield. However, in recognition that some farmers achieve much higher average yields than the 90% of county average maximum insured yield, the GRP allows farmer to insure their crop at up to 150% of the reference value.

In Uganda it is recommended that insured yield coverage levels of 50–90% of the average expected yield be considered for each crop in each UAI according to the actual level of variability in historical yields and the targeted commercial premium rates. An AYII cover is rated according to the frequency and severity (amount) of crop yield shortfall below the insured yield coverage level that is set. A policy with a 90% insured yield coverage level will obviously be much more exposed to yield shortfall and payouts than a policy with a 60% insured yield: the pure loss cost premium rate and commercial premium will therefore be considerably higher for a policy with a 90% coverage level than for one with 60% coverage level. The coverage level in any UAI should be set in consultation with farmers, insurers, and the GoU, especially where premium subsidies are involved.

Basis of Valuation and Sum Insured

Under an AYII policy, the basis of valuation is very flexible according to the objective of the cover. The insured crop yields can be valued on the basis of (i) the amount of seasonal loan per hectare, (ii) the full costs of production per hectare, or (iii) a "farm-gate sale price" or revenue basis. In India, the PMFBY commonly sets the sum insured according to the amount of seasonal production credit provided to the farmers. In the United States, the GRP permits farmers to insure their selected coverage level yield at up to 150% of the sales' reference price.

For the purposes of this preliminary rating and budgeting exercise in Uganda, a sum insured of US$250/ha is used for maize. This value is based on the typical seasonal loan amount for purchased inputs (tractor hire, seeds, fertilizers, and plant protection chemicals). In the start-up phase of any AYII program in Uganda, it is recommended that the National Committee for Agricultural Insurance discuss and agree on the per hectare sums insured (and coverage levels) that will be offered to farmers.

Calculation of Pure Risk Rates and Commercial Premiums on an AYII Policy

The starting point for any AYII policy is to conduct a historical burning cost analysis of the historical yields. Table 6.2 illustrates the principles of such an analysis as applied to the actual 10-year average area yields for maize in Dunyapur, Pakistan. In Dunyapur the actual long-term average yield (LTAY) for maize is 1,889 kg per year. However, as current maize yields are much higher, it is conventional for an AYII program to calculate the average yield index either as the average of the yields for the past three to five years, or (as in this example) the average of the middle three years out of the last five years, eliminating the lowest yield year and the highest yield year. This calculation produces an average yield of 2,246 kg/acre.

The analysis shows that with a 90% insured yield coverage level, or 2,022 kg/acre, actual yields would have fallen short of this guarantee yield level in 7 years out of 10, namely in all years from 2007/08 to 2013/14; the worst yield loss year was 2010/11, when the yield shortfall would have been 736.5 kg/acre, equivalent to a percentage yield shortfall or annual average loss (AAL) of 36.43% of the insured yield of 2,022 kg/acre.

For the 90% coverage level, the AAL (which is also termed the loss cost or pure risk premium rate) over 10 years would have been 15.27%; once loadings are added to cover data uncertainties and insurers' operating costs and profit margin, the illustrative commercial premium rate might be about 22% for 90% coverage, which would be prohibitively expensive for any farmer to pay. At 80% coverage level with an insured yield of 1,792, the number of yield shortfall years would have been reduced to five, with smaller yield loss in each year as shown by the reduced AAL of 10.07% (indicative commercial premium rate of 15%). At 70% coverage level (yield guarantee of 1,572 kg/acre), the number of loss years would have been further reduced to four, with an AAL of 5.29% (indicative commercial premium rate of 8.06%). The 70% coverage level with 8.06% indicative commercial premium rate might be affordable to farmers (table 6.2).

Table 6.2. Historical Burning Cost Rating Analysis Applied to Dunyapur Actual Maize Yields, 2007/08–2016/17 (kg/acre)

		90% Insured Yield			80% Insured Yield			70% Insured Yield			60% Insured Yield		
Year	Actual Yield	Trigger Yield	Yield Shortfall	Percent loss %	Trigger Yield	Yield Shortfall	Percent loss %	Trigger Yield	Yield Shortfall	Percent loss %	Trigger Yield	Yield Shortfall	Percent loss %
2007-08	1,718	2,022	303.5	15.01%	1,797	78.9	4.39%	1,572	0.0	0.00%	1,348	0.0	0.00%
2008-09	1,492	2,022	529.3	26.18%	1,797	304.7	16.96%	1,572	80.1	5.09%	1,348	0.0	0.00%
2009-10	1,310	2,022	711.1	35.18%	1,797	486.5	27.07%	1,572	261.9	16.65%	1,348	37.2	2.76%
2010-11	1,285	2,022	736.5	36.43%	1,797	511.9	28.49%	1,572	287.2	18.27%	1,348	62.6	4.65%
2011-12	1,872	2,022	149.7	7.41%	1,797	0.0	0.00%	1,572	0.0	0.00%	1,348	0.0	0.00%
2012-13	2,016	2,022	5.7	0.28%	1,797	0.0	0.00%	1,572	0.0	0.00%	1,348	0.0	0.00%
2013-14	1,370	2,022	651.4	32.22%	1,797	426.8	23.75%	1,572	202.1	12.86%	1,348	0.0	0.00%
2014-15	3,106	2,022	0.0	0.00%	1,797	0.0	0.00%	1,572	0.0	0.00%	1,348	0.0	0.00%
2015-16	2,638	2,022	0.0	0.00%	1,797	0.0	0.00%	1,572	0.0	0.00%	1,348	0.0	0.00%
2016-17	2,084	2,022	0.0	0.00%	1,797	0.0	0.00%	1,572	0.0	0.00%	1,348	0.0	0.00%
LTA Average Yield	1,889												
Stdev	570.25												
COV%	25.4%												
Average for AYII Insurance#	2,246												
Annual Average Loss (AAL) %				15.27%			10.07%			5.29%			0.74%
Indicative Commercial Premium Rate (%)				22.22%			14.94%			8.06%			1.27%
# average middle 3 out of last 5 years													

Source: World Bank Group 2017.

This analysis is potentially very misleading, however, because of the major increasing yield trend for maize grown in Dunyapur in recent years. If the rates are recalculated using de-trended time series yields, then the calculated pure loss costs and indicative commercial premium rates are very much reduced. For 90% coverage level, the de-trended insured yield would be 2,321 kg/acre, and the calculated pure loss cost rate would be only 3.13%, with a corresponding indicative commercial premium rate of 5.33%; at 80% coverage level, the insured yield would be 2,063 kg/acre with only one loss in 10 years, a pure loss cost rate of 0.93%, and an indicative commercial premium rate of 1.81%. This analysis clearly shows the importance of checking yields for trends before calculating rates on an AYII program.

AYII international reinsurers will likely use Monte Carlo simulation to simulate crop yields over 5,000 to 10,000 iterations (years) to calculate the maximum probable loss on a crop AYII program and to calculate the technical load that should be applied to the pure loss cost premium rates.

The World Bank Group agri-insurance team has developed an Excel-based AYII contract design and rating tool to help governments and underwriters better understand the principles of AYII rating. This tool has been used for capacity building in both Kenya and in Pakistan between 2015 and 2018.

6.4. Institutional and Operational Considerations

Linkage of Crop Insurance with Crop Credit Provision

Chapter 3 of this report highlighted the fact that access to credit is a major constraint for Ugandan smallholder farmers, and this is one of the major reasons that agricultural investment and growth have lagged behind investment and growth in other sectors of the economy.

The compulsory linkage or bundling of agricultural insurance with credit can improve small farmers' access to loans, enabling them to invest in production-enhancing seed and fertilizer technology. Agricultural insurance can be a win-win arrangement that benefits both the farmer and the lending institution. Many lending institutions are reluctant to lend to small farmers whom they regard as poor risks; but by bundling crop credit with a crop or livestock insurance cover, the bank's loans are protected against default in the event of major climate-induced crop failure or the death of the animal. Where bundling is adopted, banks are generally more willing to extend loans to small farmers (as evidenced in Mexico, Brazil, India, Pakistan, Malawi, and Kenya). Farmers, in turn, benefit by gaining access to credit with which to invest in riskier but higher yielding seed and fertilizer technology or in higher milk-producing livestock breeds; in turn, they benefit from production and income gains as well as the ability to repay their loans in the event of a major crop failure or death of their livestock. Thus many governments actively promote compulsory crop or livestock insurance for farmers who borrow formal credit, including in India, where the former NAIS and now PMFBY is mandatory for all borrowers (loanees), and in Pakistan, where the Crop Loan Insurance Scheme is compulsory for small farmers borrowing seasonal loans. Similarly, in Mexico all the commercial banks make access to their loans conditional on the farmer purchasing crop insurance; and the Bank of Brazil, which makes billions of dollars' worth of seasonal crop loans to farmers, makes crop insurance mandatory for the borrowers.[55]

As reported in section 5.6, Centenary Bank in Uganda—one of the leading financial institutions lending to small farmers—requires its seasonal loans to be protected by crop insurance. It is currently purchasing a hybrid Crop WII and indemnity-based policy from UAIS on its loan portfolio of 40,000 farmers.

Going forward, the AIC and public and private stakeholders, including the banking sector, may wish to consider a policy of protecting all their seasonal crop (and livestock) loans by compulsory crop insurance covers.

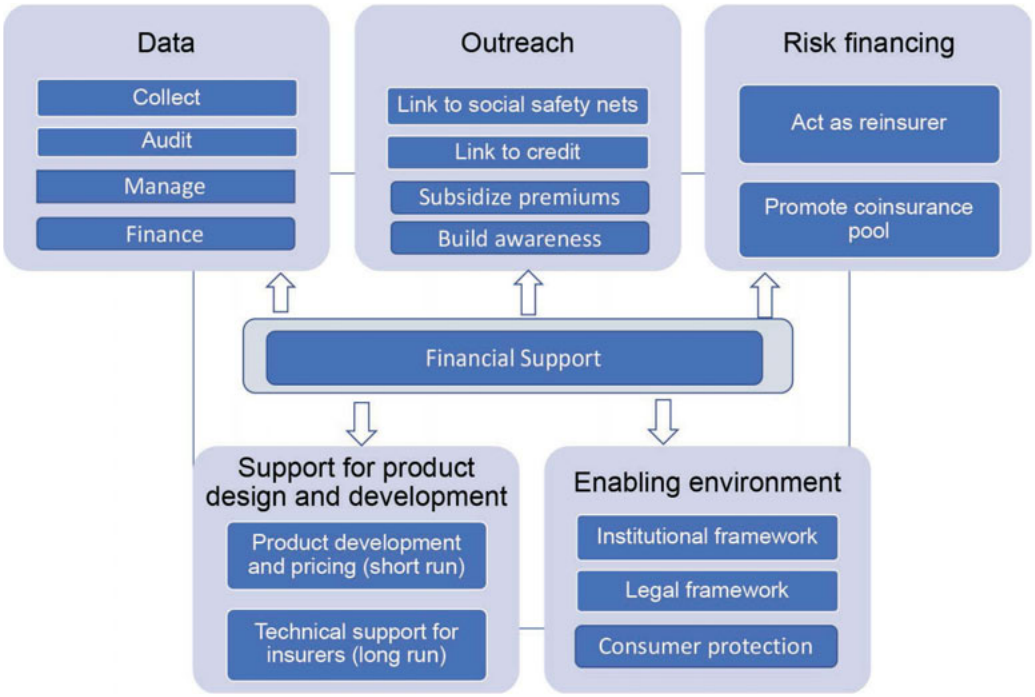
6.5. Government Support to AYII Program

International experience shows that governments can support agricultural crop and livestock programs in a number of ways.[56] These are listed below and summarized in figure 6.3.

- Create an enabling legal and regulatory framework
- Strengthen data collection and information systems
- Provide technical assistance to risk assessment and product design
- Fund awareness creation, education, and training for farmers
- Make insurance more affordable for small farmers by providing premium subsidies
- Provide risk financing (catastrophe layer reinsurance)

[55] For a broader discussion of countries with mandatory or compulsory linkage between crop credit and insurance, see Mahul and Stutley (2010a).
[56] For a review of government support to agricultural insurance, see Mahul and Stutley (2010a), which present the findings for a survey of public and private agricultural insurance programs in 65 countries.

Figure 6.3. Potential Roles for Government to Play in Supporting Agricultural Insurance



Source: World Bank Group.

There are five main areas where GoU financial support to crop insurance start-up and annual operating costs may be critical to the successful implementation of the AYII program:

1. **Data strengthening for crop insurance.** Most importantly, this includes establishing a systematic methodology for recording and reporting data on crop sown and harvested area, production, and yields at local, subdistrict, district, regional, and national levels for major cereal and row crops. This assistance would also usefully extend to the identification of homogeneous agroclimatic crop zones for each major crop, which in the future would form the UAI for the operation of the AYII program.
2. **Strengthening of the crop cutting experiments for area yield estimation.** Areas for government support include introduction of CCE yield estimation procedures for main crops throughout Uganda, and adoption of mobile phone or electronic tablet technology to record the CCE data for transmission in real time to underwriters and other stakeholders. This technology has already been developed and tested and is now under large-scale implementation in India as part of the Pradhan Mantri Fasal Bima Yojana program. Any investments in CCE technology should be made to complement and scale up the CCE program that is being introduced under the ACDP in 40 districts of Uganda.
3. **Strengthening of the automatic weather station (AWS) network** under the Uganda National Meteorological Agency (UNMA). As noted in chapter 5, the current density of weather stations in Uganda is very low. Investing in AWS technology will not only improve the agricultural insurance programs for smallholder farmers (both AYII and WII) but also strengthen UNMA's weather reporting services for the agricultural sector.
4. **Investment in farmers' awareness, education, and training in the role of crop insurance** and the operation of the various insurance products and programs. Farmer insurance awareness and literacy creation is a key pillar of efforts to scale up and ensure sustainability of the UAIS.

5. **Premium subsidy provision.** Under UAIS, GoU has already allocated a budget of UGX 5 billion per year for 2017/18 and 2018/19 for premium subsidies:[57] for large farmers, a 30% premium subsidy is provided and for smallholder farmers the subsidy level is higher, at 50% of the cost of premium. It is suggested that the same premium subsidy rules would apply to the AYII program.

6.6. Uptake Scenarios and Fiscal Costs of AYII Program

Uptake Scenario Assumptions

This section presents some indicative five-year physical and financial budgets for an AYII program that GoU could consider. Maize has been selected for the analysis as it is an important Ugandan smallholder crop for consumption and for sale. It is also a crop being invested in by smallholder farmers, who use seasonal crop loans from the banks to invest in improved maize seed and fertilizer technology and thereby increase their farm productivity and incomes.

The following assumptions are made considering the individual maize farmer:

- Insured maize area per insured farmer = 2 ha
- Sum insured based on inputs costs/credit = US$250 per ha
- Sum insured per farmer = US$250

Three crop insurance uptake scenarios are assumed based on experience in other African countries, including Ethiopia, Kenya, Ghana, Senegal, and Zambia. These are shown in table 6.3 and range from a low uptake rate of 50,000 insured farmers by year 5 to a high uptake rate of 400,000 farmers by year 5:

Table 6.3. Farmer Uptake Rates of AYII for Maize (number of insured farmers)

Number of Insured Farmers	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Option 1. Low Farmer Uptake rate	5,000	10,000	20,000	35,000	50,000	120,000
Option 2. Medium Farmer Uptake rate	25,000	50,000	100,000	150,000	200,000	525,000
Option 3. High Farmer Uptake rate	50,000	100,000	200,000	300,000	400,000	1,050,000

Source: World Bank Group.

Three maize insured yield coverage levels have been assumed, ranging from a low of 55–65% of expected area yield to a high coverage level of 75–85% of expected area yield; corresponding average indicative commercial premium rates are provided based on transferred international experience of average rates for rain-fed maize grown under smallholder technology conditions in agroclimatic zones of east Africa similar to Uganda. It is stressed, however, that these rates are purely illustrative and will need refining in due course when actual time series maize yield data are made available by MAAIF and the ACDP:

- Low coverage level (55–65% of expected yield)—indicative premium rate of 5.0%
- Medium coverage level (65–75% of expected yield)—indicative premium rate of 7.5%
- High coverage level (75–85% of expected yield)—indicative premium rate of 10.0%

[57] The original budget for premium subsidies was UGX 5 billion in year 1 (2016/17) and then UGX 10 billion per year from years 2 to 5 (2017/18 to 2020/21) (UAIS-TWG n.d.). However, as the UGX 5 billion premium subsidy budget was considerably underspent in 2017/18, for year 2 (2018/19) GoU reduced the premium subsidy to UGX 5 billion.

For the purpose of this budget exercise, it is assumed that GoU financial support to the AYII program will take the following forms:

- **Premium subsidies,** budgeted at 50% of the commercial premium rate (this is in line with the existing UAIS premium subsidy rate of 50% for smallholder farmers with less than five acres (2 ha).
- **Strengthening of yield data collection at the area level** and identification of homogeneous cropping areas for maize (and in the future other insured crops) that will form the agreed Unit Area of Insurance. Government support is assumed to cost US$1.50 per insured acre each year of the AYII program.
- **Area-based yield estimation** involving random sampling of maize farms and measurement of crop yields, based on CCEs. Government support is assumed to cost US$50 per CCE, and on average one CCE will be conducted for every 50 ha of insured crop.
- **Investment in automatic weather stations** in the areas where the AYII program is being implemented to complement the AYII program. In due course AWS technology might be used to trigger payouts for pre-season germination failure. Government support is estimated at US$2,000 per weather station (covering the capital cost of the station, installation, training for UNMA staff, and annual maintenance cost) with a density of one station per 2,500 ha of insured crop.
- **Farmer crop insurance awareness and education programs,** which are considered essential if the UAIS program is to achieve scale and sustainability. The cost of reaching insured farmers is assumed at US$5 per farmer per year.

It is likely that NAADS, the agricultural extension department of MAAIF, will perform a central role in the design and implementation of the AYII program, including (i) strengthening crop yield data collection, (ii) implementing the CCEs, and (iii) designing and implementing farmer crop insurance awareness and education programs. These budgets should therefore be reviewed, refined, and approved by NAADS-MAAIF.

Fiscal Costs of Government Support to AYII Program

Under the medium uptake scenario with medium coverage level (65% to 75% of expected yield), which assumes that by year 5 the AYII program will have reached scale, 200,000 farmers will be insured per year, with total sum insured (TSI) of US$100 million, premium income of US$7.50 million, government premium subsidies of US$3.75 million, and total costs of government financial support of US$6.07 million (UGX 22,763 million) (table 6.4). Over the full five years of the project, the cost of government's 50% premium subsidy support would be US$9.84 million; the costs of other government support would amount to a further US$6.09 million; and the total costs to government would be US$15.93 million (UGX 59,752 million).

Under the high uptake scenario with high coverage level (75% to 85% of expected yield), which assumes that by year 5 the AYII program will have reached scale, 400,000 farmers will be insured per year, with TSI of US$200 million, premium income of US$20.0 million, government premium subsidies of US$10.0 million, and total costs of government financial support of US$14.64 million (UGX 54,900 million) (table 6.5). Over the full five years of the project, the cost of government premium subsidy support would be US$26.25 million; the costs of other government support would amount to US$12.18 million; and the total costs to government would be US$38.43 million (UGX 144,113 million).

Table 6.4. Five-Year Fiscal Budget for AYII Cover for Maize Farmers in Uganda: Medium Uptake and Medium Coverage Levels of 65% to 75% of Expected Yield

Insured Farmers, Area, Sum Insured and P	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	25,000	50,000	100,000	150,000	200,000	525,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	50,000	100,000	200,000	300,000	400,000	1,050,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	12,500,000	25,000,000	50,000,000	75,000,000	100,000,000	262,500,000
Premium rate %	7.5%	7.5%	7.5%	7.5%	7.5%	
Premium per hectare (US$/Ha)	18.8	18.8	18.8	18.8	18.8	
Total Premium (US$)	937,500	1,875,000	3,750,000	5,625,000	7,500,000	19,687,500
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**468,750**	**937,500**	**1,875,000**	**2,812,500**	**3,750,000**	**9,843,750**
Other Government Support (US$)						
1. Data strengthening for AYII	75,000	150,000	300,000	450,000	600,000	1,575,000
2. Introduction of CCEs for yield estimation	50,000	100,000	200,000	300,000	400,000	1,050,000
3. Investment in weather data	40,000	80,000	160,000	240,000	320,000	840,000
3. farmer awareness and education	125,000	250,000	500,000	750,000	1,000,000	2,625,000
Sub-Total Other costs borne by Government	**290,000**	**580,000**	**1,160,000**	**1,740,000**	**2,320,000**	**6,090,000**
Total Costs of Government Support (US$)	**758,750**	**1,517,500**	**3,035,000**	**4,552,500**	**6,070,000**	**15,933,750**
Total Costs of Government Support (UGX Million)	2,845	5,691	11,381	17,072	22,763	59,752

Source: World Bank Group analysis.

Table 6.5. Five-Year Fiscal Budget for AYII Cover for Maize Farmers in Uganda: High Uptake and High Coverage Levels of 75% to 85% of Expected Yield

Insured Farmers, Area, Sum Insured and Premium	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	50,000	100,000	200,000	300,000	400,000	1,050,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	100,000	200,000	400,000	600,000	800,000	2,100,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	25,000,000	50,000,000	100,000,000	150,000,000	200,000,000	525,000,000
Premium rate %	10.0%	10.0%	10.0%	10.0%	10.0%	
Premium per hectare (US$/Ha)	25.0	25.0	25.0	25.0	25.0	
Total Premium (US$)	2,500,000	5,000,000	10,000,000	15,000,000	20,000,000	52,500,000
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**1,250,000**	**2,500,000**	**5,000,000**	**7,500,000**	**10,000,000**	**26,250,000**
Other Government Support (US$)						
1. Data strengthening for AYII	150,000	300,000	600,000	900,000	1,200,000	3,150,000
2. Introduction of CCEs for yield estimation	100,000	200,000	400,000	600,000	800,000	2,100,000
3. Investment in weather data	80,000	160,000	320,000	480,000	640,000	1,680,000
3. farmer awareness and education	250,000	500,000	1,000,000	1,500,000	2,000,000	5,250,000
Sub-Total Other costs borne by Government	**580,000**	**1,160,000**	**2,320,000**	**3,480,000**	**4,640,000**	**12,180,000**
Total Costs of Government Support (US$)	**1,830,000**	**3,660,000**	**7,320,000**	**10,980,000**	**14,640,000**	**38,430,000**
Total Costs of Government Support (UGX Million)	6,863	13,725	27,450	41,175	54,900	144,113

Source: World Bank Group analysis.

Further details of the crop AYII financial budgets are contained in annexes 4.1–4.3.


Nutrition counselling
Community Health Promoters
Flipbook

7. Large-Scale Livestock Insurance Opportunities in Uganda

7.1. Livestock Insurance Opportunities

This final chapter outlines proposals for Government of Uganda (GoU) investment in a livestock Satellite-Based Pasture Drought Index Insurance (SPDII) program for pastoralists located in the livestock corridor of Uganda. To date, under the Third Northern Uganda Social Action Fund (NUSAF 3) project, a satellite-based index has been successfully used in Karamoja as part of a GoU drought response program. This mechanism provides proof of concept for SPDII in the Karamoja subregion. It is stressed, however, that should GoU wish to expand SPDII to additional subregions in the cattle corridor, a detailed feasibility study should first be conducted to prove that SPDII is technically, financially, and operationally feasible in these subregions, and that such a cover is suitable to the risk management needs of vulnerable pastoralists and agro-pastoralists.

Chapter 5 showed that currently, the only livestock insurance product that the Agriculture Insurance Consortium is offering for cattle (and pig) is a traditional indemnity-based individual animal mortality policy. Currently there is no insurance available for small ruminants (sheep and goats), which are owned by many smallholder households. The chapter also highlighted international experience showing that individual animal accident and disease insurance is mainly suited to the needs of medium- and large-scale commercial producers of dairy cattle or beef cattle.

Traditional indemnity-based livestock insurance is difficult and costly to implement with smallholder livestock producers. Insured animals must be subject to pre-inspections and health checks by a qualified veterinarian, have up-to-date vaccination records, and be individually tagged, chipped, or branded, all of which have significant cost implications. Insurers generally require that insured animals be located within defined farm boundaries with fencing to prevent the animals from straying and that animals be attended and monitored on a 24-hour basis. Many smallholders using communal grazing resources cannot comply with these conditions. In addition, in the event of a loss (accident or injury to or death of the insured animal), there must be an inspection by a veterinarian, which can be very expensive, particularly where biopsies are required to establish the cause of death. These costs usually preclude private commercial insurers from offering livestock insurance to smallholders owning less than about 25 animals. In Uganda this criterion would exclude most smallholder beef and dairy cattle producers from participating in an individual animal accidental death program.

SPDII is a promising option for extending drought insurance cover to smallholder livestock producers who are involved in extensive ranching on natural pasture and rangelands. These covers are based

on normalized difference vegetative index (NDVI) technology and were first developed for commercial cattle ranchers in Europe (Spain) and North America (United States and Canada). These products are now being used by governments in Mexico (World Bank 2013), Kenya (World Bank 2015c), and Ethiopia (WFP 2016) as macro-level livelihood protection insurance programs for small vulnerable livestock producers. Private insurance companies (backed by donor-funded partial premium subsidies) are also marketing these products in Kenya and Ethiopia at the micro level for voluntary purchase by individual pastoralists. NDVI provides a very good indicator of pasture growth and vigor over time (typically satellites take imagery every 10 days) and can be used to construct an index to measure loss of pasture and grazing resources due to progressive drought.

The objective of these NDVI policies for smallholder livestock producers is to trigger early payouts as major droughts develop and grazing resources are depleted. These payouts allow the insured livestock producers to make timely purchases of fodder and supplementary feeds to keep their core breeding animals alive until the drought has ended, and the pasture and grazing lands have regenerated. In other words the cover is intended as a "livestock asset protection" program.

An NDVI cover for smallholder cattle and sheep producers located in the pastoral grazing areas of Uganda, such as Karamoja and other parts of the cattle corridor, would aim to keep core breeding animals alive during severe droughts as experienced in 2008 and 2010/11, when many livestock died from starvation due to lack of grazing and/or drinking water. Such a program could be targeted at vulnerable pastoralists as part of GoU's livelihood protection and drought resilience–building programs in these semi-arid parts of Uganda.

7.2. Livestock Production in Pastoral Rangelands of Karamoja

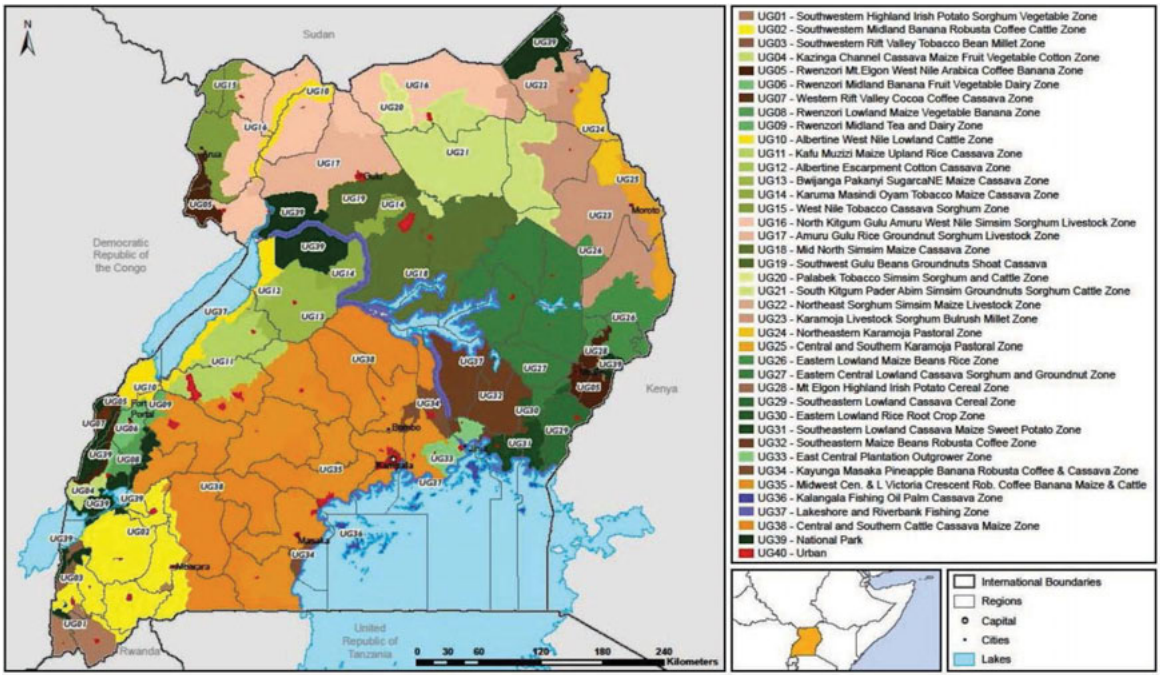
An SPDII product will be suitable only for regions and areas of extensive pasture/rangeland and livestock grazing in Uganda. Such a product is not applicable to areas of mixed agriculture and livestock production, with a predominance of annual cropping or permanent crops (e.g., coffee, tea, bananas) or where livestock are either corralled in small paddocks or maintained under zero-grazing systems and fed fodder and livestock feed supplements.

Figure 7.1 shows that the major areas of extensive livestock production and pastoralism are located in Karamoja subregion in northwestern Uganda, which is one of the country's most drought-prone areas. The most drought-prone areas in Uganda are the districts in the cattle corridor, a dry stretch of land that extends from Rakai in southwestern Uganda through Sembabule, Luwero, and Soroti to Karamoja in the northeast. In extreme cases, particularly in the Karamoja subregion, droughts have led to starvation and death both of livestock and human beings.

It is recommended that any pilot program to design, test, and subsequently implement SPDII cover for pastoralists should start in Karamoja. As experience is gained, the program could be expanded to other parts of Uganda's cattle corridor, in zones where livestock are predominantly open grazed on communal rangelands.

An important reason for recommending that an SPDII program first target Karamoja is that this subregion already has experience in the use of satellite data for drought-related disaster risk financing (DRF) under the World Bank Group (WBG)-designed drought scalability mechanism of the Labor-Intensive Public Work (LIPW) Program (World Bank Group 2015b). This scalability mechanism uses satellite-based NDVI to trigger payouts to vulnerable households throughout Karamoja in times of severe drought. The scalability mechanism is linked to the NUSAF 3, which is in its third phase of implementation. NUSAF 3 is a public works program under which the most vulnerable households receive income in return for their labor on agricultural and nonagricultural activities. The DRF drought scalability mechanism of US$5 million is designed to fund additional days of work under the public works program and thereby enable vulnerable households to earn additional income that can tide them over during periods of severe droughts. The impact of the scalability component on poverty rates is strongest in the agricultural livelihood zone, where a 1-in-10-year drought

Figure 7.1. Livelihood Zones in Uganda Showing Main Pastoral and Livestock Zones



Source: PARM 2015 citing USAID and FEWS NET 2010.

would increase the poverty head count ratio from 88% to 96%. The LIPW program would bring down the increase in poverty head count ratio for a 1-in-10-year drought by 10 percentage points to 86%.[58] The scalability component would reduce the increase in poverty head count by an additional 16 percentage points to a level of 70% (World Bank Group 2015b).

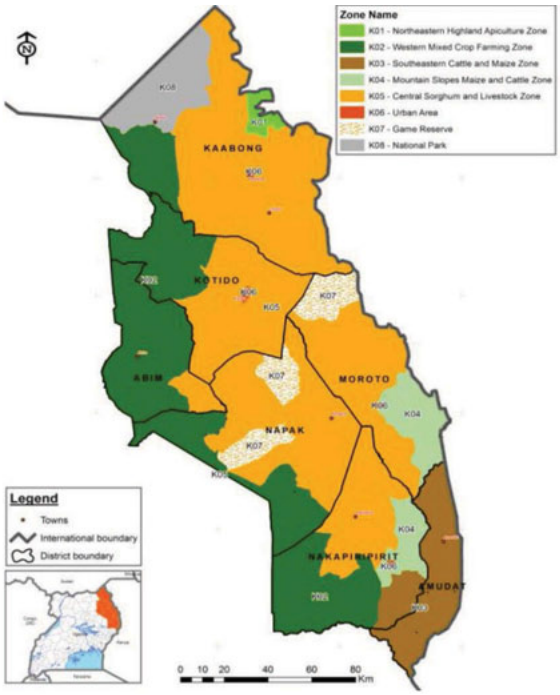
Livestock Production in Karamoja Subregion

The Karamoja subregion is divided into three zones: pastoral, agro-pastoral, and agricultural. Traditionally, pastoralism was the main form of livelihood in Karamoja, but today the majority of the Karamojong are involved in agro-pastoralism and agricultural production. In 2009 livestock management was the main form of livelihood for only 26% of households, while 61% of the households relied mainly on agriculture for their livelihood (World Bank Group 2015b). Today the main agro-pastoral zones are located in Moroto District. Napak is an agro-pastoral zone, and the western and southern parts of Karamoja are predominantly agriculture zones (figure 7.2).

The population of Karamoja region was estimated at about 1.34 million people in 2012 (table 7.1), and with a population growth rate of at least 3.5%, the 2018 population is likely to be in the order of 1.65 million people. Karamoja is the poorest and the least developed region in Uganda with a life expectancy in 2007 of 47.7 years (compared to 50.4 years at national level) and with 82% of the population living below the poverty level (compared to 31% at national level) (Okurut and Eladu 2013).

[58] As such LIPW is expected to lower the initial poverty head count from 88% to 86% and does not merely reduce the expected increase in poverty head count.

Figure 7.2. Karamoja Subregion: Agro-ecological cum Livelihoods Zones



Source: WFP and FAO 2014.

Table 7.1. Karamoja: District Population

District	Population census 2002	Population projection 2012	% of total population (2012)
Nakapiripirit	90,922	161,600	12%
Abim	67,171	100,306	7%
Kotido	122,541	233,300	17%
Moroto	77,243	136,000	10%
Kaabong	202,758	395,200	30%
Napak	112,697	197,700	15%
Amudat	63,572	113,700	8%
Total	**736,904**	**1,337,806**	**100%**

Source: Okurut and Eladu 2013. Projections are based on UBoS 2013 data on populations of districts of Uganda.

In Karamoja 90% of households have access to cultivable land, with an average of 1.2 ha per household, and most crop production is carried out for subsistence consumption. The key crops grown by most households include sorghum and maize, followed by beans and groundnuts; simsim, sunflower, bulrush millet, cassava, and sweet potatoes are also grown (WFP and FAO 2014).

The 2008 National Livestock Census estimated the 2008 livestock population in Karamoja at about 6 million, made up of about 2.3 million head of cattle (19.8% of the national cattle herd), 2 million head of goats (16.3% of all goats), and 1.7 million head of sheep (49.4% of all sheep) (table 7.2). According to a 2013 survey by the Food and Agriculture Organization of the United Nations (FAO 2014a); however, the overall numbers of livestock declined after 2008 by about 70%, to only 1.8 million head of cattle, goats, and sheep.

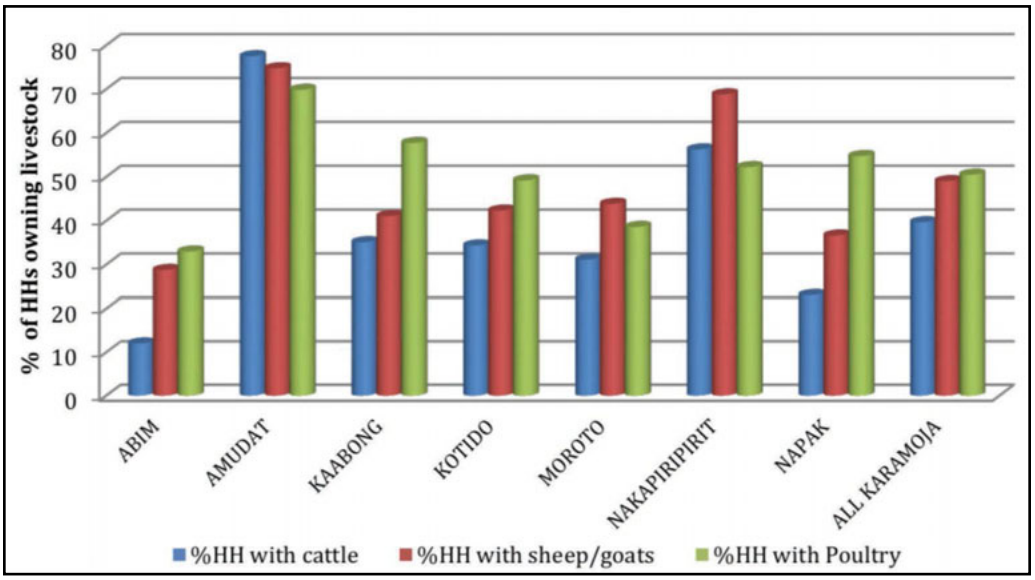
Table 7.2. Karamoja: Livestock Population by Species, 2008

Species	Total in Karamoja	As share of national total
Cattle	2,253,960	19.8%
Goats	2,025,300	16.3%
Sheep	1,685,500	49.4%
Pigs	58,360	1.8%
Chicken	1,362,820	3.6%
Ducks	67,450	4.6%
Turkeys	11,800	3.4%

Source: MAIFF and UBoS 2009.

The livestock kept in Karamoja include cattle, goats, sheep, pigs, donkeys, turkeys, ducks, and chickens. A 2013 study indicated that at least 40% of the households in Karamoja own cattle, 49% own sheep and goats, and 50% own poultry. Analysis by livelihood zone showed that the southeastern cattle and maize zone had the highest proportion of households owning cattle and other types of livestock (sheep and goats). The western mixed crop farming zone had the smallest share of livestock-owning households. The same study showed that Amudat District had the highest proportion of households with cattle, sheep, and poultry, while Abim District had the lowest proportion of households owning livestock (see figure 7.3) (WFP and FAO 2014).

Figure 7.3. Karamoja: Proportion of Households Owning Livestock by District

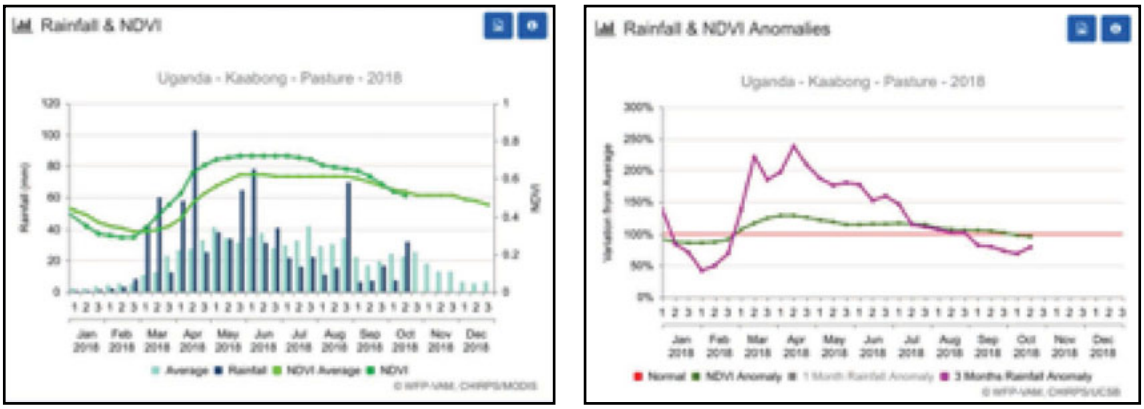


Source: WFP and FAO 2014.

Rainfall, Climate, and Climate Change

Karamoja subregion is a semi-arid region that experiences a unimodal rainfall regime from March/April to September/October and a four-month dry spell from October to February. Average annual rainfall in Kabong District is 738 mm in a normal year, with peaks in late March/April and in July. Pasture growth and grazing reserves increase during March and April and then plateau for the rest of the rainy season; pasture and vegetation resources are low during the four-month dry season (see normal average decadal and monthly rainfall and NDVI-vegetation growth patterns in figure 7.4).

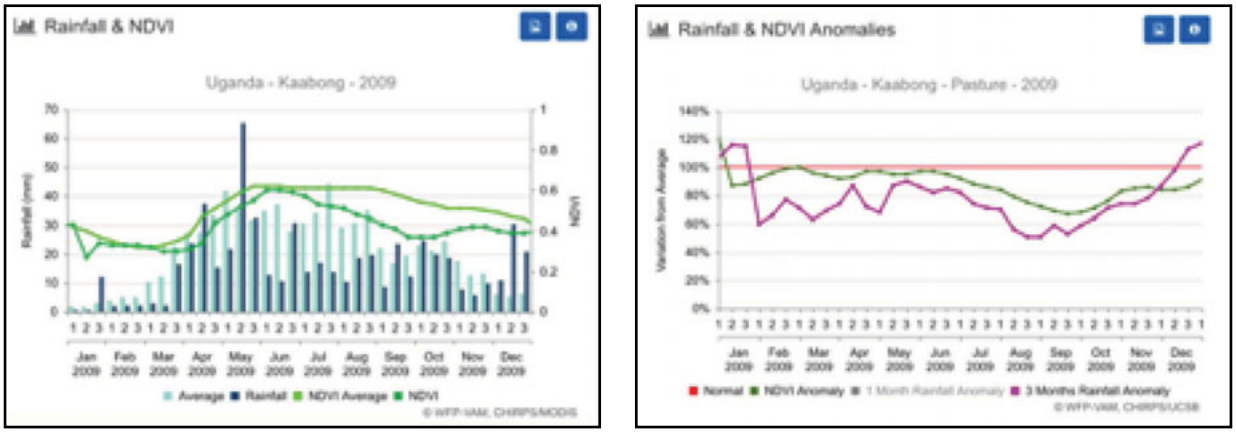
Figure 7.4. Rainfall and NDVI for Pasture in Kabong, Karamoja: Averages by Decade and 2018 Anomalies



Source: World Food Programme–Vulnerability Analysis Mapping, WFP-VAM Data Visualization Platform, dataviz.vam.wfp.org.

Karamoja is very prone to droughts and dry spells that adversely affect agriculture and livestock production, jeopardizing food security in the region and enhancing dependency on food aid (World Bank Group 2015b). Over the past 35 years (1981 to 2015), droughts have been recorded roughly every three to four years, including in 1983, 1986, 1992/93, 1998, 2002, 2005, 2008, and 2009 (CCAFS 2017). In very dry years such as 2008 and 2009, mean monthly rainfall was 30–50% lower than average, and forage availability was severely reduced (see 2009 decadal and monthly rainfall and NDVI patterns in figure 7.5). According to a 2013 survey in Karamoja, droughts and associated poor harvests were listed as the most important shock by 41.3% of surveyed households (WFP and FAO 2014). Under a separate study, nearly three-quarters of households in Karamoja reported suffering from major droughts/prolonged dry spells that had affected their households in the past five years: the reported coping strategies typically included begging, borrowing, and charcoal and firewood production, and households also resorted to sale of livestock to cope with droughts (CCAFS 2017).[59]

Figure 7.5. Rainfall and NDVI for Pasture in Kabong, Karamoja: Averages by Decade and 2009 Anomalies



Source: World Food Programme–Vulnerability Analysis Mapping, WFP-VAM Data Visualization Platform, dataviz.vam.wfp.org.

[59] The CCAFS (2017) survey findings from Karamoja reported high sales of livestock as a drought coping strategy in Amudatat (11% of households), Kaabong (13% of households), and Kotido (15% of households).

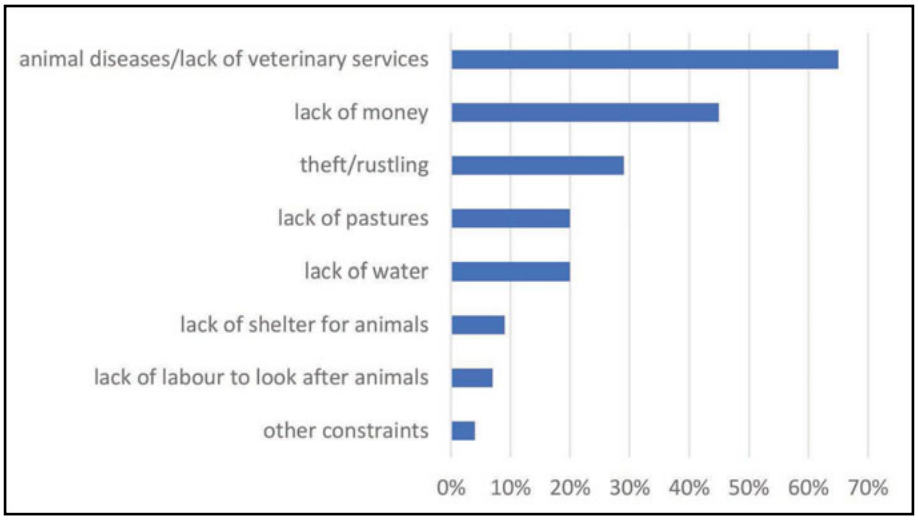
Karamoja subregion is very susceptible to climate change: over the past 35 years average rainfall has actually increased, but rainfall is becoming more variable, leading to more extreme droughts; average temperatures have also increased and will have an increasingly detrimental effect on agriculture and livestock production, livelihoods, and food security in the region. In the past decade, average annual rainfall in Karamoja has been 137 mm higher than in the 1980s. The increase is mostly marked in October and November, potentially extending the growing season; but rainfall variability in the main growing season (March to September) has become more variable, leading to more extreme dry spells (drought) and more excess rainfall (flood) events. In severe droughts farmers may lose between 50% and 100% of their expected harvests. The increasingly variable rainfall coupled with increases in temperature is increasing the susceptibility of agricultural production to poor/failed harvests and to an increase in plant and animal pests and diseases (CCAFS 2017).

Constraints to Livestock Production

In Karamoja, the major constraints to livestock production are parasites and diseases; the lack of money to buy livestock drugs or pay for veterinary services; and theft. The pastoralists are reliant on services provided by government, the United Nations, and nongovernmental organizations, and do not buy drugs to treat even the simplest diseases affecting their livestock. In spite of efforts to vaccinate animals, many diseases are still prevalent, including ECF, trypanosomiasis, foot and mouth disease, CBPP, brucellosis, nagana, and anaplasmosis among cattle; contagious caprine pleuropneumonia (CCPP), peste des petits ruminants (PPR), and foot-rot among sheep and goats; and Newcastle disease and coccidiosis among poultry (figure 7.6) (WFP and FAO 2014).

Inadequate access to water and lack of pasture/grazing were reported as constraints by one in five (20%) of livestock-owning households, which suggests that there may be a role for an SPDII program (figure 7.6).

Figure 7.6. Karamoja: Livestock Production Constraints



Source: WFP and FAO 2014.

Livestock Losses

In Karamoja there was a devastating 70% decline in livestock numbers between the time of the 2008/09 census and a 2014 survey conducted by FAO. Table 7.3 shows that over this period the cattle herd declined from 2.25 million head to only 0.67 million head, or a reduction of 75%; reductions were slightly lower in goats (68% reduction) and sheep (65% reduction). This major decline in livestock stems from the government's

"protected kraal" strategy between 2006 and 2013, which placed management of the clan herds under military control and restricted livestock movements. This led to major problems: overstocking of animals, an acute lack of pasture and grazing and water to maintain the herds, and the outbreak of epidemic pests and diseases. During this period severe droughts (such as in 2009 and 2011) contributed to the death of many millions of animals (FAO 2014b).

Table 7.3. Livestock Losses in the Karamoja Subregion (2008–2014)

District	Cattle	Goats	Sheep	Total head
Kaabong	103,000	112,000	113,000	215,000
Kotido	280,000	300,000	380,000	960,000
Moroto	165,000	180,000	200,000	545,000
Nakapiripirit	143,137	174,687	136,921	454,744
Abim	20,000	54,354	12,236	86,590
Total livestock (2014 estimates)	**568,000**	**646,354**	**592,236**	**1,806,590**
UBOS 2008 estimates	*2,253,960*	*2,025,293*	*1,685,502*	*5,964,755*
Change from 2008 to 2014 (%)	-75%	-68%	-65%	-70%

Source: FAO 2014a.

Note: The district livestock data were provided by the District Village Officers (DVOs) and sum to 2.3 million head. The total 2014 estimates are based on FAO's best estimates of 1.81 million head of livestock.

7.3. Technical Considerations for Satellite Pasture Drought Index Insurance

SPDII Cover Objective

The findings presented above suggest a considerable need for and potential to develop SPDII in Karamoja subregion. The cover would be designed to trigger payouts to pastoralists and agro-pastoralists at the onset of severe droughts, when forage and grazing become rapidly depleted, to enable them to make timely purchases of livestock fodder and feed supplements, to truck in water for their animals, and to purchase drugs and vaccines in order to keep their core breeding stock alive until the drought is over and forage conditions return to normal.[60]

Satellite Vegetation Index

All of the current SPDII programs in Kenya and Ethiopia use eMODIS NDVI imagery from the U.S. National Oceanic and Atmospheric Administration (NOAA) Aqua satellite. It is recommended that the same satellite NDVI data be used in Uganda, as they can be freely downloaded from the Internet and are updated on a monthly basis by NASA. NASA eMODIS data are available from 2000 to the present at 16-day and monthly intervals and at resolution of 250 m × 250 m or 1 km × 1 km.

Coverage Period

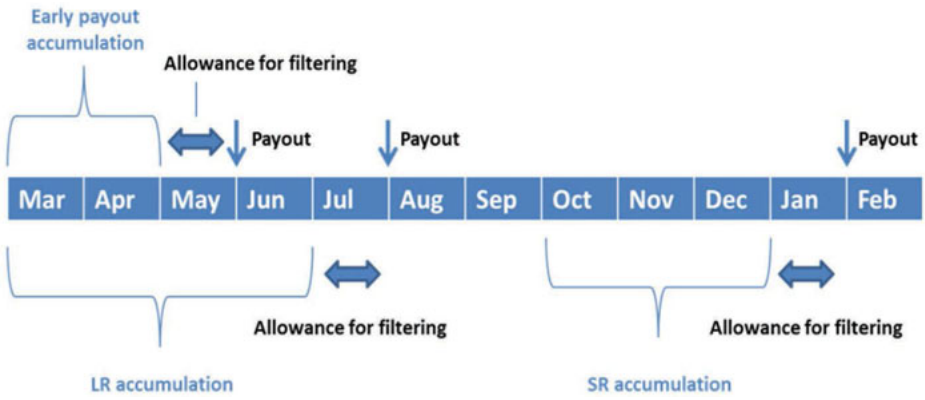
The cover period would be designed to cover rainfall failure and lack of pasture and grazing during the normal growing season in Karamoja. Figures 7.4 and 7.5 show that Karamoja experiences a unimodal rainfall

[60] In this context it is noted that since 2010, the African Union (AU) and the Regional Economic Community (REC) have on various occasions advocated for the establishment of an insurance scheme for livestock to reduce vulnerability to drought in the pastoral dryland areas of northern Uganda, including Karamoja (Muhereza 2017).

season from March to September/October (eight months) and a similar unimodal pasture growing season from March to September/October. The insurance would therefore ideally cover loss of pasture as measured by the satellite vegetative index (NDVI) for a period of up to eight months, from March to October. Decisions would need to be taken on whether to break this period down into a series of payout windows, say early season, mid-season, and end-of-season pasture/grazing payouts or to have a single end-of-season payout.

In northern Kenya, which has a bimodal rainfall distribution, both the voluntary Index-Based Livestock Insurance (IBLI) program and the large-scale livelihoods protection program (Kenya Livestock Insurance Program, KLIP) have two coverage periods: (i) long rains (March to June—four months); and (ii) short rains (October to December—three months) (World Bank 2015c). Under the voluntary IBLI program, there are sales windows prior to each cover period, and livestock producers can elect to insure their livestock in one or both seasons as they wish. Under KLIP, vulnerable pastoralists are identified and automatically enrolled under the program for both seasons (figure 7.7).

Figure 7.7. Kenya: Cover Periods for Satellite-Based Pasture Drought Index Insurance



Source: World Bank Group 2016, based on ILRI graphics.

Need to Define Unit Areas of Insurance (UAIs)

For the operation of a pasture drought insurance cover in natural rangeland areas, it is necessary to define the size of the geographical area that the satellite index should cover—that is, the Unit Area of Insurance (UAI). The definition of the geographical area should ideally encompass the area where livestock producers (pastoralists) normally live and where they normally graze their small ruminants and large animals (cattle) during the rainy season (in the case of Karamoja, between the months of March and October). If the geographical area/UAI is too large, then there is a high probability that agroclimatic and pasture and grazing conditions will vary across it, with some parts suffering from drought/lack of forage and grazing resources, and other parts having higher rainfall and better grazing conditions. Such differences will result in a blurred average monthly NDVI signal—in other words, it will result in basis risk, where livestock producers who experience severe loss of pasture and grazing do not receive a payout because overall the NDVI value for that UAI is above the threshold trigger. If the selected geographical area is too small, the satellite index will fail to reflect grazing practices during the coverage period, and the policy will become impossible to operate.

In Kenya, the UAIs are typically based on subdistricts or clusters of wards, which are drawn up by the insurance stakeholders in consultation with the local county livestock departments and local livestock clan chiefs and community leaders. The UAIs are confirmed by an analysis of variation in the underlying NDVI data over the past 15 years. Figure 7.8 shows the six counties that were initially insured under KLIP between 2015 and 2016 and the boundaries of the defined UAI. There is a total of 70 UAIs in the six counties, with a range from 6 UAIs in the smaller counties of Isiolo and Tana River to a maximum of 18 UAIs in Mandera County.

Figure 7.8. Kenya: Insured Counties and Number of Insured Units

County	Number of Insured Units
ISIOLO	6
MANDERA	18
MARSABIT	14
TANA RIVER	6
TURKANA	13
WAJIR	13
Total	**70**

Source: World Bank Group 2016, based on ILRI graphics.

In Ethiopia, both IBLI and Satellite Index Insurance for Pastoralists in Ethiopia (SIIPE) base the UAI on the woreda and/or clusters of sub-woredas. In 2014 IBLI operated at the woreda level in Borana, but some woredas experienced basis risk. In these sub-areas, severe drought and pasture loss occurred but did not result in payouts, as the rest of the woreda experienced higher rainfall and better grazing conditions. The local insurer elected to make ex gratia payouts to the affected insured pastoralists, but in order to avoid this situation going forward, several of the larger woredas/UAIs were subdivided into new smaller clusters of wards (Stutley 2014).

Each UAI is treated as a separate unit according to its historical NDVI record. This is done for the purpose of calculating the NDVI index and rates, for measuring actual pasture vigor in the current insurance cover period, and for triggering payouts.

In Karamoja, which is divided into six districts, it will be necessary to define the UAIs only for those subdistricts and zones that have a predominance of natural pasture and rangelands. As in Kenya, it is strongly recommended that the process of defining the UAIs be carried out in conjunction with the local experts from the Livestock Department and with the local clan leaders.

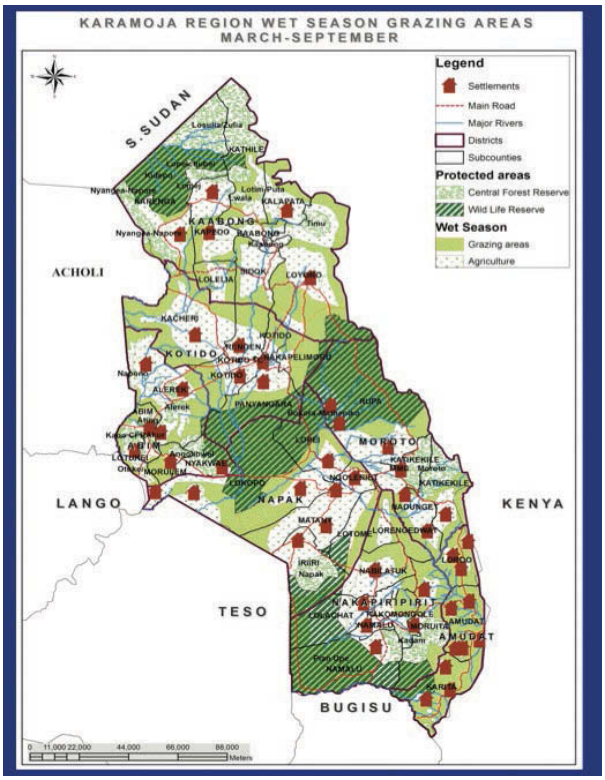
In Karamoja, the process of identifying UAIs based on homogeneous pasture grazing areas will be greatly assisted by a recent exercise to map these areas (Interest Group on Grazing Areas 2017). The exercise adopted a participatory approach that included the pastoral and agro-pastoral groups in all districts of Karamoja in efforts to map the grazing areas and migratory routes in the wet and dry seasons. The goal was to help policy makers and land use planners better understand the existing grazing areas, their size and concentration, the livestock corridors, and migration routes in order to reduce conflict between pastoralists and farmers. The output of this exercise is a detailed series of maps of the wet season and dry season grazing areas that can be used to draw up the UAIs for an SPDII program (figure 7.9 and table 7.4).

Setting of the Sum Insured

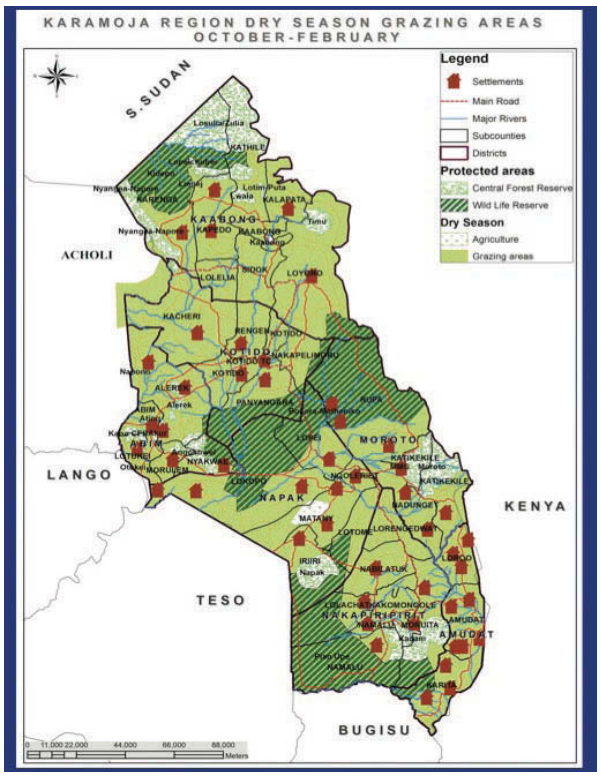
Under an SPDII insurance policy, where the objective is to make timely payouts to pastoralists to enable them to purchase fodder, water, and drugs that keep their animals alive during a severe drought, it is conventional to base the sum insured on the monthly nutritional requirements of keeping the insured animals alive. In Kenya in 2015, KLIP established the nutritional maintenance costs for one adult cow, which

Figure 7.9. Karamoja Region: Wet Season (March to September) and Dry Season (October to February) Grazing Areas

Wet season (March to September)



Dry season (October to February)



Source: Interest Group on Grazing Areas 2017.

Table 7.4. Karamoja: Grazing Areas Used by Local Pastoralist and Agro-pastoralist Groups

Dry Season (October to February) Grazing Areas used by Pastoralists and Agropastoralists	Wet Season (March to September) Grazing Areas used by Pastoralists and Agropastoralists
Kotipe, Sising, and Korisae	Kotipe, Lokichar, Lodwara-Melu and Lokosowan
Aliling, Ocor-Angakinei, and Aywelu	Acuro, Angolepak, Loyoroit and Angaro
Moruita, Lotorosa, Naporokocha, Napeded and Achoricor	Namalera, Losidok, Katabok, Lokales, Naporokocha, Lopedot and Lokoma
Usake, Kolele, Loyoro, Kamion and Lobalangit	Loyoro, Kamoni, Lotim, Kokuwam, Lobolei, Kurao, Napore and Sangar
Kapus, Kailong, Aduko, Kopuwa and Longorkipi	Lotiir, Toror, Lobeel, Lolelia, Nangolo-Apolon and Longor
Nakonyen, Kobebe,Lolung and Natapar-Akwangan	Lomoru-Arengan, Loroo, Apule, Kakingol, and Moru-Ariwon
Magoro, Kalomuriaputh and Nakiloro	Kakomongole, Loregae, and Namalu-Lokilotor

Source: Interest Group on Grazing Areas 2017.

is termed a Tropical Livestock Unit (TLU), of K Sh 1,167/month (about US$11/month). The policy provides coverage for up to 12 months so that the sum insured per TLU was K Sh 14,000; with government-provided fully funded cover for five TLUs per beneficiary pastoralist, each pastoralist had an annual sum insured of K Sh 70,000, or about US$690 (table 7.5). In Ethiopia, SIIPE was launched in March 2018 with a sum insured of Br 300 per TLU per month, or about US$10.82/TLU/month (WFP 2016).

Table 7.5. Kenya Livestock Insurance Program: Basis of the Sum Insured

County	Monthly Feed Cost per Tropical Livestock Unit (KSh)	Number of Months Covered (#)	Sum Insured per TLU (KSh)	Insured Tropical Livestock Units per HH (TLU)	Total Sum Insured per HH (KSh/HH)
ISIOLO	1,167	12	14,000	5	70,000
MANDERA	1,167	12	14,000	5	70,000
MARSABIT	1,167	12	14,000	5	70,000
TANA RIVER	1,167	12	14,000	5	70,000
TURKANA	1,167	12	14,000	5	70,000
WAJIR	1,167	12	14,000	5	70,000

Source: World Bank Group 2016, based on Deloitte contract design tool.

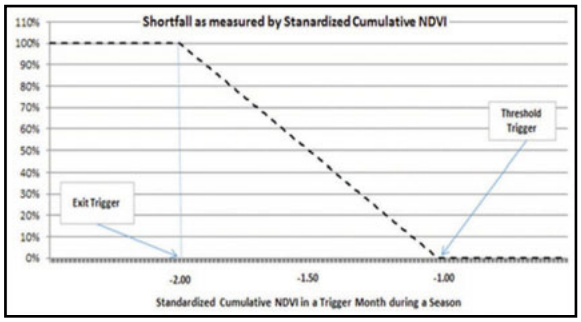
Contract Design and Rating

In designing the pasture drought NDVI contract, two key parameters need to be set:

1. The threshold trigger, which opens the policy for a payout
2. The exit trigger, which is the point when grazing conditions are assumed to be so poor that a total payout is due

In 2015, the WBG assisted the State Department of Livestock (under Kenya's Ministry of Agriculture, Livestock and Fisheries) and the commercial insurance sector in the design of the Kenya Livestock Insurance Program (World Bank 2015c). The WBG contracted Deloitte to develop an Excel-based pasture drought NDVI contract design and rating tool for training purposes. This tool permitted the user to define the preferred threshold and exit triggers in each UAI, and the tool could then calculate the historical payouts that would have occurred and the corresponding burning cost rates or pure loss cost rates. The outputs of the KLIP tool are illustrated in figure 7.10.

Figure 7.10. KLIP Pasture Drought NDVI Insurance Contract Design Features



county	Trigger/Exit	Trigger		Exit	
		ZNDVI	Return	ZNDVI	Return
ISIOLO	Main	-0.80	5.00	-2.14	100.00
MANDERA	Main	-0.76	5.00	-1.90	100.00
MARSABIT	Main	-0.74	5.00	-2.14	100.00
TANA RIVER	Main	-0.89	5.00	-1.98	100.00
TURKANA	Main	-0.87	5.00	-1.60	100.00
WAJIR	Main	-0.81	5.00	-1.92	100.00

Source: World Bank Group 2016, based on outputs of Deloitte contract design tool.

In Kenya, the KLIP index is based on standardized cumulative monthly eMODIS NDVI data, or ZCumNDVI. In 2015/16, the State Department of Livestock purchased cover with a threshold trigger equivalent to a 1-in-5-year return period and an exit trigger equivalent to a 1-in-100-year event. The threshold and exit triggers for the contract are illustrated in figure 7.10.

The KLIP contract design and rating tool is programmed to generate pure loss cost or risk premium rates and then technical rates and indicative commercial premium rates, as follows:

- **Pure risk premium** = Average value of payouts based on historical payouts. Thus pure risk premium will depend on trigger, exit, minimum payout, geographical coverage, and temporal coverage.
- **Technical rate** = Pure rate + loading for catastrophe events not incurred to date.
- **Commercial premium rate:** Determined by insurers as a function of administrative costs, profits, capital at risk, etc.

In 2015/16, commercial reinsurers quoted a 16% overall average premium rate for KLIP, which was launched with 5,012 vulnerable pastoralists in two counties, Turkana and Wajir (table 7.6). The purchased cover option was for a coverage that would trigger on average once in five years, with an exit of once in 100 years.

Table 7.6. KLIP Indicative Commercial Pricing, 2015/16

County	No Insured Pastoralists	No Insured TLUs	Sum Insured (KSh Million)	Pure risk rate (%)	Technical Rate %	Commercial Rate%	Premium (KSh Million)
TURKANA	2502	12510	175.14	9.0%	10.9%	16.9%	29.5
WAJIR	2510	12550	175.7	7.8%	9.9%	15.2%	26.7
Total	**5012**	**25060**	**350.84**	**8.4%**	**10.4%**	**16.0%**	**56.3**

Source: World Bank Group 2016.

Data and Feasibility Study Requirements

In order to implement an SPDII program in Karamoja and other parts of the cattle corridor in Uganda, a detailed feasibility study should first be undertaken, with the following goals:

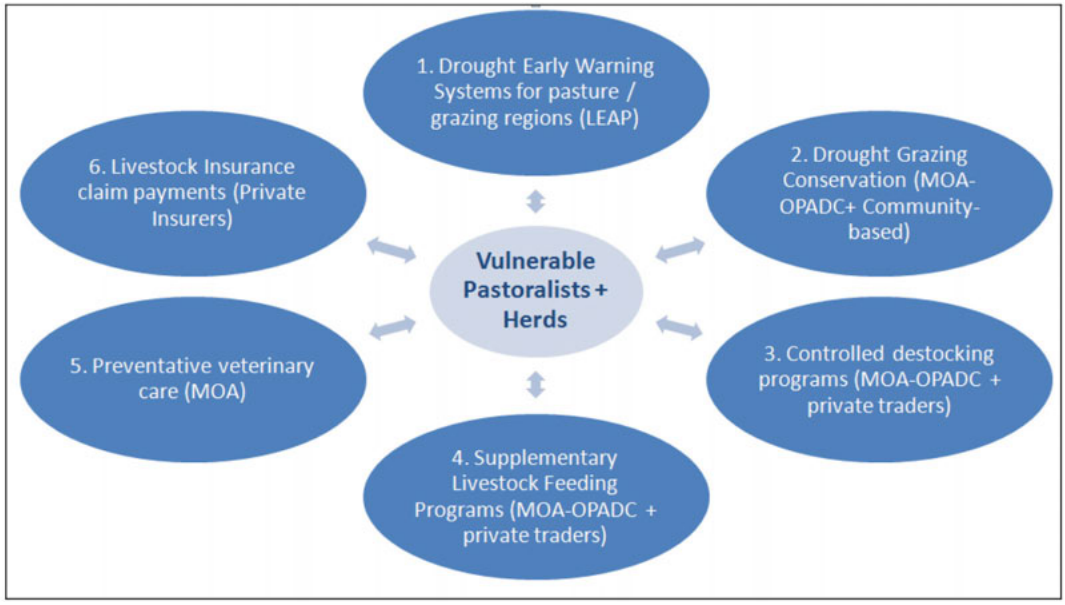
- Clearly identify areas of rangeland and grazing where an SPDII cover can be implemented. This will involve satellite image interpretation to classify the natural vegetation and land use and should be combined with ground-truthing. As a guideline, where an eMODIS NDVI pixel has more than 60% of its area under rangeland and grazing, it is deemed a pasture pixel; where less than 60% of the pixel is rangeland and has a predominance of annual cropping or *presopis* or forestry cover, it should be eliminated because it will contaminate the signal of the pasture drought index.
- Identify the demand by pastoralists and agro-pastoralists for a pasture drought index insurance program in order to assess the potential uptake for voluntary insurance cover.
- Assess the potential demand by regional government for a large-scale macro-level pasture drought insurance program as part of government rural livelihoods protection programs and drought disaster risk financing mechanisms in Karamoja.
- Identify the location and production practices of the smallholder livestock producers who are GoU's targeted beneficiaries for the voluntary and/or automatic social protection programs.
- Quantify the extent of overstocking and overgrazing, practices that invalidate the objective of the SPDII cover.
- Assess whether the livestock producer has a bank account or a mobile phone and access to mobile banking to enable the electronic transfer of premiums from insured to the insurer, and the payout of claims directly to the insured. This is an important criterion for participation in the SPDII (both voluntary and automatic cover options).

7.4. Institutional and Operational Considerations

SPDII as Part of an Integrated Drought Resilience Program for Livestock Producers

It is stressed that SPDII on its own will not be effective and that it must be implemented as part of an integrated drought disaster risk management strategy for pastoral regions in northern Uganda. Any integrated drought risk strategy for pastoral regions should aim to build resilience among livestock-owning households and communities at local and regional levels by combining elements of (i) early drought warning, (ii) drought grazing conservation measures, (iii) improved public and private sector livestock fodder markets, (iv) supplementary livestock feeding programs and access to water, and (v) access to improved veterinary services. Livestock insurance can play an integral part in such a strategy by ensuring timely payouts to pastoralists at the onset of the drought with which the pastoralists can pay for these livestock products and services (figure 7.11).

Figure 7.11. The Role of Livestock Insurance within an Integrated Drought Risk Management Strategy for Pastoralists in Uganda



Source: Stutley 2014.

Note: This model is based on that of Ethiopia.

Distributional Considerations

SPDII can be offered as either or both of the following:

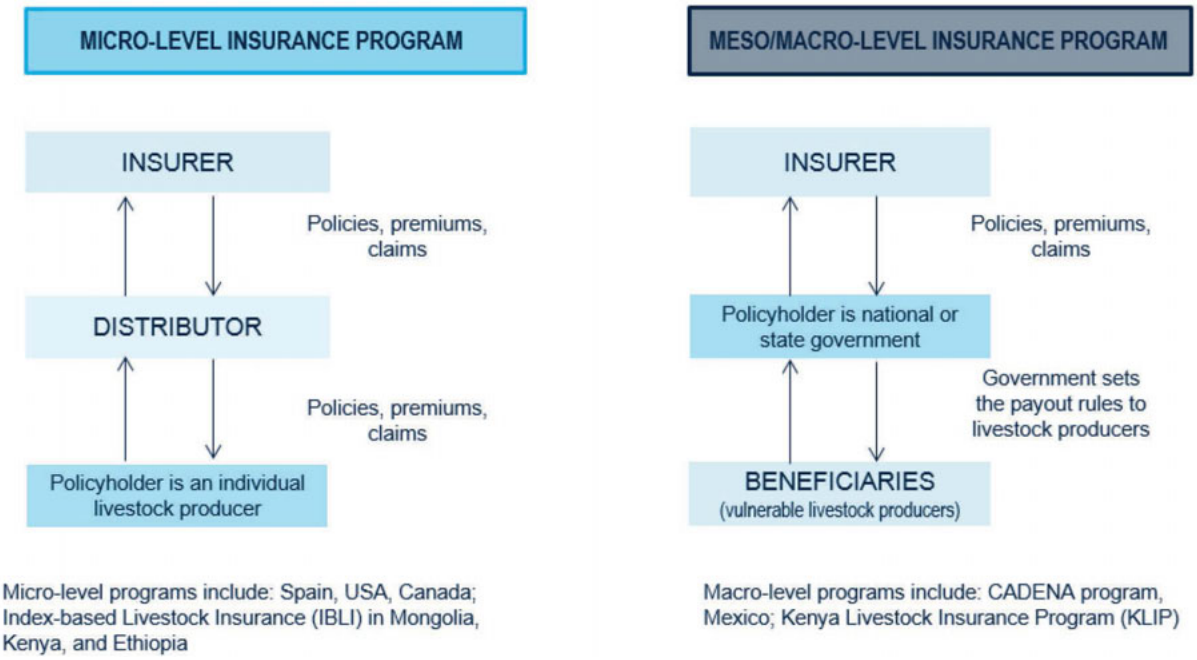
- **A voluntary retail micro-level product to individual livestock producers**
- **A macro-level product purchased by GoU and/or regional governments as part of government livelihood protection programs for vulnerable pastoralists in times of major droughts**

In the latter case, livestock insurance would act as an ex ante planned action by government, as opposed to the conventional approach, which provides ex post financing of animal feed and watering activities and livestock vaccination when government is obliged to distribute relief after declaration of a national drought disaster.

Figure 7.12 shows the differences between micro-level and macro-level applications of livestock SPDII cover. Under a micro-level approach, the insurance company is responsible for marketing and sales of the cover to individual livestock producers (pastoralists) on a voluntary basis. The pastoralist is the insured policy holder who is responsible for paying a premium to the insurer and who receives his/her own policy certificate

and policy wording. In the event a payout is due, the insurance company will make the payout(s) directly to the insured pastoralist(s). Under a macro-level approach, central or regional government is the insured policy holder and is responsible for the payment of premium to the insurance company. In this case, government purchases the SPDII protection on behalf of large numbers of pre-identified and registered vulnerable pastoralists who are the beneficiaries of the cover and who will each receive an agreed payout if the policy is triggered. Examples of macro-level SPDII programs include the Kenya Livestock Insurance Program which was launched in 2015/16 (World Bank 2015c) and in Ethiopia the Satellite Index Insurance for Pastoralists in Ethiopia (SIIPE) program which was lacunhed in 2018 (WFP 2016).

Figure 7.12. Comparison of Micro-Level and Macro-Level Distribution of SPDII



Source: World Bank Group, adapted from Dick 2009.

Other Operational Considerations

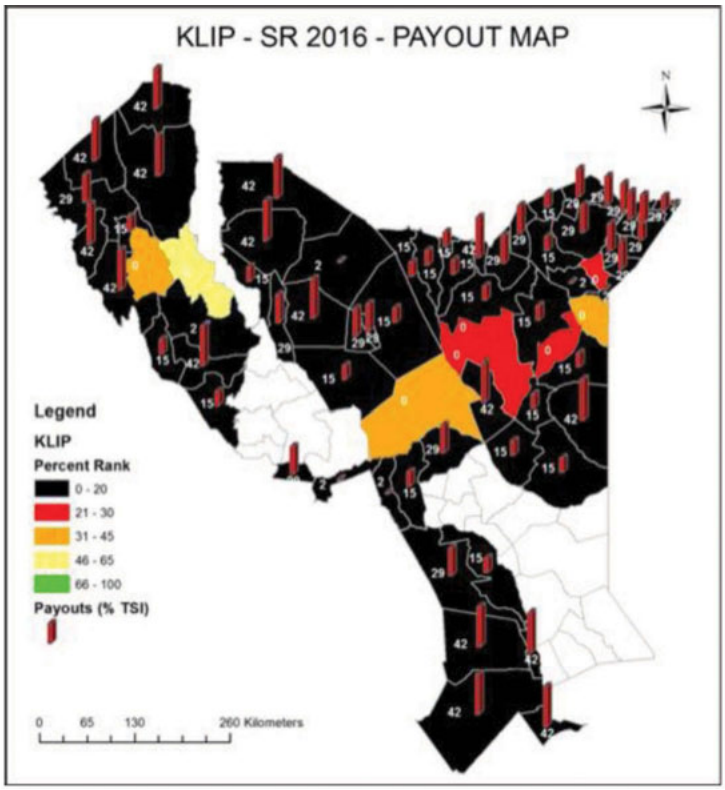
In Kenya, where IBLI and KLIP have been running for a number of years, several invaluable lessons have been learned for the effective operation of the programs. The following elements are key:

- **Electronic registration of livestock producers.** A prerequisite for the effective operation of the programs is that the government invest in creating a livestock electronic registration system. This should record livestock producers' names, IDs, addresses, and contact details, including phone numbers, along with full details of the livestock holding (type, sex, numbers, and the location of these animals for grazing purposes). This basic information is required for livestock insurance purposes. Governments can also add to this database by including more detailed information on the livestock, such as whether they are tagged, what their vaccination status is, etc.
- **Bank or mobile accounts.** Any livestock producer who elects to purchase voluntary insurance or who is enrolled in a livelihoods protection program must have either an active bank or savings account or a mobile phone and access to mobile banking. This is a precondition of insurance that must be verified at registration/insurance application to ensure that due premium can be collected by the insurance company and especially to ensure timely claims payouts to insured (or beneficiary) producers if claims are triggered in the location where their livestock are registered.
- **Awareness creation, education, and training.** Satellite index insurance is a new concept for livestock producers and is not well understood. At the time of registration or application, it is essential that the

producer receive clear guidance and advice on how the product works, how and when drought payouts are triggered, and how payouts will be received.

- **Independent claims calculation agent.** For public-private partnership programs such as KLIP, it is essential to have an independent third-party remote sensing specialist organization that can act as the claims calculation agent (CCA). The role of the CCA is to download original eMODIS NDVI data on a monthly basis and to use the pre-agreed formula for calculating (i) the average NDVI value in each UAI and (ii) cumulative monthly NDVI value for each UAI during the coverage period. It also advises all parties of the grazing conditions and likelihood of a payout as the season develops. On completion of the coverage period, the CCA formally provides the end-of-season cumulative NDVI results to the key stakeholders (insurers and government), clearly identifying UAIs that are free of claims and UAIs where claims payouts have been triggered (along with the percentage payout). At this stage the insurer(s) can formally calculate the claim payments and make the payouts directly to the beneficiaries in the UAIs that have been triggered for a claim.
- **End-of-season result declaration strategy (claims or no claims).** It is very important to plan ahead for the end-of-season declaration of the results in all counties and UAIs—both those where claims payouts have been triggered and those where they have not. Media such as radio can be useful for reaching pastoralists, as well as involving the local county livestock department veterinary and extension field staff to meet community leaders and clan chiefs. In Kenya, KLIP has passed the proof of concept stage and during the lengthy droughts of 2016/17 made very significant payouts. For example, in February 2017, KLIP insurers made pasture drought payouts of K Sh 215 million (nearly US$2.1 million) to 12,000 beneficiating pastoralists in six counties for the 2016/17 short rains season (figure 7.13).

Figure 7.13. KLIP Counties and UAIs in Northern Kenya with Payouts for Pasture Droughts in Short Rains Season (October–December 2016)



Source: ILRI 2017.

Note: Pasture drought payouts triggered in UAIs are shown in black.

7.5. Government Support to Livestock Insurance Program

GoU premium subsidy support aims to make the insurance coverage more affordable for small-scale livestock producers and to encourage uptake.

- For **voluntary cover, a 50% premium subsidy** is assumed, which would be in line with the existing GoU subsidy level for smallholder farmers under the UAIS scheme.
- For the **livelihoods protection cover for the most vulnerable livestock producers, it is assumed that GoU would fully fund the insurance cover (offer 100% premium subsidy)** as part of its disaster risk management strategy for vulnerable households in Karamoja subregion.

It is assumed that GoU would also assist the insurance companies in the start-up and implementation of the SPDII program in two main areas:

1. **Registration of the livestock producers (pastoralists).** All pastoralists will need to be electronically registered for insurance and their mobile phone contact details and bank account details recorded. (Those without bank accounts or mobile banking will need to be assisted in opening an account.) At registration the pastoralists will be assigned to a UAI where their animals are normally located for grazing purposes. The UAI is likely to be based on a grouping of districts or counties and subcounties according to its NDVI signature.
2. **SPDII insurance awareness creation and education.** It is essential that livestock producers be provided with education and training on the role of the Satellite-Based Pasture Drought Index Insurance program so they understand how the cover works and especially how they qualify for and receive claims payouts.

7.6. Uptake Scenarios and Fiscal Costs of Livestock Insurance Program

SPDII Fiscal Model Assumptions

This section presents indicative fiscal costings for a five-year SPDII program for smallholder livestock producers where government provides financial support for (i) premium subsidies, and (ii) start-up and operating expenses.

Two main scenarios have been modeled:

1. **Voluntary uptake program with partial (50%) premium subsidies,** where livestock producers in Karamoja (and other participating departments in the livestock corridor) could elect to buy the SPDII cover, and GoU would provide a 50% premium subsidy in order to make cover more affordable and promote uptake. For a voluntary program, three uptake scenarios have been modeled: (i) low, with 6,250 pastoralists enrolled by year 5; (ii) medium, 12,500 pastoralists by year 5; and (iii) high, 25,000 pastoralists by year 5. These uptake figures are reflective of a voluntary livestock insurance program. Experience from the voluntary IBLI programs for pastoralists in Kenya and Ethiopia shows that creating insurance awareness and training smallholder livestock producers in the role and benefits of livestock insurance takes considerable time. In Kenya it has taken five years to achieve total sales of slightly greater than 10,000 individual policies. Therefore, for Uganda, the voluntary medium uptake scenario (2,500 new policy sales per year) is considered realistic, but only if accompanied by major investment in insurance literacy training and promotion of SPDII with pastoral communities.
2. **Livelihoods protection program with automatic enrollment of the most vulnerable pastoralists and fully subsidized insurance protection.** Local government in Karamoja (and other participating departments in the livestock corridor) would be responsible for identifying the most vulnerable pastoralists and for registering them under the SPDII program. GoU would fully fund cover (provide 100% premium

subsidies) for these pastoralists. For an automatic program led by GoU, considerably higher uptake scenarios were assumed: (i) low, with 25,000 pastoralists enrolled by year 5; (ii) medium, 100,000 pastoralists by year 5; and (iii) high, 150,000 pastoralists by year 5.

The assumptions used in this five-year SPDII budgeting exercise are explained below and summarized in table 7.7 (voluntary cover) and table 7.8 (automatic livelihoods protection cover):

- **Insured TLUs.** Detailed production statistics for smallholder livestock producers, including average herd size, are not currently available for Karamoja or other parts of the livestock corridor in Uganda. For the purposes of this budgeting exercise, an average of five insured TLUs per livestock producer is assumed for all uptake scenarios.
- **Cover period.** The eight-month cover period from March to end September is intended to cover the unimodal rainfall pattern in Karamoja. The cover period should be adjusted and refined in the project design phase by a detailed analysis of time series NDVI data.
- **Sum insured.** The sum insured is based on the nutritional requirements to maintain one TLU (based on an adult cow) for one month. For this budgeting exercise the cost of purchased fodder and feed supplements and water is estimated at US$12 per TLU per month. This figure is based on the monthly sums insured adopted in Kenya under the KLIP (K Sh 1,166.67/TLU/month, or US$11.51/TLU/month) and in Ethiopia under the SIIPE (Br 300/TLU/month, or US$10.82/TLU/month). The monthly cost of US$12/TLU will need to be checked and verified with the Livestock Department within the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).
- **Indicative commercial premium rate.** The 15% premium rate is based on international experience from Africa (Kenya, Ethiopia) and North and South America for one-in-five-year drought events and is considered realistic for northern Uganda/Karamoja conditions.[61]
- **Indicative commercial premium subsidy level.** A product with a 15% premium rate would cost US$72 per year for an average pastoralist with five insured TLUs and sum insured of US$480.

Government of Uganda Fiscal Support

Assumptions about GoU premium subsidy support are as follows:

- For **voluntary cover, a 50% premium subsidy** is assumed, which reduces the cost to US$36 per livestock producer per year. GoU would bear the cost of the 50% premium subsidy, equal to US$36 per livestock producer.
- For the **livelihoods protection cover for the most vulnerable livestock producers, it is assumed that GoU would fully fund cover (offer 100% premium subsidy),** and that the cost to government would be US$72 per livestock producer per year.

Other government support for the livestock insurance program is assumed as follows:

- **Registration of the livestock producers (pastoralists).** It is assumed that GoU will contribute US$2.0 per TLU (or US$10 per livestock producer) toward the costs of the registration exercise.
- **SPDII insurance awareness creation and education.** It is assumed that GoU will contribute US$10.0 per livestock producer toward the costs of insurance awareness creation and education.

[61] Other scenarios could also be included in the pricing, such as an SPDII product that pays out one in every three years, with an average indicative commercial premium rate of say 20%; or a product that pays out 1 in every 7 to 10 years with, an average indicative commercial premium rate of say 10%. These additional scenarios are presented in annexes 5.1–5.3 and 6.1–6.3.

Table 7.7. Assumptions Used for Voluntary Livestock SPDII with Partial Premium Subsidies

Assumptions:	LOW Uptake	MEDIUM Uptake	HIGH Uptake
Uptake (No of Insured Smallholder Livestock Producers per year)	**1,250**	**2,500**	**5,000**
Number of Insured Livestock Units per Insured Smallholder	5	5	5
Sum Insured per Livestock Unit per Month (US$)	12	12	12
Number of Months Insurance Cover	8	8	8
Sum Insured per TLU per Year (US$/TLU/Insurance Year)	96	96	96
Sum Insured per Livestock Producer per Year (US$)	480	480	480
Indicative Commercial Premium Rate (1 in 5 year return period)	15%	15%	15%
Indicative Commercial Premium per Livestock Producer (US$)	72	72	72
Voluntary Cover Premium Subsidy level (% of Premium rate)	**50%**	**50%**	**50%**
Voluntary Cover Premium Subsidy per Livestock Producer (US$)	**36**	**36**	**36**

Source: World Bank Group analysis.

Note: See annexes 5.1–5.3 for further details.

Table 7.8. Assumptions Used for Automatic Cover under Livelihoods Protection SPDII with 100% Premium Subsidies

Assumptions:	LOW Uptake	MEDIUM Uptake	HIGH Uptake
Coverage (No of Insured Smallholder Livestock Producers per year)	**5,000**	**20,000**	**30,000**
Number of Insured Livestock Units per Insured Smallholder	5	5	5
Sum Insured per Livestock Unit per Month (US$)	12	12	12
Number of Months Insurance Cover	8	8	8
Sum Insured per TLU per Year (US$/TLU/Insurance Year)	96	96	96
Sum Insured per Livestock Producer per Year (US$)	480	480	480
Indicative Commercial Premium Rate (1 in 5 year return period)	15%	15%	15%
Indicative Commercial Premium per Livestock Producer (US$)	72	72	72
Automatic Cover Premium Subsidy level (% of Premium rate)	**100%**	**100%**	**100%**
Automatic Cover Premium Subsidy per Livestock Producer (US$)	**72**	**72**	**72**

Source: World Bank Group analysis.

Note: See annexes 6.1–6.3 for further details.

SPDII Fiscal Model Outputs

Voluntary Sales Option

For the voluntary sales option with medium insurance uptake of 12,500 insured livestock producers (pastoralists) and 62,500 insured TLUs a year by year 5 (assumed full-scale implementation), the budgeted cost of GoU financial support is US$700,000 (UGX 2,625 million) per year, made up of US$450,000 for the 50% premium subsidies and US$250,000 for electronic registration of livestock producers and awareness creation activities. The total cost to government of this option over five years would be US$2.10 million (UGX 7,875 million) (table 7.9). The cost of GoU support for other uptake scenarios varies, from a low of US$350,000 (UGX 1,313 million) at year 5 for the low uptake rate of 6,250 insured livestock producers and 31,250 insured TLUs by year 5, to a high of US$1,400,000 (UGX 5,250 million) at year 5 for the high uptake rate of 25,000 insured livestock producers and 125,000 insured TLUs (see annexes 5.1–5.3 for further details).

Table 7.9. Voluntary Livestock Insurance (SPDII): Five-Year Fiscal Budget for Medium Uptake Scenario (2,500 new pastoralists each year)

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET							
ExpansionPlan and Budget	**Assumptions**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTAL**
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	2,500	2,500	5,000	7,500	10,000	12,500	37,500
Total Number of Insured Livestock Units	5	12,500	25,000	37,500	50,000	62,500	187,500
Sum Insured (US$)	96	1,200,000	2,400,000	3,600,000	4,800,000	6,000,000	18,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	180,000	360,000	540,000	720,000	900,000	2,700,000
Premium Subsidy level/ Premium Subsidy (US$)	50.00%	**90,000**	**180,000**	**270,000**	**360,000**	**450,000**	**1,350,000**
OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS							
Support to Start up and Operational costs	**Assumptions**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTAL**
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	25,000	50,000	75,000	100,000	125,000	375,000
2. Farmer awareness, education and training (US$/Producer)	10.0	25,000	50,000	75,000	100,000	125,000	375,000
Sub-Total Start-up & Operating Expenses Support (US$)		**50,000**	**100,000**	**150,000**	**200,000**	**250,000**	**750,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**140,000**	**280,000**	**420,000**	**560,000**	**700,000**	**2,100,000**
Total Costs of Financial Support to Livestock Insurance (UGX Million)		**525**	**1,050**	**1,575**	**2,100**	**2,625**	**7,875**

Source: World Bank Group analysis.

Note: See annexes 5.1–5.3 for full details.

Livelihoods Protection Program for Vulnerable Pastoralists (beneficiaries)

Under the SPDII livelihoods protection program option, with automatic enrollment of vulnerable livestock producers (pastoralists) and medium insurance uptake of 100,000 insured livestock producers (pastoralists) and 500,000 insured TLUs a year by year 5 (assumed full-scale implementation), the budgeted cost of GoU financial support is US$9.2 million (UGX 34,500 million), made up of US$7.2 million for the 100% premium subsidies and US$2 million for electronic registration of livestock producers and awareness creation activities. The total cost to government of this option over five years would be US$27.6 million (UGX 103,500 million) (table 7.10). The costs of GoU support for other uptake scenarios could be as low as US$2.30 million (UGX 8,625 million) at year 5, for the low uptake rate of 25,000 insured livestock producers and 125,000 insured TLUs; or they could be as high as US$13.8 million (UGX 51,750 million) at year 5, for the high uptake rate of 150,000 insured livestock producers and 750,000 insured TLUs by year 5 (see annexes 6.1–6.3 for further details).

Table 7.10. Livelihood Protection Livestock Insurance (SPDII): Five-Year Fiscal Budget for Medium Uptake Scenario (20,000 new pastoralists each year)

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET							
ExpansionPlan and Budget	**Assumptions**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTAL**
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	20,000	20,000	40,000	60,000	80,000	100,000	300,000
Number of Insured Livestock Units per Insured	5	100,000	200,000	300,000	400,000	500,000	1,500,000
Sum Insured (US$)	96	9,600,000	19,200,000	28,800,000	38,400,000	48,000,000	144,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	1,440,000	2,880,000	4,320,000	5,760,000	7,200,000	21,600,000
Premium Subsidy level/ Premium Subsidy (US$)	100.00%	**1,440,000**	**2,880,000**	**4,320,000**	**5,760,000**	**7,200,000**	**21,600,000**
OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS							
Support to Start up and Operational costs	**Assumptions**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTAL**
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	200,000	400,000	600,000	800,000	1,000,000	3,000,000
2. Farmer awareness, education and training (US$/Producer)	10	200,000	400,000	600,000	800,000	1,000,000	3,000,000
Sub-Total Start-up & Operating Expenses Support (US$)		**400,000**	**800,000**	**1,200,000**	**1,600,000**	**2,000,000**	**6,000,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**1,840,000**	**3,680,000**	**5,520,000**	**7,360,000**	**9,200,000**	**27,600,000**
Total Costs of Financial Support to Livestock Insurance (UGX Million)		**6,900**	**13,800**	**20,700**	**27,600**	**34,500**	**103,500**

Source: World Bank Group analysis.

Note: See annexes 6.1–6.3 for full details.

While the above SPDII financial projections are presented separately for the voluntary sales program and the government livelihoods protection program, it is strongly recommended that the two programs be implemented in conjunction with each other: using the medium uptake projections, the total cost to GoU at year 5 with full implementation would be about US$9.9 million (UGX 37,125 million) per year. This is based on the case of Kenya: voluntary sales of IBLI cover started there in 2010, and in 2015 the government partnered with a pool of seven coinsurers to launch the Kenya Livestock Insurance Program as a fully funded social protection program for vulnerable pastoralists. If both programs can be implemented together in Uganda, an objective over time could be to gradually phase out the social protection program as pastoralists become aware of and gain trust and experience in SPDII. At that point only the voluntary SPDII program, backed by partial premium subsidies, would be offered. This would hopefully lead to a financially sustainable livestock pasture drought insurance program for vulnerable pastoralists located in the cattle corridor of Uganda.

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Annexes

Annex 1. Area, Production, and Yields of Five Major Food Crops in Uganda by Region and Season, 2008/09

Crop	Region	Number Farm HHs Growing the crop	Agri-HHs in Region growing the crop	Second Season 2008			Number Farm HHs Growing the crop	Agri-HHs in Region growing the crop	First Season 2009			Total for 2008/2009				
		2nd Season 2008	% of HHs	Area (Ha)	Production (MT)	Yield (MT/Ha)	1st Season 2009	% of HHs	Area (Ha)	Production (MT)	Yield (MT/Ha)	Area (Ha)	% of Total crop area	Average Area (Ha/AgHH)	Production (MT)	Yield (MT/Ha)
Maize	Central	410,332	51%	105,192	295,104	2.81	340,734	42%	83,943	154,756	1.84	189,135	19%	0.25	449,860	2.38
Maize	Eastern	578,363	52%	167,794	468,048	2.79	689,080	62%	220,968	640,506	2.90	388,762	38%	0.31	1,108,554	2.85
Maize	Northern	296,523	33%	95,773	143,594	1.50	401,781	44%	152,007	162,204	1.07	247,780	24%	0.35	305,798	1.23
Maize	Western	457,798	41%	96,588	257,579	2.67	397,739	35%	91,995	240,166	2.61	188,583	19%	0.22	497,745	2.64
Maize	**Uganda**	**1,743,016**	**44%**	**465,347**	**1,164,325**	**2.50**	**1,829,334**	**46%**	**548,913**	**1,197,632**	**2.18**	**1,014,260**	**100%**	**0.28**	**2,361,957**	**2.33**
Beans	Central	366,262	45%	63,906	72,101	1.13	315,853	39%	56,890	95,175	1.67	120,796	20%	0.18	167,276	1.38
Beans	Eastern	333,138	30%	54,484	55,177	1.01	349,067	31%	53,623	43,658	0.81	108,107	18%	0.16	98,835	0.91
Beans	Northern	269,514	30%	76,980	177,997	2.31	208,767	23%	69,722	73,225	1.05	146,702	24%	0.31	251,222	1.71
Beans	Western	695,843	62%	120,059	240,513	2.00	208,767	19%	121,856	171,433	1.41	241,915	39%	0.27	411,946	1.70
Beans	**Uganda**	**1,664,757**	**42%**	**315,429**	**545,788**	**1.73**	**1,082,454**	**27%**	**302,091**	**383,491**	**1.27**	**617,520**	**100%**	**0.22**	**929,279**	**1.50**
Banana (Food)	Central	459,555	57%	144,246	517,720	3.59	463,866	57%	139,226	411,814	2.96	283,472	35%	0.31	929,534	3.28
Banana (Food)	Eastern	209,283	19%	31,430	218,601	6.96	217,771	20%	28,353	115,250	4.06	59,783	7%	0.14	333,851	5.58
Banana (Food)	Northern	19,649	2%	3,225	18,891	5.86	16,896	2%	1,834	7,124	3.88	5,059	1%	0.14	26,015	5.14
Banana (Food)	Western	696,102	62%	237,818	1,377,182	5.79	677,529	60%	220,494	1,351,405	6.13	458,312	57%	0.33	2,728,587	5.95
Banana (Food)	**Uganda**	**1,384,589**	**35%**	**416,719**	**2,132,394**	**5.12**	**1,376,062**	**35%**	**389,907**	**1,885,593**	**4.84**	**806,626**	**100%**	**0.29**	**4,017,987**	**4.98**
Cassava	Central	278,854	35%	68,247	240,404	3.52	271,620	34%	59,541	169,408	2.85	127,788	15%	0.23	409,812	3.21
Cassava	Eastern	373,285	34%	189,214	518,729	2.74	299,686	27%	153,173	542,457	3.54	342,387	39%	0.51	1,061,186	3.10
Cassava	Northern	202,048	22%	138,115	673,511	4.88	100,512	11%	131,771	309,613	2.35	269,886	31%	0.89	983,124	3.64
Cassava	Western	271,150	24%	63,496	235,744	3.71	295,596	26%	67,832	204,445	3.01	131,328	15%	0.23	440,189	3.35
Cassava	**Uganda**	**1,125,337**	**29%**	**459,072**	**1,668,388**	**3.63**	**967,414**	**25%**	**412,317**	**1,225,923**	**2.97**	**871,389**	**100%**	**0.42**	**2,894,311**	**3.32**
Sweet Potatoes	Central	277,117	34%	56,151	200,827	3.58	244,672	30%	41,903	111,576	2.66	98,054	22%	0.19	312,403	3.19
Sweet Potatoes	Eastern	355,719	32%	87,783	482,572	5.50	299,686	27%	72,165	364,569	5.05	159,948	36%	0.24	847,141	5.30
Sweet Potatoes	Northern	191,305	21%	35,112	228,058	6.50	100,512	11%	25,461	64,873	2.55	60,573	14%	0.21	292,931	4.84
Sweet Potatoes	Western	321,622	29%	56,378	222,615	3.95	295,596	26%	65,303	143,680	2.20	121,681	28%	0.20	366,295	3.01
Sweet Potatoes	**Uganda**	**1,145,763**	**29%**	**235,424**	**1,134,072**	**4.82**	**940,466**	**24%**	**204,832**	**684,698**	**3.34**	**440,256**	**100%**	**0.21**	**1,818,770**	**4.13**

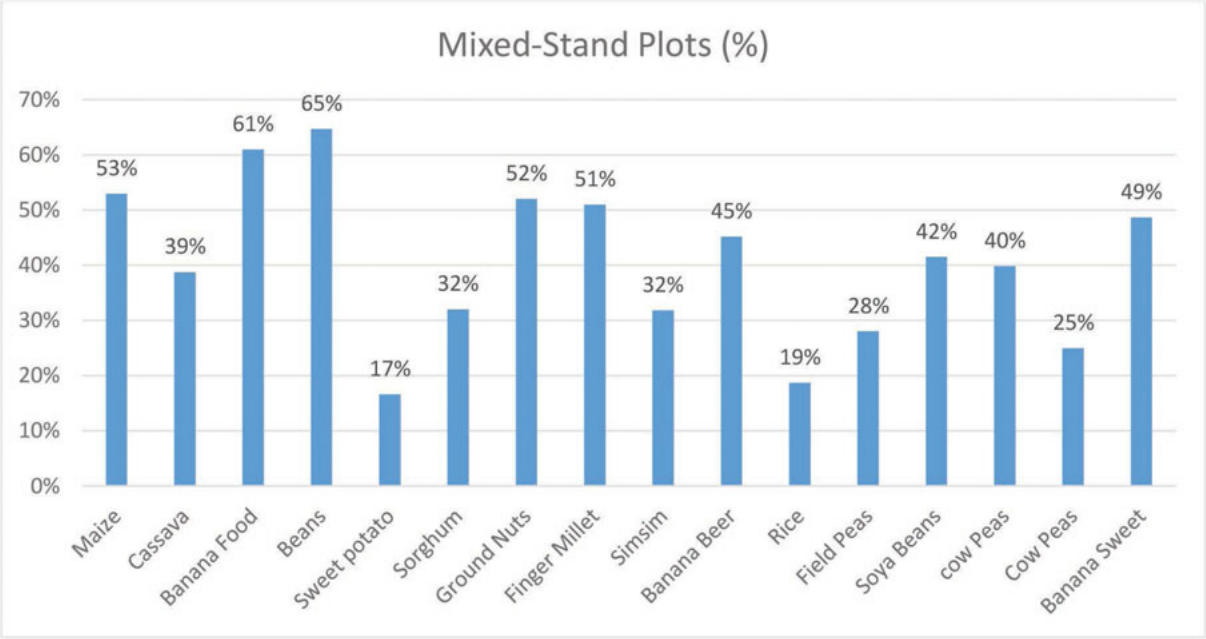
Source: UBoS 2010a.

Note: HH = household.

Annex 2. Pure-Stand versus Mixed-Stand Plots in Uganda, 2008/09

Crop	Area (Ha)	Pure-Stand Plots (No.000)	Pure-Stand Plots (%)	Mixed-Stand Plots (No.000)	Mixed-Stand Plots (%)	Total Number of Plots (000)	Average size of Plot (Ha)
Maize	1,014,260	1352	47%	1522	53%	2874	0.35
Cassava	871,387	1928	61%	1220	39%	3148	0.28
Banana Food	806,630	1127	39%	1763	61%	2890	0.28
Beans	617,521	804	35%	1473	65%	2277	0.27
Sweet potato	440,256	2266	83%	452	17%	2718	0.16
Sorghum	399,255	824	68%	388	32%	1212	0.33
Ground Nuts	345,234	676	48%	734	52%	1410	0.24
Finger Millet	249,990	459	49%	477	51%	936	0.27
Simsim	175,599	319	68%	149	32%	468	0.38
Banana Beer	86,128	114	55%	94	45%	208	0.41
Rice	75,088	152	81%	35	19%	187	0.4
Field Peas	43,835	95	72%	37	28%	132	0.33
Soya Beans	36,448	62	58%	44	42%	106	0.34
cow Peas	32,759	163	60%	108	40%	271	0.12
Cow Peas	23,818	57	75%	19	25%	76	0.31
Banana Sweet	23,124	39	51%	37	49%	76	0.31
Total	**5,241,332**	**10437**	**55%**	**8552**	**45%**	**18989**	**0.29875**

Source: UBoS 2010b.



Source: UBoS 2010b.

Annex 3. Uganda Agricultural Insurance Scheme (UAIS): Institutional and Operational Considerations

Institutional Arrangement from Public Sector Side

Institutional Arrangement at Policy Level

Several actors are involved in the provision of public-private agricultural insurance under the UAIS in Uganda and require an appropriate institutional framework for effective delivery of the insurance products to farmers. At the highest level, agriculture insurance should be aligned with the country's development objectives and policy decisions on why and how the government will be involved. Strong justification is required before using public resources to support agriculture insurance. The relevant ministry needs to demonstrate how such support contributes to the country's overall economic development and if such support is the best use of public resources. Such decisions are taken at the government executive level and require interministerial engagement. Justification of the economic viability of government support is followed by fiscal costing that considers the life of the program. Supporting agriculture insurance requires long-term commitment, and the government involvement requires careful analysis of fiscal implications. A long-term view is desirable because experience has shown that such schemes take time to develop.

Decisions about supporting agriculture insurance should be discussed and approved, possibly at the cabinet level, and there should be clarity about which ministries will be involved in guiding implementation. An interministerial committee composed of either ministers or permanent secretaries could be formed at the apex. The crucial functions of such a committee could include performance oversight and continuous monitoring and evaluation of whether public resources are being utilized appropriately and whether objectives set at the inception are still valid. Such a committee is critical, especially during the scheme design and formation phase and could be constituted on an ad hoc and need-arise basis.

The UAIS is already operational on a pilot basis in Uganda; thus, such a committee could be necessary to evaluate the achievement of the pilot scheme, the government's role moving forward, and future fiscal implications. The scheme having been implemented for over two years provides an opportunity to carry out evaluation and formulate lessons learned.

Institutional Arrangement at Technical Level

Implementation of the policy decision is downscaled to the ministry's technical level, which provides guidance on the scheme implementation. The policy statements are broken down into implementable documents providing the components of the program and an accompanying budget. The program documents outline what activities need to be carried out, and they assign responsibilities and resources. A Technical Working Group (TWG) has already formed drawing membership from relevant government departments to guide implementation of UAIS. Such a group could also be important in facilitating interministerial and interdepartmental coordination. The TWG could serve as a coordination mechanism and provide implementation oversight to ensure the policy objectives are being met and resources are gained in a timely manner. Among other activities, the TWG's tasks could include reviewing the suitability of products and recommending target beneficiaries for the government subsidy. The TWG could provide technical backstopping of the program implementation unit (PIU), which is charged with day-to-day implementation of the program. It could meet in the beginning of the season to review and approve the proposed products and at the end of season to review end-of-season results; it could also meet on a need-arise basis.

Program Implementation Unit

The public sector–related activities will require coordination; hence the need to consider forming a PIU. The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) normally has considerable responsibilities for implementing agriculture insurance programs, making it suitable for forming a PIU. MAAIF has the infrastructure in place for interacting with farmers on a continuous basis. The unit could be a stand-alone (most preferable if

the government support is going to be long term) or could be an existing unit within the ministry undertaking related functions. Such a unit could coordinate activities undertaken by the public sector and ensure the program is meeting the objectives as set by the government. For easy operation, a program document could be developed to provide guidance on the implementation of agriculture insurance.

Observation: MAAIF is not assigned any role in implementing UAIS according to the Memorandum of Understanding (MOU).

The expected strong link between agriculture insurance and other initiatives for promoting the agriculture sector is missing. At the policy level, agriculture insurance is expected to contribute to the achievement of MAAIF's vision of a "competitive, profitable and sustainable agricultural sector" and fulfil its mission "to transform subsistence farming to commercial agriculture" (MAAIF 2013). Agriculture insurance should fit within the overall framework for promoting the growth of the agriculture sector. A strong linkage between agriculture insurance and access to credit and subsidized farm inputs could be established.

At the operational level, an agriculture insurance program will require agriculture production data to design appropriate insurance products. It will also require systems for continuous yield data collection for loss adjustment. Such data are very useful for products like AYII because they are used to determine coverage level and whether the yield of an insured season is above or below the guaranteed yield. MAAIF also has an elaborate infrastructure that could be used to raise farmers' awareness of agriculture insurance. MAAIF facilitates collection of agriculture-related statistics and has infrastructure down to the farmer level for awareness creation. MAAIF has also revamped its extension service provision network, and with the support of the World Bank, is setting up infrastructure for collecting agriculture statistics.

Institutional Arrangement from the Private Sector Side

The private sector will need to form its own institutional implementation mechanism for engaging with the government in the provision of agriculture insurance—currently identified as Uganda Insurers Association (UIA) and Agriculture Insurance Consortium (AIC). The public-private partnership (PPP) should entail close interaction and collaboration between the two sectors. The private sector will need to form its own operational framework for addressing sector-related issues. CEOs of interested insurance companies will require coordination among themselves and agreement on leadership for engagement with the government. The private sector will also need to address how the products will be underwritten and marketed and how loss adjustment will be carried out. A business-sharing arrangement will need to be agreed on, along with budgets and contributions toward supporting activities that private sector actors undertake.

Observation: *The MOU clearly indicates that UAIS is being implemented as a PPP between the government of Uganda and UIA. The MOU acknowledges the formation of the AIC composed of insurance companies that provide underwriting services to the scheme. However, there is no explanation given on the link between the UIA and AIC. The UIA's roles and responsibilities are clear, but those of AIC are not. There is also a lack of clarity on how the Agro Consortium Secretariat (ACS), which has been formed by the 11 AIC members to market, promote, underwrite, and adjust claims on UAIS, is accountable to, managed by, and reports to the AIC. ACS has significantly reduced the crop and livestock premium rates agreed for UAIS, but it is not clear if these rate reductions have been approved by AIC members and by UIA or not. To date, AIC appears to have been minimally involved in the evaluation of the agriculture insurance products and rates offered by ACS under the UAIS. Clearer roles for the AIC and ACS could usefully be defined, and the process of developing and approving products under the scheme will need to be agreed upon. Discussion of the roles of UIA versus AIC-ACS should also be encouraged.*

Technical Level

The TWG is currently chaired by MoFPED and has representatives from MAIFF, the Uganda Meteorology Agency, and the UIA, ACS, and development partners (USAID) and hence provides a solid foundation for implementing a PPP agriculture insurance scheme. Provision of agriculture insurance requires partnership, especially in countries where there is limited expertise and experience. The private sector TWG could agree on approaches and methodologies for promoting and marketing the insurance products, and it could also be involved in developing appropriate products and loss adjustment. The TWG should provide technical backstopping of the AIC under the UIA, which manages the agriculture insurance scheme on behalf of 11 insurance companies.

Observation: *There seems to be no institutional arrangement that brings together insurance companies providing underwriting services to UAIS. There is thus limited technical understanding of products offered and limited long-term vision of agriculture insurance from a private sector perspective. Strong links between the AIC at the technical level and the TWG and government line ministries are desirable.*

The AIC Secretariat

The Agriculture Insurance Consortium has set up the Agro Consortium Secretariat (ACS) with a technical manager. The role of the ACS is to implement the UAIS, including product development and rating, claims administration, and subsidy management. The ACS manages the scheme from the private side on behalf of AIC. Each of the 11 insurance companies markets the insurance products and issues policies, then shares business with the rest of the consortium members under the coinsurance arrangement. The company originating the business gets a commission of 5% on the premium raised, while the participating companies each get 2% of the risk share, totaling 22%; the rest is ceded to reinsurance companies. The ACS manages its operations through a 15% commission charged on the total premium collected. The secretariat is expected to implement activities to raise farmers' awareness of the scheme; to undertake loss adjustment; and to engage in other related activities.

Observation: *There seems to be no system for providing oversight on activities undertaken by the secretariat. AIC has no defined role and no linkage with the secretariat or UIA, making it difficult to make collective decisions on growing the agriculture insurance market. There is need for deeper involvement by AIC in activities carried out by the secretariat, considering that the insurance companies forming the consortium bear the risk. The TWG composed of representatives from AIC members could provide oversight.*

Operational Considerations under the PPP

Closer collaboration between the private and public sector actors is required to make provision of agriculture insurance commercially sustainable. Clarity on roles and responsibilities of key actors at all levels is necessary. At policy level, there is a need for MAAIF to share its vision with CEOs of private companies, and there is also a need to establish clarity on common goals. Ad hoc meetings between CEOs of companies that provide agriculture insurance and the MAAIF leadership are encouraged. The support provided by the government should be geared toward creating an enabling environment for insurance in general and agriculture insurance in particular.

The same interaction is cascaded at the technical level, with TWGs of both private and public sector interacting to support implementation of agreed goals.

Institutional and Operational Considerations for Area Yield Index Insurance

Provision of AYII involves several actors and requires an appropriate institutional and operational framework. AYII is a product that targets smallholder farmers who can't be offered Multi-Peril Crop Insurance (MPCI) because of the challenges of loss adjustment at the farm level. The operational cost to insurance companies of providing MPCI to smallholder farmers is prohibitive; this makes AYII a more suitable product for cereal crops. With AYII, the loss adjustment does not require harvesting at each farm; instead, statistically sampled farms give a fair estimate of the yield of a particular geographical unit referred to as the Unit Area of Insurance (UAI).

Institutional and Operational Framework at AYII Product Development Phase

Provision of AYII involves several steps that bring several actors into play. For the actors to operate efficiently, establishment of an appropriate institutional framework is required. To develop AYII involves the determination of the UAI and access to historical yield data for the reference crop. MAAIF is best suited to lead the process of determining the UAI and will need to closely collaborate with the private sector involved in the provision of the insurance product. Other essential actors could also be brought on board to delineate the UAI, including farmers, research organizations, institutions in charge of meteorological services, etc. The UAIs could in the future become reference units for collecting agriculture statistics, and administrative borders could be used. Delineating UAIs using administrative boundaries increases the usability of yield data collected for insurance purposes.

Historical yield data provide the backbone for developing AYII products, where the information is used to identify years that experienced shocks and determine pure risk premium. Historical yield data are also used to determine average yield for each referenced unit (UAI) and to set up guarantee levels. Agriculture statistics are handled by the ministry in charge of agriculture and the same ministry becomes important in supplying the yield data for product development purposes. In Uganda, MAAIF collects agriculture statistics, thus making it an essential stakeholder in the provision of agriculture insurance products. The Uganda Bureau of Statistics tracks and keeps important agriculture statistics, which are useful information for developing an AYII product.

Product Pricing

Product pricing is a private sector function; however, the government plays an essential role in setting up parameters that determine premium rates charged for an agriculture insurance product. In schemes where public resources are used to provide the subsidy for agriculture insurance products, the government plays a critical role in ensuring the products offered to farmers are sound and able to address farmers' risk needs. The government must ensure the products provided to farmers are sound and are priced reasonably with regard to the risk they cover. A clear product approval process helps ensure the product offered addresses the desired risk needs of the targeted farmers. The committee in charge of overseeing the UAIS could be tasked with the responsibilities of product approval. However, its members may require some technical training on some products in order to execute this function.

In Uganda, the Insurance Regulatory Authority (IRA) is tasked with ensuring the agriculture insurance products offered under the scheme (and all insurance products sold in Uganda) are sound. Given that agriculture insurance products are new and offered with limited knowledge of how the products are designed, IRA's capacity to evaluate the soundness of the products may be constrained. In this situation, external support may be necessary to (i) build the technical capacity of IRA to gain adequate technical knowledge on available agriculture insurance products, and (ii) build the technical capacity of relevant government officials to understand the technical design of these products and offer guidance on loss adjustment. For an AYII product, the government should negotiate with insurance companies on yield guarantee and reasonable product prices to ensure farmers get the best deal possible.

Kenya experience: *Knowledge gaps on product development within both the public and private sector were identified, and the World Bank and partners provided required technical support to both sectors. The World Bank supported development of an AYII Excel-based tool that was used to train government officials, including in the Insurance Regulatory Authority, on product design, parameters for considerations in product development, and potential trade-offs between coverage level and pricing. The same tool was also used to train insurance companies, given that agriculture insurance is a new line of business in which the industry has limited expertise. The reinsurance providers with substantial experience with agriculture insurance were crowded in to support the private sector in designing sound products. It is therefore prudent to build the capacity of the public sector to acquire adequate technical knowledge, including how to design sound agriculture insurance products. Such interventions will ensure a solid foundation for agriculture insurance and a high potential to continue innovating and developing a commercially viable agriculture insurance business.*

Product Offering and Distribution

Experience worldwide has shown that it is difficult to retail agriculture insurance products and that use of aggregators has demonstrated positive results. Insurance companies lack the localized infrastructure for promoting and selling agriculture insurance products, while most potential aggregators operate near farmers and have already established working relationships. Use of aggregators, including financial institutions, cooperative societies, and agro-dealers who have direct dealing with farmers, has proved to be effective in promoting agriculture insurance. Business to business deals between private sector players providing various service to farmers give faster and better results, making the provision of agriculture insurance commercially sustainable. For example, banks are essential insurance distribution channels and could work closely with insurance companies to promote agriculture insurance products to their members and the general public. Other important actors are input dealers; in Kenya, for example, crop AYII has scaled up quickly as the Ministry of Agriculture allowed farmers accessing credit under the One Acre Fund to benefit from government subsidies. Private sector actors best negotiate such deals without government interventions. The interaction could be broader than the promotion of products and include claim processing and settlement.

Loss Adjustment for AYII

Loss adjustment for AYII requires determining the average yield achieved by each UAI at the end of the harvest season to determine whether there is a payout or not. The average yield for UAIs is determined through crop cutting experiments (CCEs). The CCEs are carried out using a methodology developed and agreed by all the stakeholders and involve sampling farms where crop cuts are undertaken and the average yield per acre or hectare for each UAI is determined. Farmers are paid if the average yield per UAI is below the guaranteed level.

The determination of the average yield per UAI follows credible scientific methods to produce accurate and reliable results. Both public and private stakeholders are involved in approving the methodology used for sampling the farm areas where the crop cuts will be done. The sample size for each UAI is determined by considering the level of homogeneity of the UAI and the cost implication of CCEs. A fair balance between the number of crop cuts and the cost is required and should be agreed between the private and public sector players. It is possible to reduce the number of crop cuts to the bare minimum if on-season monitoring is in place to indicate how the season is progressing and whether a loss is expected. In seasons where a loss is not likely the number of crop cuts could be reduced to save on cost.

CCEs are undertaken by a credible institution with the technical and logistical capacity to carry out the work involved. Government entities could be used to undertake CCEs in situations where strong and sound agriculture statistical infrastructure is in place. The cost of conducting the CCEs at the onset of the scheme could be met by the government (which could also use the data for other purposes), with the private sector meeting part of the cost when the project matures. The maturity process might be gradual; therefore, the government should be prepared to continue meeting costs of CCEs in the longer term. Conducting CCEs requires extensive work, especially when dealing with many UAIs, and elaborate planning and coordination are necessary to ensure the results are credible and delivered on time. Determination of yield at end of season needs to be done in near real time to build farmers' confidence in the insurance products being offered.

CCEs could be done by either public or private sector players. The ministry in charge of agriculture could undertake CCEs, although high levels of objectivity and a robust auditing process will be necessary in this case. It is also possible to engage the private sector in undertaking CCEs on behalf of parties involved in the provision of agriculture insurance. However, using private sector players to carry out CCEs has its challenges, which may include a delay in the procurement of a service provider, given that government procurement processes are known to be lengthy. The level of mobilization involved in undertaking crop cuts could result in severe logistical difficulties, and finding a private sector actor with the capacity to undertake the work when the scheme reaches scale may be a challenge.

Annex 4.1. Area Yield Index Insurance Five-Year Budget: Option 1—Low Insurance Uptake (US$)

AYII Cover for maize farmers in Uganda

Option 1.1. Low Farmer Uptake Rate and Low Insured Yield coverage level of 55% to 65% of Average Area Yield

Insured Farmers, Area, Sum Insured and Prer	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	5,000	10,000	20,000	35,000	50,000	120,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	10,000	20,000	40,000	70,000	100,000	240,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	2,500,000	5,000,000	10,000,000	17,500,000	25,000,000	60,000,000
Premium rate %	5.0%	5.0%	5.0%	5.0%	5.0%	
Premium per hectare (US$/Ha)	12.5	12.5	12.5	12.5	12.5	
Total Premium (US$)	125,000	250,000	500,000	875,000	1,250,000	3,000,000
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**62,500**	**125,000**	**250,000**	**437,500**	**625,000**	**1,500,000**
Other Government Support (US$)						
1. Data strengthening for AYII	15,000	30,000	60,000	105,000	150,000	360,000
2. Introduction of CCEs for yield estimation	10,000	20,000	40,000	70,000	100,000	240,000
3. Investment in weather data	8,000	16,000	32,000	56,000	80,000	192,000
3. farmer awareness and education	25,000	50,000	100,000	175,000	250,000	600,000
Sub-Total Other costs borne by Government	**58,000**	**116,000**	**232,000**	**406,000**	**580,000**	**1,392,000**
Total Costs of Government Support (US$)	**120,500**	**241,000**	**482,000**	**843,500**	**1,205,000**	**2,892,000**
Total Costs of Government Support (UGX Million)	452	904	1,808	3,163	4,519	10,845

AYII Cover for maize farmers in Uganda

Option 1.2. Low Farmer Uptake Rate and Medium Insured Yield coverage level of 65% to 75% of Average Area Yield

Insured Farmers, Area, Sum Insured and Prer	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	5,000	10,000	20,000	35,000	50,000	120,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	10,000	20,000	40,000	70,000	100,000	240,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	2,500,000	5,000,000	10,000,000	17,500,000	25,000,000	60,000,000
Premium rate %	7.5%	7.5%	7.5%	7.5%	7.5%	
Premium per hectare (US$/Ha)	18.8	18.8	18.8	18.8	18.8	
Total Premium (US$)	187,500	375,000	750,000	1,312,500	1,875,000	4,500,000
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**93,750**	**187,500**	**375,000**	**656,250**	**937,500**	**2,250,000**
Other Government Support (US$)						
1. Data strengthening for AYII	15,000	30,000	60,000	105,000	150,000	360,000
2. Introduction of CCEs for yield estimation	10,000	20,000	40,000	70,000	100,000	240,000
3. Investment in weather data	8,000	16,000	32,000	56,000	80,000	192,000
3. farmer awareness and education	25,000	50,000	100,000	175,000	250,000	600,000
Sub-Total Other costs borne by Government	**58,000**	**116,000**	**232,000**	**406,000**	**580,000**	**1,392,000**
Total Costs of Government Support (US$)	**151,750**	**303,500**	**607,000**	**1,062,250**	**1,517,500**	**3,642,000**
Total Costs of Government Support (UGX Million)	569	1,138	2,276	3,983	5,691	13,658

AYII Cover for maize farmers in Uganda

Option 1.3. Low farmer Uptake Rate and High Insured Yield coverage level of 75% to 85% of Average Area Yield

Insured Farmers, Area, Sum Insured and Prer	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	5,000	10,000	20,000	35,000	50,000	120,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	10,000	20,000	40,000	70,000	100,000	240,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	2,500,000	5,000,000	10,000,000	17,500,000	25,000,000	60,000,000
Premium rate %	10.0%	10.0%	10.0%	10.0%	10.0%	
Premium per hectare (US$/Ha)	25.0	25.0	25.0	25.0	25.0	
Total Premium (US$)	250,000	500,000	1,000,000	1,750,000	2,500,000	6,000,000
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**125,000**	**250,000**	**500,000**	**875,000**	**1,250,000**	**3,000,000**
Other Government Support (US$)						
1. Data strengthening for AYII	15,000	30,000	60,000	105,000	150,000	360,000
2. Introduction of CCEs for yield estimation	10,000	20,000	40,000	70,000	100,000	240,000
3. Investment in weather data	8,000	16,000	32,000	56,000	80,000	192,000
3. farmer awareness and education	25,000	50,000	100,000	175,000	250,000	600,000
Sub-Total Other costs borne by Government	**58,000**	**116,000**	**232,000**	**406,000**	**580,000**	**1,392,000**
Total Costs of Government Support (US$)	**183,000**	**366,000**	**732,000**	**1,281,000**	**1,830,000**	**4,392,000**
Total Costs of Government Support (UGX Million)	686	1,373	2,745	4,804	6,863	16,470

Source: World Bank Group.

Annex 4.2. Area Yield Index Insurance Five-Year Budget: Option 2—Medium Insurance Uptake (US$)

AYII Cover for maize farmers in Uganda

Option 2.1. Medium Farmer Uptake Rate and Low Insured Yield coverage level of 55% to 65% of Average Area Yield

Insured Farmers, Area, Sum Insured and P	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	25,000	50,000	100,000	150,000	200,000	525,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	50,000	100,000	200,000	300,000	400,000	1,050,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	12,500,000	25,000,000	50,000,000	75,000,000	100,000,000	262,500,000
Premium rate %	5.0%	5.0%	5.0%	5.0%	5.0%	
Premium per hectare (US$/Ha)	12.5	12.5	12.5	12.5	12.5	
Total Premium (US$)	625,000	1,250,000	2,500,000	3,750,000	5,000,000	13,125,000
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**312,500**	**625,000**	**1,250,000**	**1,875,000**	**2,500,000**	**6,562,500**
Other Government Support (US$)						
1. Data strengthening for AYII	75,000	150,000	300,000	450,000	600,000	1,575,000
2. Introduction of CCEs for yield estimation	50,000	100,000	200,000	300,000	400,000	1,050,000
3. Investment in weather data	40,000	80,000	160,000	240,000	320,000	840,000
3. farmer awareness and education	125,000	250,000	500,000	750,000	1,000,000	2,625,000
Sub-Total Other costs borne by Government	**290,000**	**580,000**	**1,160,000**	**1,740,000**	**2,320,000**	**6,090,000**
Total Costs of Government Support (US$)	**602,500**	**1,205,000**	**2,410,000**	**3,615,000**	**4,820,000**	**12,652,500**
Total Costs of Government Support (UGX Million)	2,259	4,519	9,038	13,556	18,075	47,447

AYII Cover for maize farmers in Uganda

Option 2.2. Medium Farmer Uptake Rate and Medium Insured Yield coverage level of 65% to 75% of Average Area Yield

Insured Farmers, Area, Sum Insured and P	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	25,000	50,000	100,000	150,000	200,000	525,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	50,000	100,000	200,000	300,000	400,000	1,050,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	12,500,000	25,000,000	50,000,000	75,000,000	100,000,000	262,500,000
Premium rate %	7.5%	7.5%	7.5%	7.5%	7.5%	
Premium per hectare (US$/Ha)	18.8	18.8	18.8	18.8	18.8	
Total Premium (US$)	937,500	1,875,000	3,750,000	5,625,000	7,500,000	19,687,500
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**468,750**	**937,500**	**1,875,000**	**2,812,500**	**3,750,000**	**9,843,750**
Other Government Support (US$)						
1. Data strengthening for AYII	75,000	150,000	300,000	450,000	600,000	1,575,000
2. Introduction of CCEs for yield estimation	50,000	100,000	200,000	300,000	400,000	1,050,000
3. Investment in weather data	40,000	80,000	160,000	240,000	320,000	840,000
3. farmer awareness and education	125,000	250,000	500,000	750,000	1,000,000	2,625,000
Sub-Total Other costs borne by Government	**290,000**	**580,000**	**1,160,000**	**1,740,000**	**2,320,000**	**6,090,000**
Total Costs of Government Support (US$)	**758,750**	**1,517,500**	**3,035,000**	**4,552,500**	**6,070,000**	**15,933,750**
Total Costs of Government Support (UGX Million)	2,845	5,691	11,381	17,072	22,763	59,752

AYII Cover for maize farmers in Uganda

Option 2.3. Medium Farmer Uptake Rate and High Insured Yield coverage level of 75% to 85% of Average Area Yield

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	25,000	50,000	100,000	150,000	200,000	525,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	50,000	100,000	200,000	300,000	400,000	1,050,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	12,500,000	25,000,000	50,000,000	75,000,000	100,000,000	262,500,000
Premium rate %	10.0%	10.0%	10.0%	10.0%	10.0%	
Premium per hectare (US$/Ha)	25.0	25.0	25.0	25.0	25.0	
Total Premium (US$)	1,250,000	2,500,000	5,000,000	7,500,000	10,000,000	26,250,000
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**625,000**	**1,250,000**	**2,500,000**	**3,750,000**	**5,000,000**	**13,125,000**
Other Government Support (US$)						
1. Data strengthening for AYII	75,000	150,000	300,000	450,000	600,000	1,575,000
2. Introduction of CCEs for yield estimation	50,000	100,000	200,000	300,000	400,000	1,050,000
3. Investment in weather data	40,000	80,000	160,000	240,000	320,000	840,000
3. farmer awareness and education	125,000	250,000	500,000	750,000	1,000,000	2,625,000
Sub-Total Other costs borne by Government	**290,000**	**580,000**	**1,160,000**	**1,740,000**	**2,320,000**	**6,090,000**
Total Costs of Government Support (US$)	**915,000**	**1,830,000**	**3,660,000**	**5,490,000**	**7,320,000**	**19,215,000**
Total Costs of Government Support (UGX Million)	3,431	6,863	13,725	20,588	27,450	72,056

Source: World Bank Group.

Annex 4.3. Area Yield Index Insurance Five-Year Budget: Option 3—High Insurance Uptake (US$)

AYII Cover for maize farmers in Uganda

Option 3.1. High Farmer Uptake rate and Low Insured Yield coverage level of 55% to 65% of Average Area Yield

Insured Farmers, Area, Sum Insured and Premium	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	50,000	100,000	200,000	300,000	400,000	1,050,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	100,000	200,000	400,000	600,000	800,000	2,100,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	25,000,000	50,000,000	100,000,000	150,000,000	200,000,000	525,000,000
Premium rate %	5.0%	5.0%	5.0%	5.0%	5.0%	
Premium per hectare (US$/Ha)	12.5	12.5	12.5	12.5	12.5	
Total Premium (US$)	1,250,000	2,500,000	5,000,000	7,500,000	10,000,000	26,250,000
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**625,000**	**1,250,000**	**2,500,000**	**3,750,000**	**5,000,000**	**13,125,000**
Other Government Support (US$)						
1. Data strengthening for AYII	150,000	300,000	600,000	900,000	1,200,000	3,150,000
2. Introduction of CCEs for yield estimation	100,000	200,000	400,000	600,000	800,000	2,100,000
3. Investment in weather data	80,000	160,000	320,000	480,000	640,000	1,680,000
3. farmer awareness and education	250,000	500,000	1,000,000	1,500,000	2,000,000	5,250,000
Sub-Total Other costs borne by Government	**580,000**	**1,160,000**	**2,320,000**	**3,480,000**	**4,640,000**	**12,180,000**
Total Costs of Government Support (US$)	**1,205,000**	**2,410,000**	**4,820,000**	**7,230,000**	**9,640,000**	**25,305,000**
Total Costs of Government Support (UGX Million)	4,519	9,038	18,075	27,113	36,150	94,894

AYII Cover for maize farmers in Uganda

Option 3.2. High Farmer Uptake rate and Medium Insured Yield coverage level of 65% to 75% of Average Area Yield

Insured Farmers, Area, Sum Insured and Premium	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	50,000	100,000	200,000	300,000	400,000	1,050,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	100,000	200,000	400,000	600,000	800,000	2,100,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	25,000,000	50,000,000	100,000,000	150,000,000	200,000,000	525,000,000
Premium rate %	7.5%	7.5%	7.5%	7.5%	7.5%	
Premium per hectare (US$/Ha)	18.8	18.8	18.8	18.8	18.8	
Total Premium (US$)	1,875,000	3,750,000	7,500,000	11,250,000	15,000,000	39,375,000
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**937,500**	**1,875,000**	**3,750,000**	**5,625,000**	**7,500,000**	**19,687,500**
Other Government Support (US$)						
1. Data strengthening for AYII	150,000	300,000	600,000	900,000	1,200,000	3,150,000
2. Introduction of CCEs for yield estimation	100,000	200,000	400,000	600,000	800,000	2,100,000
3. Investment in weather data	80,000	160,000	320,000	480,000	640,000	1,680,000
4. farmer awareness and education	250,000	500,000	1,000,000	1,500,000	2,000,000	5,250,000
Sub-Total Other costs borne by Government	**580,000**	**1,160,000**	**2,320,000**	**3,480,000**	**4,640,000**	**12,180,000**
Total Costs of Government Support (US$)	**1,517,500**	**3,035,000**	**6,070,000**	**9,105,000**	**12,140,000**	**31,867,500**
Total Costs of Government Support (UGX Million)	5,691	11,381	22,763	34,144	45,525	119,503

AYII Cover for maize farmers in Uganda

Option 3.3. High Farmer Uptake Rate and High Insured Yield coverage level of 75% to 85% of Average Area Yield

Insured Farmers, Area, Sum Insured and Premium	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Number of Insured farmers	50,000	100,000	200,000	300,000	400,000	1,050,000
Insured Crop Area per farmer (hectare)	2.0	2.0	2.0	2.0	2.0	
Insured Area (hectares)	100,000	200,000	400,000	600,000	800,000	2,100,000
Sum Insured per ha (US$)	250	250	250	250	250	
Total Sum Insured (US$)	25,000,000	50,000,000	100,000,000	150,000,000	200,000,000	525,000,000
Premium rate %	10.0%	10.0%	10.0%	10.0%	10.0%	
Premium per hectare (US$/Ha)	25.0	25.0	25.0	25.0	25.0	
Total Premium (US$)	2,500,000	5,000,000	10,000,000	15,000,000	20,000,000	52,500,000
Premium subsidy rate %	50%	50%	50%	50%	50%	
Premium Subsidy (US$)	**1,250,000**	**2,500,000**	**5,000,000**	**7,500,000**	**10,000,000**	**26,250,000**
Other Government Support (US$)						
1. Data strengthening for AYII	150,000	300,000	600,000	900,000	1,200,000	3,150,000
2. Introduction of CCEs for yield estimation	100,000	200,000	400,000	600,000	800,000	2,100,000
3. Investment in weather data	80,000	160,000	320,000	480,000	640,000	1,680,000
3. farmer awareness and education	250,000	500,000	1,000,000	1,500,000	2,000,000	5,250,000
Sub-Total Other costs borne by Government	**580,000**	**1,160,000**	**2,320,000**	**3,480,000**	**4,640,000**	**12,180,000**
Total Costs of Government Support (US$)	**1,830,000**	**3,660,000**	**7,320,000**	**10,980,000**	**14,640,000**	**38,430,000**
Total Costs of Government Support (UGX Million)	6,863	13,725	27,450	41,175	54,900	144,113

Source: World Bank Group.

Annex 5.1. Satellite NDVI Pasture Drought Index Insurance for Livestock: Voluntary Cover and Partial Premium Subsidies for Five-Year Uptake Plan and Financial Budget (Low, Medium, and High Uptake Projections) and Low 10% Premium Rate (US$)

LOW UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	1,250	1,250	2,500	3,750	5,000	6,250	18,750
Total Number of Insured Livestock Units	5	6,250	12,500	18,750	25,000	31,250	93,750
Sum Insured (US$)	96	600,000	1,200,000	1,800,000	2,400,000	3,000,000	9,000,000
Indicative Commercial Premium Rate/Premium (US$)	10.00%	60,000	120,000	180,000	240,000	300,000	900,000
Premium Subsidy level/ Premium Subsidy (US$)	50.00%	30,000	60,000	90,000	120,000	150,000	450,000

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	12,500	25,000	37,500	50,000	62,500	187,500
2. Farmer awareness, education and training (US$/Producer)	10.0	12,500	25,000	37,500	50,000	62,500	187,500
Sub-Total Start-up & Operating Expenses Support (US$)		25,000	50,000	75,000	100,000	125,000	375,000
Total Costs of Financial Support to Livestock Insurance (US$)		55,000	110,000	165,000	220,000	275,000	825,000
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		206	413	619	825	1,031	3,094

MEDIUM UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	2,500	2,500	5,000	7,500	10,000	12,500	37,500
Total Number of Insured Livestock Units	5	12,500	25,000	37,500	50,000	62,500	187,500
Sum Insured (US$)	96	1,200,000	2,400,000	3,600,000	4,800,000	6,000,000	18,000,000
Indicative Commercial Premium Rate/Premium (US$)	10.00%	120,000	240,000	360,000	480,000	600,000	1,800,000
Premium Subsidy level/ Premium Subsidy (US$)	50.00%	60,000	120,000	180,000	240,000	300,000	900,000

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	25,000	50,000	75,000	100,000	125,000	375,000
2. Farmer awareness, education and training (US$/Producer)	10.0	25,000	50,000	75,000	100,000	125,000	375,000
Sub-Total Start-up & Operating Expenses Support (US$)		50,000	100,000	150,000	200,000	250,000	750,000
Total Costs of Financial Support to Livestock Insurance (US$)		110,000	220,000	330,000	440,000	550,000	1,650,000
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		413	825	1,238	1,650	2,063	6,188

HIGH UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	5,000	5,000	10,000	15,000	20,000	25,000	75,000
Number of Insured Livestock Units per Insured	5	25,000	50,000	75,000	100,000	125,000	375,000
Sum Insured (US$)	96	2,400,000	4,800,000	7,200,000	9,600,000	12,000,000	36,000,000
Indicative Commercial Premium Rate/Premium (US$)	10.00%	240,000	480,000	720,000	960,000	1,200,000	3,600,000
Premium Subsidy level/ Premium Subsidy (US$)	50.00%	120,000	240,000	360,000	480,000	600,000	1,800,000

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	50,000	100,000	150,000	200,000	250,000	750,000
2. Farmer awareness, education and training (US$/Producer)	10.0	50,000	100,000	150,000	200,000	250,000	750,000
Sub-Total Start-up & Operating Expenses Support (US$)		100,000	200,000	300,000	400,000	500,000	1,500,000
Total Costs of Financial Support to Livestock Insurance (US$)		220,000	440,000	660,000	880,000	1,100,000	3,300,000
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		825	1,650	2,475	3,300	4,125	12,375

Source: World Bank Group.

Note: The 10% indicative premium rate is for a major payout once in 10–12 years.

Annex 5.2. Satellite NDVI Pasture Drought Index Insurance for Livestock: Voluntary Cover and Partial Premium Subsidies for Five-Year Uptake Plan and Financial Budget (Low, Medium, and High Uptake Projections) with Medium 15% Premium Rate (US$)

LOW UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	1,250	1,250	2,500	3,750	5,000	6,250	18,750
Total Number of Insured Livestock Units	5	6,250	12,500	18,750	25,000	31,250	93,750
Sum Insured (US$)	96	600,000	1,200,000	1,800,000	2,400,000	3,000,000	9,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	90,000	180,000	270,000	360,000	450,000	1,350,000
Premium Subsidy level/ Premium Subsidy (US$)	**50.00%**	**45,000**	**90,000**	**135,000**	**180,000**	**225,000**	**675,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	12,500	25,000	37,500	50,000	62,500	187,500
2. Farmer awareness, education and training (US$/Producer)	10.0	12,500	25,000	37,500	50,000	62,500	187,500
Sub-Total Start-up & Operating Expenses Support (US$)		**25,000**	**50,000**	**75,000**	**100,000**	**125,000**	**375,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**70,000**	**140,000**	**210,000**	**280,000**	**350,000**	**1,050,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**263**	**525**	**788**	**1,050**	**1,313**	**3,938**

MEDIUM UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	2,500	2,500	5,000	7,500	10,000	12,500	37,500
Total Number of Insured Livestock Units	5	12,500	25,000	37,500	50,000	62,500	187,500
Sum Insured (US$)	96	1,200,000	2,400,000	3,600,000	4,800,000	6,000,000	18,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	180,000	360,000	540,000	720,000	900,000	2,700,000
Premium Subsidy level/ Premium Subsidy (US$)	**50.00%**	**90,000**	**180,000**	**270,000**	**360,000**	**450,000**	**1,350,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	25,000	50,000	75,000	100,000	125,000	375,000
2. Farmer awareness, education and training (US$/Producer)	10.0	25,000	50,000	75,000	100,000	125,000	375,000
Sub-Total Start-up & Operating Expenses Support (US$)		**50,000**	**100,000**	**150,000**	**200,000**	**250,000**	**750,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**140,000**	**280,000**	**420,000**	**560,000**	**700,000**	**2,100,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**525**	**1,050**	**1,575**	**2,100**	**2,625**	**7,875**

HIGH UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	5,000	5,000	10,000	15,000	20,000	25,000	75,000
Number of Insured Livestock Units per Insured	5	25,000	50,000	75,000	100,000	125,000	375,000
Sum Insured (US$)	96	2,400,000	4,800,000	7,200,000	9,600,000	12,000,000	36,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	360,000	720,000	1,080,000	1,440,000	1,800,000	5,400,000
Premium Subsidy level/ Premium Subsidy (US$)	**50.00%**	**180,000**	**360,000**	**540,000**	**720,000**	**900,000**	**2,700,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	50,000	100,000	150,000	200,000	250,000	750,000
2. Farmer awareness, education and training (US$/Producer)	10.0	50,000	100,000	150,000	200,000	250,000	750,000
Sub-Total Start-up & Operating Expenses Support (US$)		**100,000**	**200,000**	**300,000**	**400,000**	**500,000**	**1,500,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**280,000**	**560,000**	**840,000**	**1,120,000**	**1,400,000**	**4,200,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**1,050**	**2,100**	**3,150**	**4,200**	**5,250**	**15,750**

Source: World Bank Group.

Note: The 15% indicative premium rate is for a major payout once in five to seven years.

Annex 5.3. Satellite NDVI Pasture Drought Index Insurance for Livestock: Voluntary Cover and Partial Premium Subsidies for Five-Year Uptake Plan and Financial Budget (Low, Medium, and High Uptake Projections) and High 20% Premium Rate (US$)

LOW UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	1,250	1,250	2,500	3,750	5,000	6,250	18,750
Total Number of Insured Livestock Units	5	6,250	12,500	18,750	25,000	31,250	93,750
Sum Insured (US$)	96	600,000	1,200,000	1,800,000	2,400,000	3,000,000	9,000,000
Indicative Commercial Premium Rate/Premium (US$)	20.00%	120,000	240,000	360,000	480,000	600,000	1,800,000
Premium Subsidy level/ Premium Subsidy (US$)	50.00%	**60,000**	**120,000**	**180,000**	**240,000**	**300,000**	**900,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	12,500	25,000	37,500	50,000	62,500	187,500
2. Farmer awareness, education and training (US$/Producer)	10.0	12,500	25,000	37,500	50,000	62,500	187,500
Sub-Total Start-up & Operating Expenses Support (US$)		**25,000**	**50,000**	**75,000**	**100,000**	**125,000**	**375,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**85,000**	**170,000**	**255,000**	**340,000**	**425,000**	**1,275,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**319**	**638**	**956**	**1,275**	**1,594**	**4,781**

MEDIUM UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	2,500	2,500	5,000	7,500	10,000	12,500	37,500
Total Number of Insured Livestock Units	5	12,500	25,000	37,500	50,000	62,500	187,500
Sum Insured (US$)	96	1,200,000	2,400,000	3,600,000	4,800,000	6,000,000	18,000,000
Indicative Commercial Premium Rate/Premium (US$)	20.00%	240,000	480,000	720,000	960,000	1,200,000	3,600,000
Premium Subsidy level/ Premium Subsidy (US$)	50.00%	**120,000**	**240,000**	**360,000**	**480,000**	**600,000**	**1,800,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	25,000	50,000	75,000	100,000	125,000	375,000
2. Farmer awareness, education and training (US$/Producer)	10.0	25,000	50,000	75,000	100,000	125,000	375,000
Sub-Total Start-up & Operating Expenses Support (US$)		**50,000**	**100,000**	**150,000**	**200,000**	**250,000**	**750,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**170,000**	**340,000**	**510,000**	**680,000**	**850,000**	**2,550,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**638**	**1,275**	**1,913**	**2,550**	**3,188**	**9,563**

HIGH UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	5,000	5,000	10,000	15,000	20,000	25,000	75,000
Number of Insured Livestock Units per Insured	5	25,000	50,000	75,000	100,000	125,000	375,000
Sum Insured (US$)	96	2,400,000	4,800,000	7,200,000	9,600,000	12,000,000	36,000,000
Indicative Commercial Premium Rate/Premium (US$)	20.00%	480,000	960,000	1,440,000	1,920,000	2,400,000	7,200,000
Premium Subsidy level/ Premium Subsidy (US$)	50.00%	**240,000**	**480,000**	**720,000**	**960,000**	**1,200,000**	**3,600,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	50,000	100,000	150,000	200,000	250,000	750,000
2. Farmer awareness, education and training (US$/Producer)	10.0	50,000	100,000	150,000	200,000	250,000	750,000
Sub-Total Start-up & Operating Expenses Support (US$)		**100,000**	**200,000**	**300,000**	**400,000**	**500,000**	**1,500,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**340,000**	**680,000**	**1,020,000**	**1,360,000**	**1,700,000**	**5,100,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**1,275**	**2,550**	**3,825**	**5,100**	**6,375**	**19,125**

Source: World Bank Group.

Note: The 20% indicative premium rate is for a major payout once in three to five years.

Annex 6.1. Satellite NDVI Pasture Drought Index Insurance for Livestock: Automatic Livelihoods Protection Cover and Full Premium Subsidies for Five-Year Uptake Plan and Financial Budget (Low, Medium, and High Uptake Projections) with Low 10% Premium Rate (US$)

LOW UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	5,000	5,000	10,000	15,000	20,000	25,000	75,000
Total Number of Insured Livestock Units	5	25,000	50,000	75,000	100,000	125,000	375,000
Sum Insured (US$)	96	2,400,000	4,800,000	7,200,000	9,600,000	12,000,000	36,000,000
Indicative Commercial Premium Rate/Premium (US$)	10.00%	240,000	480,000	720,000	960,000	1,200,000	3,600,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**240,000**	**480,000**	**720,000**	**960,000**	**1,200,000**	**3,600,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	50,000	100,000	150,000	200,000	250,000	750,000
2. Farmer awareness, education and training (US$/Producer)	10	50,000	100,000	150,000	200,000	250,000	750,000
Sub-Total Start-up & Operating Expenses Support (US$)		**100,000**	**200,000**	**300,000**	**400,000**	**500,000**	**1,500,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**340,000**	**680,000**	**1,020,000**	**1,360,000**	**1,700,000**	**5,100,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**1,275**	**2,550**	**3,825**	**5,100**	**6,375**	**19,125**

MEDIUM UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	20,000	20,000	40,000	60,000	80,000	100,000	300,000
Total Number of Insured Livestock Units	5	100,000	200,000	300,000	400,000	500,000	1,500,000
Sum Insured (US$)	96	9,600,000	19,200,000	28,800,000	38,400,000	48,000,000	144,000,000
Indicative Commercial Premium Rate/Premium (US$)	10.00%	960,000	1,920,000	2,880,000	3,840,000	4,800,000	14,400,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**960,000**	**1,920,000**	**2,880,000**	**3,840,000**	**4,800,000**	**14,400,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	200,000	400,000	600,000	800,000	1,000,000	3,000,000
2. Farmer awareness, education and training (US$/Producer)	10	200,000	400,000	600,000	800,000	1,000,000	3,000,000
Sub-Total Start-up & Operating Expenses Support (US$)		**400,000**	**800,000**	**1,200,000**	**1,600,000**	**2,000,000**	**6,000,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**1,360,000**	**2,720,000**	**4,080,000**	**5,440,000**	**6,800,000**	**20,400,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**5,100**	**10,200**	**15,300**	**20,400**	**25,500**	**76,500**

HIGH UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	30,000	30,000	60,000	90,000	120,000	150,000	450,000
Number of Insured Livestock Units per Insured	5	150,000	300,000	450,000	600,000	750,000	2,250,000
Sum Insured (US$)	96	14,400,000	28,800,000	43,200,000	57,600,000	72,000,000	216,000,000
Indicative Commercial Premium Rate/Premium (US$)	10.00%	1,440,000	2,880,000	4,320,000	5,760,000	7,200,000	21,600,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**1,440,000**	**2,880,000**	**4,320,000**	**5,760,000**	**7,200,000**	**21,600,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	300,000	600,000	900,000	1,200,000	1,500,000	4,500,000
2. Farmer awareness, education and training (US$/Producer)	10	300,000	600,000	900,000	1,200,000	1,500,000	4,500,000
Sub-Total Start-up & Operating Expenses Support (US$)		**600,000**	**1,200,000**	**1,800,000**	**2,400,000**	**3,000,000**	**9,000,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**2,040,000**	**4,080,000**	**6,120,000**	**8,160,000**	**10,200,000**	**30,600,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**7,650**	**15,300**	**22,950**	**30,600**	**38,250**	**114,750**

Source: World Bank Group.

Note: The 10% indicative premium rate is for a major payout once in 10 to 12 years.

Annex 6.2. Satellite NDVI Pasture Drought Index Insurance for Livestock: Automatic Livelihoods Protection Cover and Full Premium Subsidies for Five-Year Uptake Plan and Financial Budget (Low, Medium, and High Uptake Projections) and Medium 15% Premium Rate (US$)

LOW UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	5,000	5,000	10,000	15,000	20,000	25,000	75,000
Total Number of Insured Livestock Units	5	25,000	50,000	75,000	100,000	125,000	375,000
Sum Insured (US$)	96	2,400,000	4,800,000	7,200,000	9,600,000	12,000,000	36,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	360,000	720,000	1,080,000	1,440,000	1,800,000	5,400,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**360,000**	**720,000**	**1,080,000**	**1,440,000**	**1,800,000**	**5,400,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	50,000	100,000	150,000	200,000	250,000	750,000
2. Farmer awareness, education and training (US$/Producer)	10	50,000	100,000	150,000	200,000	250,000	750,000
Sub-Total Start-up & Operating Expenses Support (US$)		**100,000**	**200,000**	**300,000**	**400,000**	**500,000**	**1,500,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**460,000**	**920,000**	**1,380,000**	**1,840,000**	**2,300,000**	**6,900,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**1,725**	**3,450**	**5,175**	**6,900**	**8,625**	**25,875**

MEDIUM UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	20,000	20,000	40,000	60,000	80,000	100,000	300,000
Total Number of Insured Livestock Units	5	100,000	200,000	300,000	400,000	500,000	1,500,000
Sum Insured (US$)	96	9,600,000	19,200,000	28,800,000	38,400,000	48,000,000	144,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	1,440,000	2,880,000	4,320,000	5,760,000	7,200,000	21,600,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**1,440,000**	**2,880,000**	**4,320,000**	**5,760,000**	**7,200,000**	**21,600,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	200,000	400,000	600,000	800,000	1,000,000	3,000,000
2. Farmer awareness, education and training (US$/Producer)	10	200,000	400,000	600,000	800,000	1,000,000	3,000,000
Sub-Total Start-up & Operating Expenses Support (US$)		**400,000**	**800,000**	**1,200,000**	**1,600,000**	**2,000,000**	**6,000,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**1,840,000**	**3,680,000**	**5,520,000**	**7,360,000**	**9,200,000**	**27,600,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**6,900**	**13,800**	**20,700**	**27,600**	**34,500**	**103,500**

HIGH UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	30,000	30,000	60,000	90,000	120,000	150,000	450,000
Number of Insured Livestock Units per Insured	5	150,000	300,000	450,000	600,000	750,000	2,250,000
Sum Insured (US$)	96	14,400,000	28,800,000	43,200,000	57,600,000	72,000,000	216,000,000
Indicative Commercial Premium Rate/Premium (US$)	15.00%	2,160,000	4,320,000	6,480,000	8,640,000	10,800,000	32,400,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**2,160,000**	**4,320,000**	**6,480,000**	**8,640,000**	**10,800,000**	**32,400,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	300,000	600,000	900,000	1,200,000	1,500,000	4,500,000
2. Farmer awareness, education and training (US$/Producer)	10	300,000	600,000	900,000	1,200,000	1,500,000	4,500,000
Sub-Total Start-up & Operating Expenses Support (US$)		**600,000**	**1,200,000**	**1,800,000**	**2,400,000**	**3,000,000**	**9,000,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**2,760,000**	**5,520,000**	**8,280,000**	**11,040,000**	**13,800,000**	**41,400,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**10,350**	**20,700**	**31,050**	**41,400**	**51,750**	**155,250**

Source: World Bank Group.

Note: The 15% indicative premium rate is for a major payout once in five to seven years.

Annex 6.3. Satellite NDVI Pasture Drought Index Insurance for Livestock: Automatic Livelihoods Protection Cover and Full Premium Subsidies for Five-Year Uptake Plan and Financial Budget (Low, Medium, and High Uptake Projections) with High 20% Premium Rate (US$)

LOW UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	5,000	5,000	10,000	15,000	20,000	25,000	75,000
Total Number of Insured Livestock Units	5	25,000	50,000	75,000	100,000	125,000	375,000
Sum Insured (US$)	96	2,400,000	4,800,000	7,200,000	9,600,000	12,000,000	36,000,000
Indicative Commercial Premium Rate/Premium (US$)	20.00%	480,000	960,000	1,440,000	1,920,000	2,400,000	7,200,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**480,000**	**960,000**	**1,440,000**	**1,920,000**	**2,400,000**	**7,200,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	50,000	100,000	150,000	200,000	250,000	750,000
2. Farmer awareness, education and training (US$/Producer)	10	50,000	100,000	150,000	200,000	250,000	750,000
Sub-Total Start-up & Operating Expenses Support (US$)		**100,000**	**200,000**	**300,000**	**400,000**	**500,000**	**1,500,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**580,000**	**1,160,000**	**1,740,000**	**2,320,000**	**2,900,000**	**8,700,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**2,175**	**4,350**	**6,525**	**8,700**	**10,875**	**32,625**

MEDIUM UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	20,000	20,000	40,000	60,000	80,000	100,000	300,000
Total Number of Insured Livestock Units	5	100,000	200,000	300,000	400,000	500,000	1,500,000
Sum Insured (US$)	96	9,600,000	19,200,000	28,800,000	38,400,000	48,000,000	144,000,000
Indicative Commercial Premium Rate/Premium (US$)	20.00%	1,920,000	3,840,000	5,760,000	7,680,000	9,600,000	28,800,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**1,920,000**	**3,840,000**	**5,760,000**	**7,680,000**	**9,600,000**	**28,800,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	200,000	400,000	600,000	800,000	1,000,000	3,000,000
2. Farmer awareness, education and training (US$/Producer)	10	200,000	400,000	600,000	800,000	1,000,000	3,000,000
Sub-Total Start-up & Operating Expenses Support (US$)		**400,000**	**800,000**	**1,200,000**	**1,600,000**	**2,000,000**	**6,000,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**2,320,000**	**4,640,000**	**6,960,000**	**9,280,000**	**11,600,000**	**34,800,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**8,700**	**17,400**	**26,100**	**34,800**	**43,500**	**130,500**

HIGH UPTAKE PROJECTIONS: LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY AND O&A EXPENSE BUDGET

LIVESTOCK PASTURE DROUGHT NDVI INSURANCE EXPANSION PLAN AND PREMIUM SUBSIDY BUDGET

ExpansionPlan and Budget	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
		1	2	3	4	5	
Number Insured Smallholder Livestock Producers	30,000	30,000	60,000	90,000	120,000	150,000	450,000
Number of Insured Livestock Units per Insured	5	150,000	300,000	450,000	600,000	750,000	2,250,000
Sum Insured (US$)	96	14,400,000	28,800,000	43,200,000	57,600,000	72,000,000	216,000,000
Indicative Commercial Premium Rate/Premium (US$)	20.00%	2,880,000	5,760,000	8,640,000	11,520,000	14,400,000	43,200,000
Premium Subsidy level/ Premium Subsidy (US$)	**100.00%**	**2,880,000**	**5,760,000**	**8,640,000**	**11,520,000**	**14,400,000**	**43,200,000**

OTHER AREAS OF GOVERNMENT OF UGANDA SUPPORT FOR LIVESTOCK NDVI INSURANCE FOR SMALLHOLDER LIVESTOCK PRODUCERS

Support to Start up and Operational costs	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1. Electronic Registration of Livestock Producers (US$/Livestock Unit)	2.0	300,000	600,000	900,000	1,200,000	1,500,000	4,500,000
2. Farmer awareness, education and training (US$/Producer)	10	300,000	600,000	900,000	1,200,000	1,500,000	4,500,000
Sub-Total Start-up & Operating Expenses Support (US$)		**600,000**	**1,200,000**	**1,800,000**	**2,400,000**	**3,000,000**	**9,000,000**
Total Costs of Financial Support to Livestock Insurance (US$)		**3,480,000**	**6,960,000**	**10,440,000**	**13,920,000**	**17,400,000**	**52,200,000**
Total Costs of Financial Support to Livestock Insurance (UGX Milion)		**13,050**	**26,100**	**39,150**	**52,200**	**65,250**	**195,750**

Source: World Bank Group.

Note: The 20% indicative premium rate is for a major payout once in three to five years.

This report was co-financed by the United States Agency for International Development (USAID) and the European Union (EU)—funded Africa Disaster Risk Financing (ADRF) Initiative, managed by the Global Facility for Disaster Reduction and Recovery (GFDRR).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