

Platform
for Agricultural
Risk Management

Managing risks
to improve farmers'
livelihoods

Implementation



Uganda Final Report

In collaboration with



MINISTRY OF AGRICULTURE,
ANIMAL INDUSTRY & FISHERIES

**Holistic approach
to risk management:
new opportunities
for investment in agriculture**



May 2017





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MANAGEMENT

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Foreword

The Platform for Agricultural Risk Management (PARM), a G8-G20 initiative hosted by the International Fund for Agricultural Development (IFAD), is a multi-donor partnership co-financed by the European Commission (EC), Agence française de Développement (Afd), Italian Cooperation Agency and the International Fund for Agricultural Development (IFAD), to support Governments and stakeholders on Agricultural Risk Management (ARM). The Platform works in strategic partnership with NEPAD / CAADP in African countries to mainstream agricultural risk management into the national agricultural policy and investment plans (www.p4arm.org). The German Ministry of Agriculture through KfW also funds ARM investments by NEPAD. Current work supports ARM assessment and policy process in Cabo Verde, Cameroon, Ethiopia, Liberia, Niger, Senegal, Uganda and Zambia.

The Government of Uganda, through the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), has been actively engaged, at least since 2011, in a process to mainstream Agricultural Risk Management (ARM) into its policy framework and to develop investment plans for its stakeholders. PARM, in partnership with NEPAD and other development actors, has supported the Government in strengthening this ARM process through a holistic approach. The results of this partnership have created risk assessment and management capacities, and developed promising ARM tools investment proposals which aim at creating new opportunities to boost investment in Ugandan agriculture.

This report collects the main outcomes of each of the phase of this joint process starting from the prioritization of risks, assessment of the right tools, development of capacities and identification of specific tools for investment. The report also contains specific proposals to invest in plant health control, improving information systems for ARM and finance, and creating ARM capacities for extension services.

The report is structured into 6 sessions: (i) an introductory session that summarizes the main achievements, the process timeline along with the main milestones and the way forward; (ii) a session focused on the risk assessment phase and the prioritization of risks in Uganda; (iii) a session on the assessment of tools such as information systems and warehouse receipt; (iv) specific session on the plant health control study and (v) on finance and information for ARM proposal; finally, (vi) a session on capacity development for ARM in Uganda strategy and concept note. The reports provides an executive summary of the main reports, which full studies and background reports are available on PARM website www.p4arm.org.

The Government of Uganda and, in particular, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), has largely contributed to all the studies supported by PARM and has been the leading partner of all the work undertaken on Agricultural Risk Management during the last few years. The partnership with the College of Agricultural and Environmental Sciences of Makerere University has been extremely fruitful in many phases of the process. Many other development partners, stakeholders, experts and institutions have also participated in different moments and aspects of the process and they are recognized in the different documentation that supports this work.



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List of acronyms

AC	Advisory Committee
AFD	Agence Française de Development
AFIRM	Agriculture and Food Insecurity Risk Management
AFRACA	African Rural and Agricultural Credit Association
ARM	Agricultural Risk Management
ARMT	Agricultural Risk Management Team
ASDP	Agriculture Sector Development Plan
ASSP	Agricultural Sector Strategic Plan
ATAAS	Agricultural Technology and Agribusiness Advisory Services
AU	African Union
BMZ	The Federal Ministry for Economic Cooperation and Development
CAADP	Comprehensive Africa Agriculture Development Programme
CABI	Centre for Agriculture and Biosciences International
CD	Capacity Development
CEIGRAM	Centro de Estudios e Investigación para la Gestión de Riesgos Agrarios y Medioambientales
DGCS	Direzione Generale Cooperazione allo Sviluppo (Italian Development Cooperation)
DRMFSS	Disaster Risk Management and Food Security Sector
DSIP-II	Development Strategy and Investment Plan
EC	European Commission
EU	European Union
EWS	Early Warning System
FAO	Food and Agriculture Organization
FARM-D	Forum for Agricultural Risk Management in Development
FIRM	Financial Information and Risk Management
GoU	Government of Uganda
KfW	Kreditanstalt für Wiederaufbau (KfW Development Bank)
KM	Knowledge Management
LDCs	Least Developed Countries
LMICs	Low and Middle Income Countries
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MFI	Monetary Financial Institutions
MoA	Ministry of Agriculture
NAFSIP	National Agriculture and Food Security Investment Plan
NDCs	Nationally Determined Contributions
NDIP	National Development Investment Plan
NEPAD	The New Partnership for Africa's Development
NGOs	Non-governmental Organizations
NSC	National Steering Committee
PARM	Platform for Agricultural Risk Management
PPP	Private-public partnership
PTA	Policy and Technical Advisory Division
RAS	Risk Assessment Study
RECs	Regional Economic Communities
SC	Steering Committee
TORs	Terms of Reference
UCA	Uganda Cooperative Alliance
UN	United Nations
WB	World Bank
WFP	World Food Programme
WRS	Warehouse receipt study



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Overview

1. Main Achievements in Uganda

In Uganda the agricultural sector represents 23% of GDP, 54% of exports and 70% of the employment. The economy and the rural poor are particularly vulnerable to agricultural risks that can generate economic losses of 3% of its GDP every year. It is not surprising that the Government of Uganda was one of the first to express interest on agriculture risk assessment work to identify its risk management priorities in agriculture.

An Agricultural Risk Management (ARM) workshop co-organized in late 2013 by the Ministry of Agriculture and Animal Industry and Fisheries (MAAIF) with FAO and NEPAD in Kampala was an early milestone in a process to enhance Agricultural Risk Management (ARM) policies and tools in Uganda. The process became structured and intense with the establishment of the Secretariat of the Platform for Agricultural Risk Management (PARM) in IFAD in late 2014 that facilitated a closest partnership with the Government of Uganda and other stakeholders in the country including FAO, WFP and development partners.

PARM is a G20 initiative hosted in IFAD and working on mainstreaming ARM into agricultural policy and investment plans. The PARM process is a participatory policy engagement process and it is comprised of three main phases: (i) a risk assessment phase that focuses on the assessment and identification of risks and risk management gaps with an holistic approach which is validated by a National Stakeholder Workshop; (ii) a tools assessment phase that analyses their feasibility and proposes specific investment plans discussed and validated in a High Level Policy Dialogue and Dissemination Workshop, which also represents the end of the PARM process; finally (iii) the implementation phase that consists in integrating the identified tools into the national policy and implement the identified tools for investment by the government and partners. PARM had its first Risk Assessment Validation Workshop in June 2015 and its final high level dissemination workshop in November 2016. Uganda has become the first country to accomplish all the phases of the PARM process. This is just the starting point for a longer term process of mainstreaming ARM in agriculture in Uganda to be led by the Government in collaboration with stakeholders and development partners.

What has PARM achieved in cooperation with NEPAD and the Government of Uganda?

1.1. Bringing Risk Management to the core of development and agricultural policies

The first achievement of PARM has been raising the awareness about the importance to manage properly agricultural risks, having a more accurate perception of the relative size of these risks. The key message that investing in ARM is the only way to boost investment and growth in this crucial sector has been discussed and disseminated. As a result, the Government of Uganda, with the support of PARM under the CAADP framework and in consultation with the National Steering Committee, already integrated PARM analysis and ARM policies into its Agriculture Sector Development Plan (ASDP). This early achievement and commitment to ARM was a milestone that was followed by further discussion and definition of priorities.

1.2. Assessing Agricultural Risks in Uganda: bringing evidence to improve risk perception

Many participants in the PARM risk assessment workshop perceived before the meeting that droughts were the main risk in Uganda. These perceptions were confronted to evidence from data and analysis of costs and frequency of risks at country level collected and developed during the PARM risk assessment study. During this process, Uganda's stakeholders from government, farmers and private sector converged to a common prioritization of risks and ARM tools. Crop pest and diseases were found as the main source of losses with very high average severity and frequency, and potential large losses in the case of an extreme scenario. Post-harvest losses and price risk followed as main risks in terms of their quantitative impact. Droughts have large severity and frequency but only in the Northern and Eastern regions of the country which of course, deserves regional policy attention. PARM analysis and consultations with stakeholders served to match risk perceptions with statistical evidence.

Table 1: Ranking of most severe agricultural risks in Uganda

Risk	Average Severity	Average Frequency	Worst Case Scenario	Score
Crop pest & diseases	● VERY HIGH	● VERY HIGH	● VERY HIGH	5.00
Post harvest loss	● VERY HIGH	● VERY HIGH	● HIGH	4.75
Price risk food & cash crops	● VERY HIGH	● HIGH	● HIGH	4.35
Livestock pest & diseases	● HIGH	● VERY HIGH	● MEDIUM	4.10
Droughts	● MEDIUM	● MEDIUM	● VERY HIGH	3.50
Counterfeit inputs	● MEDIUM	● VERY HIGH	● LOW	3.40
Karamoja cattle raids	● 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) Agricultural Risk Assessment Study of Uganda

PARM Risk Assessment study of Uganda was presented and discussed in several fora including the PARM workshops and seminars, but also in the monthly meeting of the Agricultural working group of donors in Kampala, and in the African Day for Food and Nutrition Security. The Government of Uganda as main organizer of this last event invited PARM to make a presentation and a panel discussion focused on this report that has become a reference on agricultural risk assessment.

1.3. Developing ARM capacity to enhance partnerships

From its early stage, a first priority for PARM in Uganda has been to contribute to create capacities on risk assessment and risk management among government officials and farmers' representatives and service providers. The ARM holistic approach is an innovative way of thinking about agricultural development and it requires raising awareness and creating capacities. The first PARM capacity development seminar in Kampala in 2015 focused on government officials and regional representatives. Following the demands from the Government and stakeholders, a second seminar took place in Mbale focused more on local farmers and advisors. Both seminars were organized in partnership with the MAAIF and Makerere University, engaging with academics that could give continuity to ARM capacity development in Uganda. Providing this continuity and reaching the broad extension services, that are under reform in Uganda, became one of the ARM investment priorities to be supported by PARM.

PARM met with the ARM National ARM Steering Committee in 2014, 2015 and 2016. The discussions with stakeholders and with the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) through this committee and through other discussions brought a consensus towards the priority areas for PARM in Uganda. These areas included: i) Plant Health, responding to the first priority risk identified during the risk assessment phase; ii) Information on markets and other risks and Access to Finance, as a response to price risks and farmers' access to information priorities; and (iii) creating farm advisory capacities on ARM, responding to the needs and demands expressed and identified along all phases of the PARM process. Three feasibility studies or proposals have been developed focused on these three areas in collaboration with the government and the best experts on each matter.

1.4. Investing on priorities for better agricultural risk management tools

The elaboration of these proposals benefited from two PARM technical meetings in Kampala with local and international experts and key stakeholders. A first seminar focused on information systems and presented the draft PARM report on "Information Systems for ARM in Uganda". The issue of accessibility for farmers and the link to risk assessment tools and financial institutions came up as a priority together with plant health information. A second technical

meeting took place in Kampala led by the Centre for Agriculture and Biosciences International (CABI), a leading institution on plant health and development. This meeting served to engage with the plant protection unit in MAAIF and to define the priorities of the proposal.

1. Under the support of PARM, CABI has developed a comprehensive **Plant Health Investment plan** for Uganda of USD 24 million in five years to upgrade the Ugandan Plant Pest management system and make it sustainable. This plan has three pillars: (i) building cost-efficient information systems to detect and monitor plant pests and diseases and providing timely information for a rapid response; (ii) improving the access to pest management services by smallholders and other value chain actors; and (iii) strengthening the capacity of the Government, mainly MAAIF, to monitor analyse and combat the threat of plant pests and diseases. The proposal builds on existing programmes and plans by MAAIF and other development partners. Pests do not stop at administrative or national borders, which requires a holistic approach that includes coordinating at regional and international level on One Health for plants, animals and humans.
2. An innovative public-private partnership to enhance access to information and risk analysis for farmers and their service providers was developed by FIT Uganda as a private agri-business consultant and developer, and AgriRiskAnalyser as a developer of a risk assessment software solution. The proposal is called **Financial Information and Risk Management (FIRM)** and foresees to complement a private information system for financial institutions, service providers and farmers with two important innovations. First a risk analysis tool that is able to provide risk profiles of farmers in a holistic manner, combining farmer business information with information about climate, market and disease risk exposure. Second, a partnership between the private and the public sector to make the system accessible to farmers and government officials, and to make it financially sustainable. The objective of the partnership is to exploit and enhance the linkages with the offer of financial, inputs and other services. The tool will also be used to improve the access to risk information by the government and as a pedagogical material for ARM training.
3. A partnership on ARM capacity building with **Makerere University and the extension services of MAAIF** has been developed with the support of PARM. This initiative foresees the investment on a pool of knowledge and expertise to be hosted in the leading agricultural Academic institution in Uganda (Makerere University) and the use of this pool to provide trainings on a holistic Agricultural Risk Management in particular to the extension services and services providers for farmers. This pool will put together expertise from different institutions and experts nationally and internationally. The partnership is being extended between Makerere University and MAAIF to provide ARM training to new and existing extension workers. The programme will be offered more generally to other service providers and organisations and it is planned to mainstream it in the curriculum of regular university degrees.

1.5. Engaging with the Government local institutions and development partners

The final milestone of PARM policy dialogue process was the High level Policy Dialogue Stakeholder workshop in late 2016 led by the Ministry of Agriculture, Animal Industry and Fisheries with the participation of the Ministry of Finance and bilateral partners. The active role of organizations like NEPAD, IFAD, FAO, USAID and World Bank in the discussions proved the increasing interest and engagement on agricultural risk management and on the PARM holistic approach.

In early 2017, with the support of PARM, Makerere University has delivered its first one-week course on Agricultural Risk Management to extension workers in collaboration with the Extension Department of MAAIF. This is a starting point to mainstream ARM in Uganda by hosting this important training capacity in Makerere University.

PARM has been able to put on the table together with the Government of Uganda and other stakeholder an attractive package of initiatives and raised the interest of potential donors. KfW funding for PARM through NEPAD will make a call of interest in a selection of PARM countries including Uganda in order to select ARM initiatives to invest. In this context, NEPAD will follow up on the implementation of ARM in Uganda.



2. Timeline of the Country Process

2.1. Preparatory work 2011-2014

NEPAD has worked with FAO since the beginning of the ARM initiative in 2011 in Uganda, and more partners have started to provide additional support through PARM since 2014. Further to the regional workshops held in Johannesburg in 2012 and in Kampala in May 2013 a NEPAD-led initiative supported by FAO and AFD was presented. The first meeting of the ARM National Steering Committee (NSC) was organised in November 2013. The Committee comprises of about 15 members from different Government Ministries (Agriculture; Finance and Planning; Trade; Local Government; Gender and Labour), other Government Departments (Office of the Prime Minister; National Planning Authority; Insurance Regulatory Authority), and Development partners, including Uganda Farmer's Federation, Uganda Cooperative Alliance (UCA) and Makerere University.

The Ugandan warehouse receipt systems (WRS) was analysed by an international consultancy agency as part of the (WRS) Study sponsored by IFAD/PARM-AFD-CTA in 2014. The study recommends that external partners should provide support to the regulated public warehousing only when there will be a clear decision of the GoU about the implementation and regulation (reform) of the system.

2.2. Launch of PARM process in Uganda in late 2014

The PARM Team organised its first visit to Uganda jointly with NEPAD from 15-18 December 2014 to follow-up on the ARM process already started with FAO and NEPAD in 2013. The main purpose of the mission was re-launching ARM activities in the country in order to include ARM initiatives in the new Agricultural Sector Strategic Plan (ASSP) that was to be approved in 2015 for the period 2016-20. The PARM Team and NEPAD was received by the Permanent Secretary V. R. Rubarema of the Ministry of Agriculture of Uganda, who engaged in using the PARM process to develop good specific initiatives to be included in the new ASSP for Uganda.

A meeting of the National ARM Steering Committee (NSC) meeting was also organised during the December mission to re-launch its activities. The Committee was chaired by the Acting Director and Chair of the Agro-Business Department, and attended by 12 participants from public sector, insurance companies and associations. An important outcome resulted from the meeting: Agricultural Risk Management would be explicitly included in the first drafts of the overall National Investment Plan 2016-20 and the Agricultural Investment Plan. In the debriefing with the National ARM Steering Committee chaired by the Director for Agriculture of MAAIF, PARM's road map in Uganda was presented and its alignment with the Development Strategy and Investment Plan (DSIP-II) and National Development Investment Plan (NDIP) through the new ASSP 2016-2020 was considered a priority.

Already in 2014, a first draft of **Terms of Reference for the Risk Assessment Study** was developed and shared with the Advisory Committee and the Ugandan authorities.

2.3. Risk Assessment Phase in 2015

After the validation of the Terms of Reference for the Risk Assessment Study in February 2015, a pool of experts both international and local (from Makerere University) was identified and recruited to undertake the **Risk Assessment study**. The study was undertaken from April to October 2015, when it was discussed with the stakeholders. Additionally, a preparatory Agricultural Risk Management Information Systems Study was undertaken in collaboration with NEPAD and the Uganda CAADP Focal point. A national expert was selected and the study was completed in July 2015.

In 2015, ARM was brought to the Agricultural Policy strategic programme through the Ugandan Agriculture Sector Development Plan (ASDP) with the support of PARM. The content of the Risk Assessment Study was crucial in this exercise. As a result, the Government of Uganda, with the support of PARM under the CAADP frame, already integrated PARM analysis and ARM policies into its ASDP of 2015.

A **National Risk Assessment Validation Workshop** was held in 29-30 June 2015 in Kampala to present and discuss the Risk Assessment Study and identify priorities on risks and tools. The PARM NSC and other relevant actors attended the workshop and the most relevant inputs integrated in the report. A National Steering Committee (NSC) inclusive of the main relevant stakeholders on ARM met on the 3 July to be informed about the results of the discussions and to guide the process that would lead to further integrate agricultural risk management into the national policy.

A Capacity Development Seminar was conducted from 1 to 2 July 2015 by PARM, NEPAD and FAO in partnership with MAAIF with the main objectives to provide trainees with critical capacity to understand and apply the holistic approach to analyse and manage the main agriculture risks affecting smallholders. As a follow-up, a second Capacity Development Training took place at district level on 8-9 December 2015 in Mbale.

PARM engaged in several meetings and events to mainstream and discuss about ARM were also organized in Uganda in 2015. On 26-30 October PARM attended and presented its analysis and methodology at the 6th Africa Day for Food and Nutrition Security organized by AU-NEPAD. The Risk Assessment Study on Uganda was formally launched on this occasion, together with a webinar discussion in the World Bank initiative FARM-D. Back to back to this event PARM organized two meetings with PARM - CAADP focal points to coordinate and develop synergies around ARM initiatives, and with the most relevant international technical and financial partners active on Agriculture sector in Uganda to discuss about areas on which focusing PARM actions. PARM also participated and presented the work of the Platform in the Agricultural Development working group meeting on the 27th October 2015 in Kampala.

2.4. Tools assessment Phase in 2016

The focus and content of the Terms of Reference (TORs) for the feasibility studies on plant pests and diseases, information access, and creating ARM capacities in the extension services, were developed in close collaboration with the Government and national and regional technical partners. This consultative process led to launching three ARM feasibility studies or initiatives in coordination with the Ministry of Agriculture and Animal Industries and Fisheries (MAAIF): plant pest and diseases control, led by the Centre for Agriculture and Biosciences International (CABI); financial information and risk management model (FIRM), led by FIT Uganda and AgririskAnalyszer; and capacity development and extension services led by Makerere University and PARM. The following meetings and consultations were part of the tools identification process:

Seminar on Information Systems for Agricultural risk management in Uganda in May 2016. The country report on information systems from CEIGRAM was presented and discussed with technical experts and stakeholders. The conceptual note for the Financial information and risk management model (FIRM) was presented and discussed with stakeholders, the government and development partners.

Meeting with the Ministry of Agriculture and with Makerere University on July 2016. The meetings focused on how to incorporate Agricultural Risk Management in the extension services strategy that is being elaborated by the Ministry of Agriculture and on how to include ARM in the training courses and curricula of Makerere University. The Extension Services Directorate staff will be one of the first beneficiaries of the course.

Validation Seminar of the Uganda Pest Management Study in September 2016. A technical seminar was organized by PARM in collaboration with the Ministry of Agriculture to validate the outcome of the CABI study and recommending additional insights and practices to better manage future incidences of crop pests and diseases in Uganda with a view to finalize the study.

Uganda is the first country that has completed the overall PARM process. The final outcomes were presented during a flagship event organized in Kampala in presence of the highest representatives of the Government from the Ministries of Finance and Agriculture, private sector companies, farmer organizations and technical agencies (WFP, FAO, USAID, NEPAD, WB, IFAD...). In this **High level national stakeholders workshop on the 29th November 2016**, experts from institutions, financial and technical sectors have been grouped around the three topics or tools assessed by PARM: plant pest and diseases which was the major risk identified by the RAS in 2015, the financial information and risk management (FIRM) and the enhancement of the extension services technical capacities on ARM. The dissemination workshop in November was a milestone for PARM and for Uganda, providing a holistic specific package responding to the main ARM priorities and gaps.



3. The way forward: matching ARM investment needs with donors

The package of three proposals has been presented during the High-Level Policy Dialogue Workshop in Kampala on the 29th of November 2016. The Minister of Agriculture Animal Industries and Fisheries, Vincent Bamulangaki Ssempijja, participated in the workshop and engaged the MAAIF with the outcomes of PARM. Several directors and commissioners from MAAIF also participated in the discussions. The active role of organizations like NEPAD, IFAD, FAO, USAID and World Bank in the discussions proved the increasing interest on agricultural risk management and on the PARM holistic approach.

The three initiatives have already raised the interest of development partners. The potential of the **Plant Health plan** to reduce losses and to improve investment opportunities in agriculture are large and have attracted the attention of several development partners such as **FAO and USAID**. The opportunities that the **FIRM initiative** can create to improve risk assessment and symmetric access to information between farmers and services providers is being followed closely by potential partners such as the Agribusiness Alliance, and the **Agricultural Business Initiative** (aBi) Trust. The training capacities in Makerere have the potential to empower the extension services that can become a vector of rural transformation in Uganda's agriculture towards a more business oriented sector, and it has already raised the attention of some donors like IFAD and the World Bank, and some African organizations like AFRACA.

With the support of PARM, Makerere University delivered on 27-31 March 2017 its first one-week course on **Agricultural Risk Management to extension workers** in collaboration with the Extension Department of MAAIF. Hosting this knowledge and training capacities in a national institution like Makerere University is an important asset for the future and the Government has already expressed interest on making this training part of its extension services strategy and of projects with development partners such as the Agricultural Technology and Agribusiness Advisory Services (ATAAS) project.

The investment proposals developed through the PARM process with the Government and other stakeholder constitute a solid and attractive holistic package to enhance Agricultural Risk Management in Uganda. This is a great opportunity for the Government of Uganda to lead and all development partners to continue their engagement by implementing ARM initiatives and policies like those proposed here. Development partners and stakeholders have already expressed their interest on these initiatives and KfW will fund selected ARM initiatives through NEPAD, which will follow up and support on the implementation process. Uganda has been in advance compared to other countries and keeping the momentum of ARM mainstreaming can significantly improve the livelihoods of farmers and boost the investment in the sector.



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A woman with a joyful expression stands in a lush green field. She is wearing a vibrant red dress with gold floral patterns and a white lace headscarf. In her right hand, she holds a single ear of yellow corn, and in her left, she carries a large bundle of green corn stalks. The background is filled with dense foliage, including coffee plants with small green berries. The overall scene conveys a sense of pride and connection to the land.

Prioritizing Risks

Uganda



Agricultural Risk Assessment Study

Executive Summary

In collaboration with



MINISTRY OF AGRICULTURE,
ANIMAL INDUSTRY & FISHERIES

April 2017

Scope of study

This Risk Assessment Study (RAS) provides a comprehensive mapping and assessment of agricultural risks in Uganda through a holistic approach. The report provides stakeholders with data and information on priority risks for Ugandan agriculture in order to develop appropriate policy solutions aimed at improving agricultural risk management (ARM) in the country. The guiding policy framework for this work is the recently developed Agricultural Sector Strategy Paper 2014/15-19/20 (ASSP). The discussions with the stakeholders on a first draft of this study during the Risk Assessment Validation Workshop organized by the Government of Uganda in 29-30 June 2015 have contributed to improve this study.

The country context

Importance of agriculture

The agricultural sector is still the mainstay for a large part of the Ugandan population. But while the contribution to GDP (22.5% in 2013/14), exports (54% in 2014) and employment (70%) is still high, the growth rate of the sector is way below average GDP growth. 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 neighbouring countries.

Focus on smallholders

The current production structure of agriculture in Uganda is dominated by small-scale farmers comprising of an estimated 2.5 million households (90% of the farming community), the majority of who own less than 2 acres of land each. Despite good agro-climatic conditions with two rainy seasons in most parts of the country, yields of smallholder farmers remain low. Limited access to quality inputs, low adoption of modern technology, and lack of storage and market infrastructure are constraints to the sector.

Identification of agricultural risks: country risk profile

Range of risks

Farmers are faced by a plethora of risk. The majority of risks are linked to specific stages in the agricultural value chain (e.g. the input risk during the planting and growth stage of the crops). Policy risk, safety risk, and health risk, on the other hand, may occur during any stage of the agricultural production cycle. The major risks are:

Input risk: The problem is a consequence of a poorly developed seed sector where the informal seed system accounts for an estimated 87% of planted seed. The total demand for grain crop seeds is estimated at approximately 110,580 MT, while total sales from the formal seed market account for only 12,000 MT. The supply shortages create incentives for substandard and/or counterfeit seed; studies suggest counterfeiting affects 30-40% of purchased seed.

Weather risk: Ugandan agriculture is mostly rain-fed making it vulnerable to weather hazards and climate change. Therefore, drought has affected the highest number of people in Uganda. Often drought and flooding follow each other. In the last 30 years (1985-2015), Uganda has experienced fourteen riverine floods, which affected more than one million people and killed more than 200 people. Landslides and mudslides usually occur in the Eastern region. The population pressure and environmental degradation of the hilly areas around Mt. Elgon are root causes for the frequent occurrence of landslides.

Biological and environmental risk: A range of pests and diseases have caused crop failures and livestock deaths in Uganda in the recent past. On the crop side, Cassava Brown



Streak Virus African, Cassava Mosaic Virus, Banana Bacterial Wilt (BBW), Maize Streak Virus (MSV), Maize Lethal Necrosis Disease (MLND), and groundnut rosette are severely affecting food crops and threatening food security in Uganda. For cash crops diseases such as Coffee wilt and Coffee rust are still not properly managed. On the livestock side, the endemic Newcastle disease in poultry and the sporadic and cyclic outbreaks of African swine fever in pigs wipe out stocks of poultry and pigs in the country every year. Other diseases such as foot and mouth disease, Bovine pleuropneumonia, East Coast fever, and Black quarter although largely managed by routine vaccination still occur in livestock.

Logistical and infrastructural risk: The lack of sufficient storage capacity, both at the farm level and the crop trading system, leads to high losses for farmers due to attacks from pests and animals. Uganda has 550,000 metric tonnes (MT) of storage capacity, but estimated demand for storage facilities totals 2.3 million MT. In 2012 alone an estimated 18.3% of cereal production was lost in post production activities.

Market risk: Uganda experiences high price fluctuations on account of weather conditions, low level of stocks, low level of organization of producers in the value chain, and segmentation of regional and domestic markets. Farmers are exposed to both inter-annual and intra-annual price volatility. Yet the country lacks price stabilization instruments.

Public policy and institutional risk: The legal environment for the agricultural sector is conducive but implementation of many initiatives has been poor in the past due to a lack of institutional and financial resources. The ongoing restructuring of the extension system has created many challenges for farmers to access advisory and other support services.

Political and security risk: The security situation in the country has improved greatly since the containment of the Northern Insurgency. Still, regional security threats such as the Karamoja cattle raiding are a constraint for the development of agriculture in some regions of Uganda.

Mapping of existing Agricultural Risk Management policies and tools

Policy environment

The Government of Uganda (GoU) is trying to tackle these risks through various policies, most notably the National Development Plan II (NDP II). In the past, risks have not been handled in a comprehensive manner but the recent ASSP contains a section on ARM. The Ministry of Agriculture, Animal Industries, and Fishery (MAAIF) is driving this process with other public sector entities (e.g. Office of the Prime Minister, Ministry of Water and Environment), and non-state actors playing an important role as well. Lack of capacity and financial constraints are impediments to improved risk management from the government.

Risk management landscape

Major risk initiatives are currently being implemented:

Information systems: A broad range of state and non-state actors (e.g. MAAIF, UBOS, UNMA; Infotrade, Farmgain) currently provide farmers and other stakeholders with data on specific aspects of agricultural risk, e.g. weather, market prices. Despite the broad range of service providers, timely and accurate information does not yet always reach the target audience. The absence of effective extension services is a major factor contributing to this situation.

Initiatives related to input risk: MAAIF is currently in the process to finalize the National Seed Policy aimed at improving quality assurance in the seed sector. The private sector, particularly the Uganda National Agro-Input Dealers Association (UNADA) is involved in this process. The issue of quality assurance, in particular concerning the use of counterfeited inputs is addressed by a number of initiatives from donors and the private sector. Yet access to quality inputs remains a key issue in the sector.

Initiatives related to weather risk: Despite significant investments in recent years (USD 25 million in 2013), the irrigation potential remains largely untapped, in particular small-scale irrigation. The irrigation potential for Uganda is estimated at 445,041 ha at an investment cost of USD 2.3 billion. Other initiatives related to weather risk have mostly been driven by the insurance sector; the introduction of weather based insurance (such as the Kungula Agrinsurance by a consortium of companies) has witnessed some early success.

Initiatives related to biological risk: Pest and disease management are mostly the domain of MAAIF and/or respective value chain organizations (e.g. UCDA in the coffee sector). Still, access to support services for plant protection remains low. Decentralization and privatization of clinical veterinary services and downscaling of civil service since the 1990s have severely constrained the access to animal health services for farmers.

Initiatives related to infrastructure risk: Post harvest losses are at the centre of a few recently implemented initiatives, most notably a project on Post-Harvest Food Loss Reduction by the WFP that has reached 16,600 farmers since 2014. There is, however, much scope to expand the outreach of such initiatives on low-cost storage for smallholders to many more households in Uganda.

Initiatives related to market risk: Currently, no price control mechanisms are found in the food crop sector. For various cash crops such as coffee, tea, and cotton a range of price setting mechanisms are applied that provide some level of protection to these sub-segments. Still, fluctuations on international markets, for example for coffee, directly affect farmers and price drops directly translate to income loss for farmers.



Risk analysis: a systematic quantification of impacts and likelihood

Cost of risk

The overall economic impact of agricultural risk is estimated to amount to USD 606 million to USD 804 million per year. Based on an agricultural GDP of USD 5.71 billion, losses therefore amount to between 10.61% and 14.08% of total annual production, which is between 2.3% and 3.1% of the GDP of Uganda.

Ranking of most severe risks. An evaluation of all risks was carried out based on average frequency and severity, and the impact of the worst case scenario. The following table provides an overview on the scoring:

RISK	AVERAGE SEVERITY	AVERAGE FREQUENCY	WORST CASE SCENARIO	SCORE
CROP PEST & DISEASES	● VERY HIGH	● VERY HIGH	● VERY HIGH	5.00
POST HARVEST LOSS	● VERY HIGH	● VERY HIGH	● HIGH	4.75
PRICE RISK FOOD & CASH CROPS	● VERY HIGH	● HIGH	● HIGH	4.35
LIVESTOCK PEST & DISEASES	● HIGH	● VERY HIGH	● MEDIUM	4.10
DROUGHTS	● MEDIUM	● MEDIUM	● VERY HIGH	3.50
COUNTERFEIT INPUTS	● MEDIUM	● VERY HIGH	● LOW	3.40
KARAMOJA CATTLE RAIDS	● 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

The top six risks make up more than 99% of average annual losses in Uganda. These major risks in terms of severity are:

1. Price fluctuations: Inter-annual 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 3 years. Matooke/banana are similarly 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 USD 262.22 million p.a.

2. Crop pests and diseases: Average crops 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 are in the range of USD 113 million to USD 298 million (mainly banana, cassava, coffee, and cotton).

3. Post harvest losses: The weight loss resulting from attacks of pests and animals to major cereals (mostly for maize, but also barley, millet, rice, sorghum, and wheat) cause losses of USD 97.17 million p.a. This figure does not yet include opportunity cost for farmers that were forced to sell at low market prices directly after harvest due to lack of proper storage facilities.

4. Livestock pests and diseases: The economic impact of diseases on farming households are diverse: farmers incur cost for disease control, treatment, and vaccination. Direct losses are associated with animal mortality, reduced milk production, and use of animal for traction. The total economic cost for diseases in cattle alone are estimated at USD 76.5 million p.a.

5. Droughts: Uganda has been hit severely by droughts in recent years (2002, 2005 to 2008, and 2010/11). The return period of large-scale droughts that affected 25,000 people or more is 5.3 years. The average annualized losses amount to USD 44.4 million. But, drought has the highest probable loss of all risks in Uganda. For example, the drought period of 2010/11 caused extensive damage of USD 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 factor is the lack of good-quality, higher-yielding, more vigorous, drought-resistant, and disease-free seeds and planting material. A pronounced problem is the issue of counterfeit inputs that lead to losses to farmers of USD 10.7 to 22.4 million p.a.

Impact

Apart from turning to relatives and friends in times of need, selling of livestock, reducing expenditures, and reducing the food intake are the most common reactions by farmers to distress. Poorer farmers (i.e. smallholders) are affected stronger by risk than commercial agriculture.

Conclusions and recommendations

Required changes in the institutional framework

ARM has not been managed in a holistic manner in the past. In the future more efforts and funding is required by MAAIF to tackle the issues raised in the report. Establishment of an ARM unit within the ministry in charge of monitoring risks and developing policy responses is proposed. Dedicated ARM personnel within the Planning Department of MAAIF is in charge of coordinating with other MAAIF departments and the stakeholder forum on ARM in Uganda.

Building up capacity for ARM

The starting point for improved use of ARM tools in Uganda is investment in human resources: trainings for MAAIF officials at



national and local level, for extension workers, farmer organizations, and other important stakeholders is required to build up capacity in the country on risk analysis and management.

Improved data collection and analysis

Improving data collection and analysis of risk related information is one important strategy to reduce the key risks (pests and diseases for both crops and livestock, and intra-annual price fluctuations). This assessment report has suffered from the lack of information on risks at farm or district level, including information on production, yields and losses. A key issue for improving information systems and early warning is the dissemination of information to smallholder farmers which is currently often lacking.

Risk reduction

It is critical to raise awareness of farmers on their individual risk exposure and on the best way to protect their livelihoods. This requires well trained and informed extension officers that can provide practical advice to farmers. Integrating risk management into the core extension messages is important to help farmers understand how they can reduce, transfer, or cope with risks. Improving the value chain for inputs and developing low-cost storage options for farmers are two other important areas that require further attention.

Risk transfer

The current outreach of agricultural insurance still leaves much room for further increasing penetration amongst farmers. Further analysis of the current constraints and opportunities should be carried out for the GoU to develop a support strategy for agricultural insurance. Government support is required to enhance farmers opportunities to transfer some of their risk to the market.

Risk coping

Formal social safety nets are non-existent in rural areas. In the past, many emergency response programs have supported farmers after external shocks. GoU should analyze this experience and decide ex-ante what support mechanisms for farmers are established for times of distress. This helps to avoid profiteering after disasters from criminal groups or individuals and ensures that the help really reaches to smallholder farmers that have been affected most by a shock.

Uganda

Agricultural Risk Profile November 2016



What are the key findings?

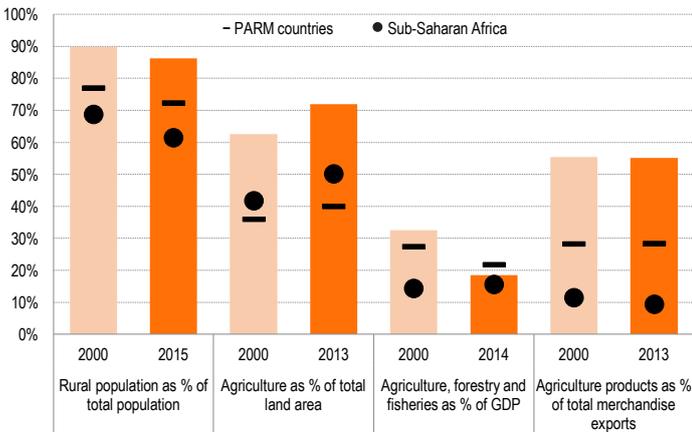
- ▶ Crop pests and diseases, output prices and postharvest losses are identified as the three greatest agricultural risks.
- ▶ Many livestock diseases are endemic, and along with droughts and counterfeit inputs are also high-level risks for Uganda.
- ▶ Temperature levels are rising fast.
- ▶ Cassava and beans are the two crops most affected by yield losses.
- ▶ Maize, millet and sorghum are most affected by output price risks.
- ▶ The price of imported inputs appears a risk, along with a depreciating currency.
- ▶ Political stability is low but improving.

What are agricultural risks?

Agricultural risks are uncertain events that cause farmers significant financial loss or other adverse outcomes. They are different from constraints, which are predictable and constant limitations. Risks can negatively affect rural employment and assets, increase food insecurity, and lead to inefficient private and public sector investment. The purpose of the profile is to provide a high-level quantitative analysis of selected risks. It uses a common methodology, drawing on easily available information. As annual national averages are used, local and seasonal variations cannot be observed. This may underestimate production risks as compared to output price risks. The scope of the analysis is also limited by the lack of price and output data for livestock products. For Uganda, price data was available only for 2001-13 and for a small number of crops. The results of a detailed risk assessment are incorporated into the profile.

What role does agriculture play?

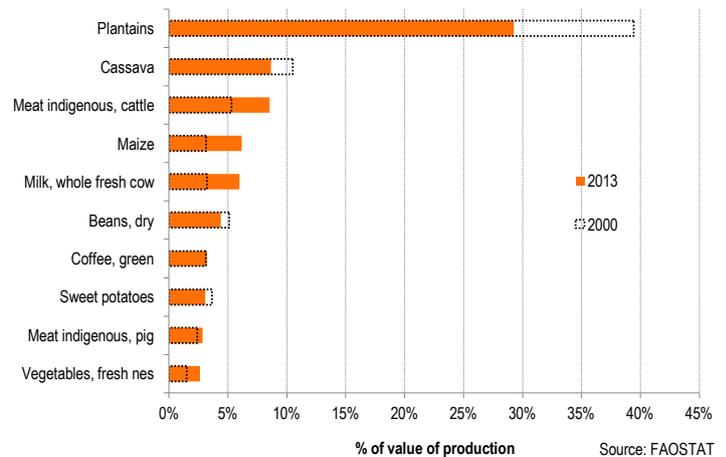
Agriculture is relatively more important than in most other African countries. About 86% of the total population of 19 million is rural, over 70% of the land area is used for agriculture, and agriculture contributes over 50% of merchandise export earnings.



Source: FAOSTAT

What products are most important?

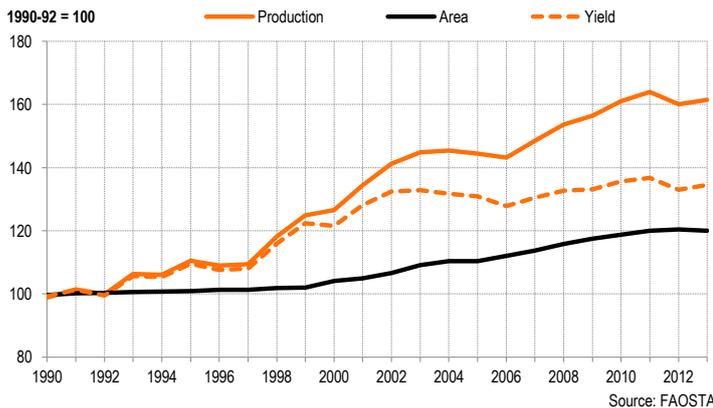
Plantains are by far the most important product, although their relative importance is decreasing. The top ten products represent 75% of production in 2013, with all crops accounting for 78%. Cattle meat, maize and milk production show the largest increases.



Source: FAOSTAT

How has the sector grown?

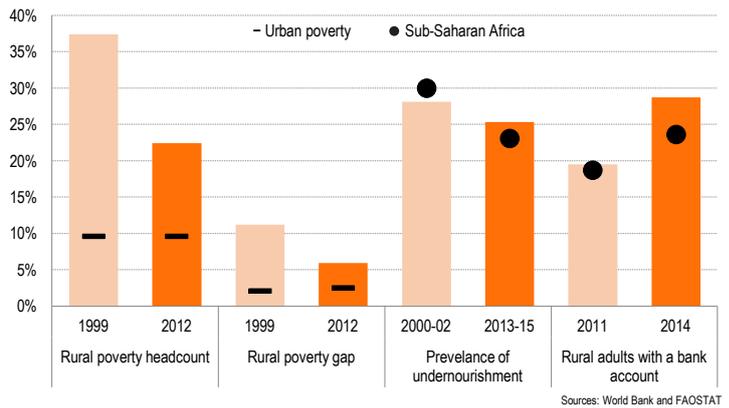
Agricultural output increased by 60% between 1990 and 2013, a 2.2% annual growth rate. This has been driven by both an expansion in yields (1.4% per annum) and in land area (0.8%). Livestock production has risen faster than crop output.



Source: FAOSTAT

How vulnerable are people to risks?

Both the number of rural people living in, and the level of, poverty has fallen dramatically. The prevalence of undernourishment has also fallen but 25% of the population remain undernourished. Access to credit has grown faster than in other African countries.



Sources: World Bank and FAOSTAT



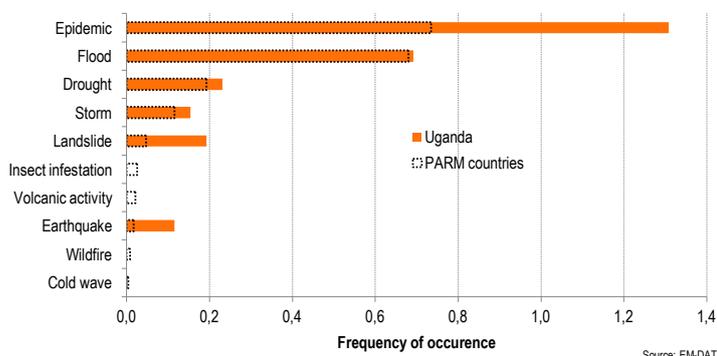
Production risks

What are production risks?

A large number of risks affect agricultural production. These include climate related events (such as droughts, floods and cyclones), outbreaks of pests and diseases, and damage caused by animals, windstorms or fire. The geographic and temporal spread of these impacts can vary significantly. Production risks are mostly associated with yield reductions but can also affect product quality.

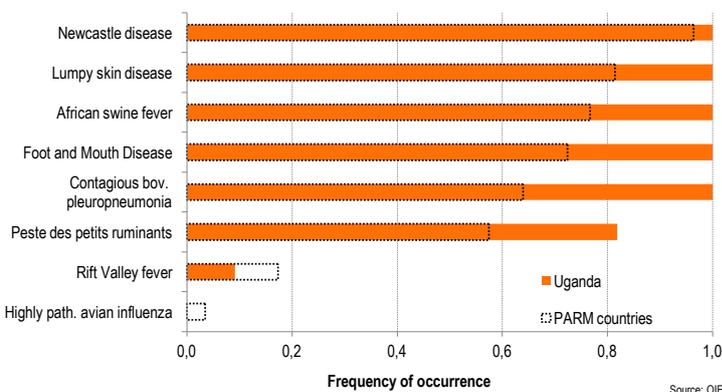
How often do major disasters occur?

In the period 1990-2015, epidemics were the most frequent disaster to affect Uganda. A major flood event occurs about every 18 months. Droughts, storms and landslide events occur every 5 years or so. Uganda also suffers the occasional earthquake.



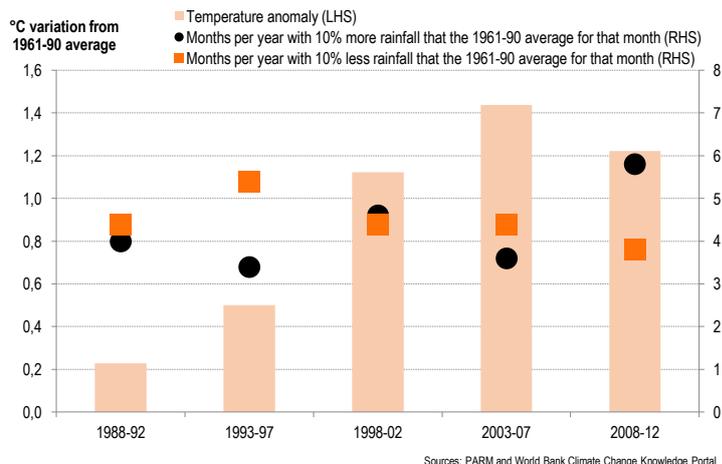
What animal diseases are present?

Of the eight animal diseases analysed over the period 2005-2015, five could be considered endemic. A sixth, Peste des petits ruminants, has been present every year since 2007. Only Highly pathogenic avian influenza has never been reported.



Are weather anomalies increasing?

Temperature levels are rising. The 2008-12 average was 1.2°C warmer than the 1961-1990 average despite falling. Changes in rainfall patterns are harder to identify. The number of wetter than average months was greater than drier months in 2008-12.

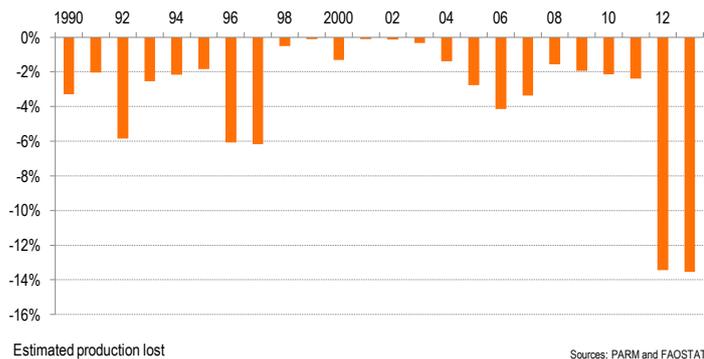


What is the likely impact of future climate change?

The IPCC 5th assessment report concludes that land temperatures over Africa are likely to rise faster than the global land average, particularly in the more arid regions. Mean average temperatures are likely to be 2°C higher than experienced in the late 20th century. Projected rainfall change over most of sub-Saharan Africa is uncertain due to complete topography and more research is required. Some models predict a wetter core rainfall season in Uganda while others suggest drying over most parts of the country. Increasing temperatures and changes in precipitation are very likely to reduce cereal crop productivity, and could also adversely affect high-value perennial crops. Pest, weed, and disease pressure on crops and livestock is expected to increase.

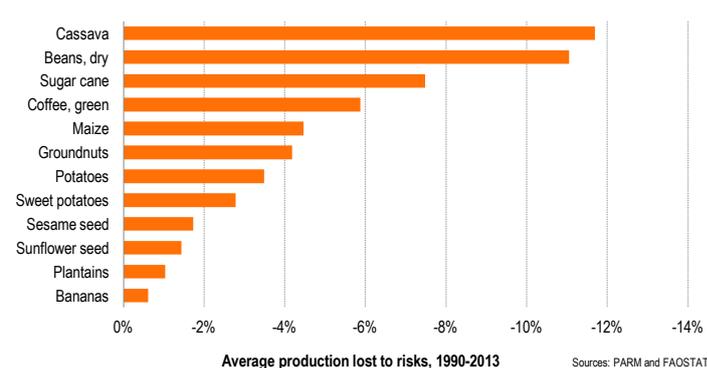
Has the risk varied over time?

Totalling the annual value of production losses for the 12 crops provides an indicative production risk profile for the period. Production losses averaged 4%, ranging from 0-13%. The largest loss occurred in 2012 and 2013, primarily due to yield losses for cassava.



Which crops appear most at risk?

Cassava and beans are the two crops most affected by yield losses as estimated by the impact on production. Annual yield losses averaged over 10% of production for both crops (average losses of 47% once every four years for cassava and 27% every 2.5 years for beans).





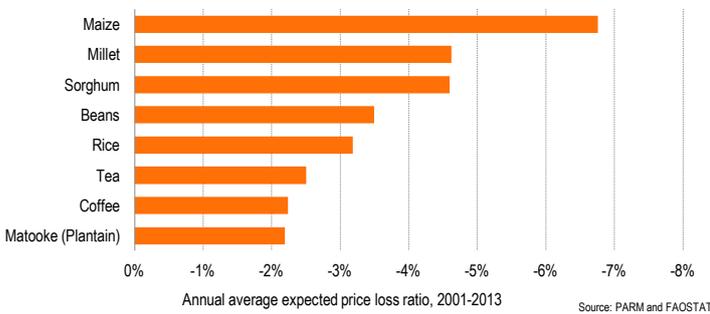
Market risks

What are market risks?

Market risks are issues that affect the price and availability of outputs and inputs. Commodity markets can have a high degree of volatility caused by changing local and global supply and demand. Producers are concerned about low prices (reducing their income); consumers are worried by high prices (raising their expenditure). Other market risks include exchange rate volatility, and the purchase of "fake" inputs such as seeds.

Which products appear most at risk?

Over the period 2001-2013, maize, millet and sorghum appear to be the commodities most affected by output price risks. These products have an annual average price loss of greater than 4%.



How are the product and temporal risks estimated in this profile?

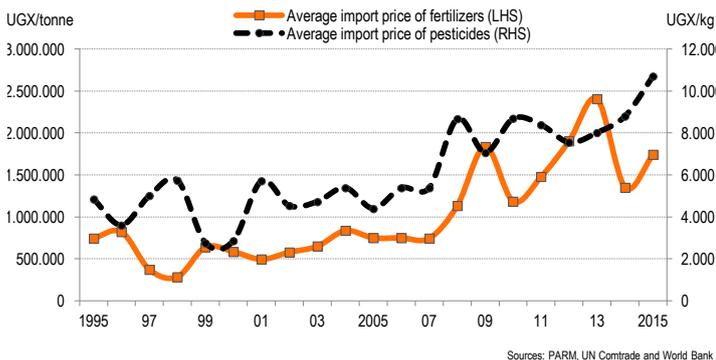
Indicative estimates of production and output price risks are calculated in a similar way. A loss threshold of 0.33 times the standard deviation below the trend value in either yield or prices is calculated to set a benchmark for identifying the losses resulting from production and market risks respectively.

To calculate product specific risk values, the average yield or price loss below the threshold level and the frequency of these occurrences are multiplied to obtain average production and price loss ratios. This is done for the 12 most important crop and livestock commodities for which data was available.

To calculate the risk profile over time, the individual loss for each respective year are added together across the crop commodities only.

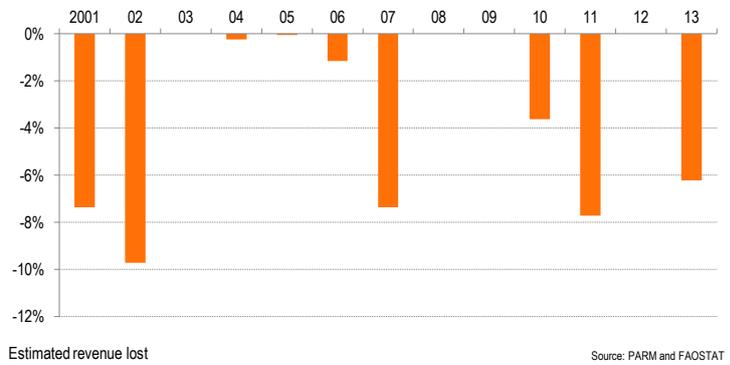
How variable are input prices?

Variations in annual average import prices suggest farmers face input price risks. Since 1995 import prices have risen by 15% or more at least once every two years for fertilisers, and once every three years for pesticides.



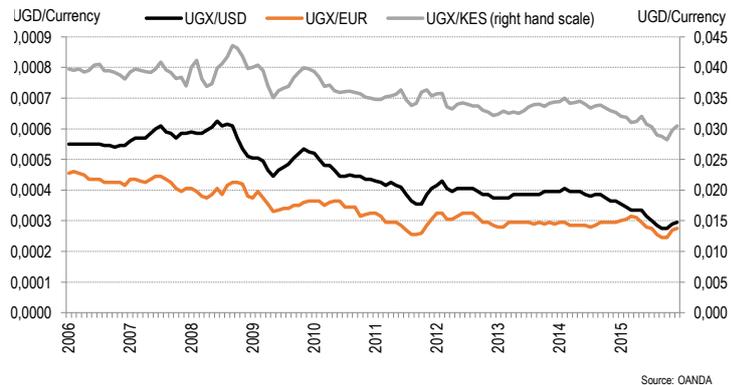
Has price risk changed over time?

Totalling the estimated revenue lost due to output price risks for the individual commodities provides an indicative market risk profile. The average annual revenue loss is 3%, with a maximum loss of almost 10% in 2002. No trend over time can be observed.



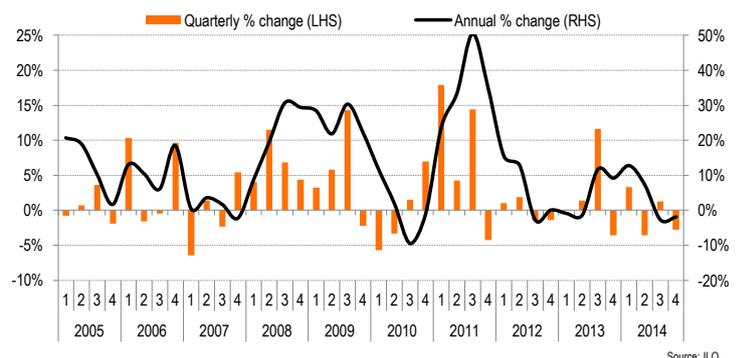
Is there an exchange rate risk?

Over the past decade the Ugandan shilling (UGX) has depreciated against the USD, Euro and the Kenyan shilling, it's main African export market. As it has become weaker, the effect of variation has become larger.



Do food prices vary for consumers?

Over 2005-14, the food component of the consumer price index recorded an average annual increase of 13%. The highest annual rate of 50% was recorded in September 2011. Prices have risen more slowly since 2010 but fluctuate more.





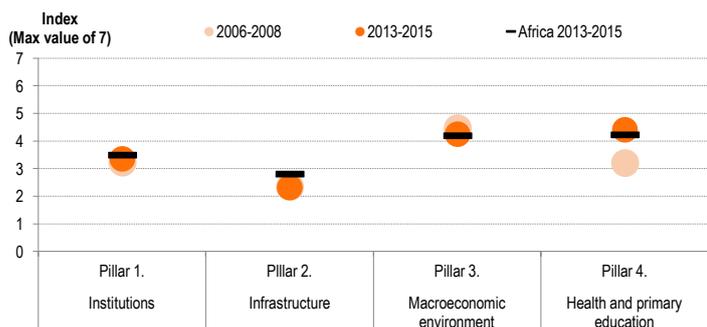
Macro level risks

What are macro level risks?

Macro level risks cover unexpected changes in the broader economic environment in which agriculture occurs. It can include changes in government or business regulations, fiscal and monetary policy settings, external trade restrictions, political instability, corruption, regional conflict and domestic unrest.

Are basic requirements in place?

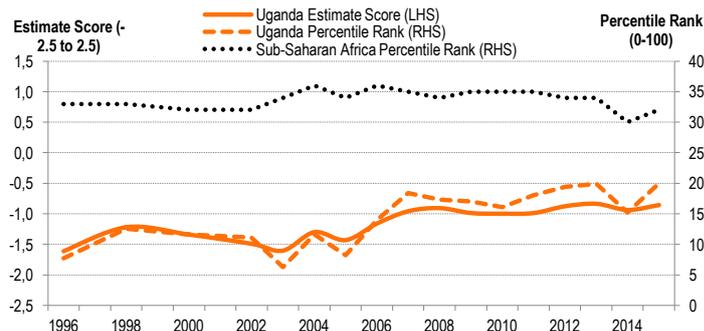
Index scores for the basic requirement pillars place Uganda close to the African average for three pillars, falling it below it for infrastructure. The index score for health and primary education has lifted notably over the past ten years.



Source: World Economic Forum, Global Competitiveness Index

Is the political environment stable?

Uganda scores below the Sub-Saharan Africa average in the political stability and absence of violence index. Its ranking has shown a steady improvement since 2003, rising from a percentile ranking of 6 to 20, and bringing it closer to the African average.



Source: Worldwide Governance Indicators

Overall risk assessment

The PARM process

A detailed risk assessment is carried out as part of the PARM process, in partnership with NEPAD and the relevant African government. It is a rigorous consultation process involving a risk assessment report drafted by international and local experts, followed by a national validation workshop with the participation of stakeholders including farmers, private sector companies and government. Risks are identified at a detailed level, e.g. droughts, raids, etc.

In Uganda, a national stakeholders risk assessment validation workshop was held in June 2015. The workshop identified three very high-level risks in Uganda: crop pests and diseases, output prices and postharvest losses. Other identified high-level risks were livestock pests and diseases, droughts and counterfeit inputs.

What are the main agricultural risks?

RISK	AVERAGE FREQUENCY	AVERAGE SEVERITY	WORST CASE SCENARIO
CROP PESTS AND DISEASES	● VERY HIGH	● VERY HIGH	● VERY HIGH
OUTPUT PRICE RISKS	● VERY HIGH	● VERY HIGH	● HIGH
POSTHARVEST LOSSES	● VERY HIGH	● HIGH	● HIGH
LIVESTOCK PESTS AND DISEASES	● MEDIUM	● VERY HIGH	● MEDIUM
DROUGHTS	● MEDIUM	● MEDIUM	● VERY HIGH
COUNTERFEIT INPUTS	● LOW	● VERY HIGH	● LOW
KARAMOJA CATTLE RAIDS	● VERY LOW	● HIGH	● VERY LOW
FLOODS	● VERY LOW	● HIGH	● VERY LOW
HAILSTORMS	● VERY LOW	● HIGH	● VERY LOW
THUNDERSTORMS	● VERY LOW	● HIGH	● VERY LOW
ALL OTHER NATURAL RISKS	● VERY LOW	● HIGH	● VERY LOW
NORTHERN UGANDA INSURGENCY	● VERY LOW	● VERY LOW	● MEDIUM

What are the linkages between risks?

Managing risks in agriculture is particularly challenging, as many risks are highly correlated, resulting in whole communities being affected at the same time. Impacts on yield that are widespread and have a significant impact on total market supply can have profound effects on market prices. Drought is a clear example of one risk that can trigger others, aggravating some pests and diseases (additional production risks), leading to spikes in food prices (market risks) and even stimulating conflicts over water and pasture (macro level risks).

What is PARM? The Platform for Agricultural Risk Management (PARM), an outcome of the G8 and G20 discussions on food security and agricultural growth, is a four-year multi-donor partnership between developing nations and development partners to make risk management an integral part of policy planning and implementation in the agricultural sector. PARM operates a process to achieve this through risk assessment, policy dialogue, tools assessment and capacity development.

PARM Secretariat International Fund for Agricultural Development (IFAD)

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PARM
PLATFORM FOR
AGRICULTURAL RISK
MANAGEMENT

A woman with a blue headwrap and a dark patterned top stands in a field of banana plants. She is holding large green leaves, and a black cow is eating them. The scene is set in a lush, green environment with many banana trees in the background. The text 'Finding the right tools' is overlaid on the image in a white serif font.

Finding the right tools

Uganda



Information Systems for Agricultural Risk Management

Policy Brief

In collaboration with



October 2016

Key message

1

Many risks including crop pests and disease and post-harvest losses affect the agricultural livelihoods in Uganda. Efforts to manage them are constraint by limited access to agricultural risk management information.

2

National information systems like UBOS¹, UNMA², MAAIF³, Infotrade Uganda and FARMIS⁴ provide comprehensive and disaggregated information for proper agricultural risk management in areas of commodity prices and trade.

3

However, there are cases of poor representation, insufficient access and lack of historical data on plant health (crop pests and diseases), soils, commodity stock level and inputs availability, and animal disease and endemics.

4

Building human and financial resources for data collection, public-private partnership for investment in access to information, and a review of historical information/data is required to improve information for agricultural risk management.

Context

In October 2016, the Platform for Agricultural Risk Management (PARM) finalised a study that assessed **Information Systems for Agricultural Risk Management (IS-ARM)** in seven Sub-Saharan African countries conducted by CEIGRAM/VISAVET. The assessment and systematic scoring focused on information for seven thematic areas (see table 1) of agricultural risk management: meteorology, climate and soils, satellite image and communications, price of commodities, inputs and market, production level, yield and plant health, animal and human health, policy, and socio-economic and sectorial. This policy brief outlines the strengths, weaknesses and recommendations for the information systems as identified in the Uganda IS-ARM report.

Managing risks in agriculture involves seeking avenues and information to identify the opportunities and threats affecting farmers, both on-farm and off-farm.

The PARM Risk Assessment Study (RAS) for Uganda conducted in 2015 identified crop pest and diseases such as coffee wilt disease (CWD) and banana xanthomonas wilt (BXW), and livestock pest and disease like Newcastle disease and helminth infections as the major risk for farmers. Other risks noted among the top four include crop price volatility and post-harvest loss. Pest and disease attacks are causing frequent crop failures and livestock death. The average estimated crop loss due to pest and diseases is about 10-20% during pre-harvest and 20-30% at post-harvest. Losses are as high as 90% for perishable horticultural crops. In addition, price fluctuations and post-harvest losses due to poor storage reduce earnings from farm investments. These rampant consequences are as a result of limited risk information services in Uganda.

Existing information sources and information systems

The information systems identified for the seven thematic areas of agricultural risk management in Uganda are indicated in Table 1. Some information systems deliver information on a single thematic area of agricultural risk management. They include Infotrade Uganda for commodity price and market information, Ministry of Health (MoH) for animal and human health information, and Bank of Uganda (BOU) for policy information on finance and income. Others such as UBOS, MAAIF, UCDA⁵ and UNMA offer integrated information on two or more thematic areas.

The UBOS for instance is a semi-autonomous public body, which supervises and coordinates national statistical systems in Uganda. It has ample information on thematic areas such as trade, production levels, animal and human health and some socio-economic indicators like households' income, poverty trends and access to social services within the context of Uganda. Another important national information system in Uganda is the UNMA, a semi-autonomous department under the Ministry of Water and Environment. It establishes and maintains information on the conditions of climate in Uganda, which is useful for managing risk relating to meteorology and satellite image thematic areas. Both UBOS and UNMA have related risk information published on their websites, which requires farmers and stakeholders to have internet service for access. More to this, some weather data from the UNMA can only be accessed upon request, and FARMIS also requires payment of a fee..

- 1 Uganda Bureau of Statistics (UBOS).
- 2 Uganda National Meteorological Agency (UNMA).
- 3 Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).
- 4 Farm Record Management System (FARMIS).
- 5 Uganda Coffee Development Authority (UCDA).

Study Conducted by: Research Centre for the Management of Agricultural and Environmental Risks (**CEIGRAM**), a research centre of the Universidad Politécnica de Madrid, Spain; **VISAVET**- Health Surveillance Centre, a research centre of the Universidad Complutense de Madrid, Spain



**Table 1:** Information systems for thematic areas of agricultural risk management in Uganda.

Type of information systems	Thematic areas of agricultural risk management						
	Meteorology, climate & soils	Satellite image & communications	Prices of commodity, input & market	Production levels, yields & plant health	Animal & human health	Policy	Socio-economic & sectorial
National	UNMA / UBOS	UNMA	UBOS / Infotrade Uganda / FARMIS / AgriNet Uganda / UCDA / UNADA	MAAIF / UBOS / UCDA	MAAIF / UBOS / MoH	MAAIF / DEWS / BOU /	UBOS
Regional	ACMAD / IGAD – ICPAC / MESA-IGAD	AARSE / RCMRD	RATIN / AIDB / Farmgain Africa / AFO / AMITSA / UNECA	AJ-IAPSC / IPPC / AIDB / ASARECA / COMESTAT / AfricaRice	AU-IBAR / WHO-Regional Office for Africa	FEWS NET / HDE	AfDB
International	CRED – IDD / FAO / Aqualat / WB – CCKP / ESDAC / ISRIC / GYGA	NASA / ESA / USGS / CGIAR – CSI / RSAC / Terra Remote Sensing	GIEWS-FAO / WFP-VAM / FEWS NET / FAOSTAT	CountryStat-FAO / FAO-crop calendar / GYGA / Plantwise	FAOSTAT / OIE / WHO-HSIS / EMPRES / IAEA / USAID	GIEWS-FAO / FEWSNET / WFP / WB	WB

Source: PARM IS-ARM Report, Uganda (2016). These information systems were identified during the Information Systems for Agricultural Risk Management Study in Uganda finalised by PARM in October 2016. The classification of information systems are based on geographical scope or scale of information (national, regional and international).

Strengths

The most important national information systems in Uganda include both public and private initiatives such as FARMIS, UCDA, RATIN⁶, Infotrade, UNMA, UNADA⁷, UBOS and MAAIF. They provide significant information that allows for proper agricultural risk management on thematic and sub-thematic areas of commodity price, satellite image, policy, meteorology and climate, and trade in Uganda (see Table 2 for the score). The information gathered and delivered are:

Regular and comprehensive information: A wide range of agrometeorological and weather bulletins are available at the UNMA's website on daily to monthly basis. Seasonal forecasts are also provided at the beginning of every rainy season. In relation to trade information, the UBOS has a complete survey data and report on monthly informal cross border trading activities in Uganda. Farmgain and Infotrade also provide recent information on prices of about 46 major agricultural commodities and inputs in 23 central markets.

Disaggregated data at local-level: The MAAIF collaborates with Plantwise in efforts to diagnose, generate and disseminate district as well as community level data on plant pest and diseases. Information on socio-economic themes gathered through the UBOS surveys are reported at household level, making it possible to get a clear picture of individual farmer-level situations.

First-hand source of data for regional and international information systems: Information from the national information systems such as UBOS and InfoTrade are the main inputs into the systems of credible regional and international information sources like RATIN, GEWS-FAO, FEWS-NET and WFP-VAM. This help to prevent duplication of information on various agricultural risk themes

Weaknesses

In some cases, information on thematic and sub-thematic areas such as plant health (crop pests and diseases), soils, commodity stock level and inputs availability, production levels and yield, and animal disease and endemics are recorded not to be sufficient (see Table 2 for the scores) for agricultural risk management purposes in Uganda due to:

Insufficient access to information for stakeholders: Remote sensing data available at UNMA's website and commodity price information generated by the FARMIS are only available on-line. Limited internet connection in Uganda restrains access to these services. In some cases (like detailed information on prices by FARMIS and Farmgain) there is not free/open access to the information: access comes with a cost of a fee. Smallholder farmers may not be able or willing to pay for information.

Poor representation of information: ESDAC and ISRIC are the only available soil information system in Uganda. But their databases of soil profiles show insufficient information on Uganda. The ISRIC database presents only 13 soil profiles for Uganda, which are not enough for soil erosion and soil water management risk monitoring. In addition, very few of the weather and climate observation stations of UNMA are in service. This limits the spatial coverages for extensive climate risk analysis in Uganda.

Limited up-to-date information: Some of the most relevant national information systems such as UBOS and MAAIF provide good information services on various risk management themes, through census and surveys reports but the data are usually outdated. The latest MAAIF pest data was generated three years ago, in 2013/2014. Also, the UBOS data on socio-economic aspects of farmers' livelihoods are not

updated on time. None of the information systems provide data on market of commodity stock and input.

Insufficient historical information: Not all the national information sources have relevant historical data that allow for robust risk analysis on agricultural systems. Historical data on production and yields of important commodities like coffee is not available on the UCDA's website. There is an initiative under the Plantwise programme to collect and share plant health information but no historical data exists on pests and diseases that affect crops. This hinders crop health trend and variability analysis for effective risk monitoring and management.

The way forward

Build human and financial resources for regular data collection and extensive coverage of useful risk related information. The government of Uganda and its private partners should invest adequate resources to hire and train more extension officers that are capable of identifying, gathering and analyzing different range of information useful for agricultural risk management. Highest priority should be placed on thematic areas with the weakest information systems such as plant health (crop pests and diseases), soils, commodity stock and input market, production levels and animal diseases information.

Negotiate for public-private partnerships for improved access to information, especially in remote rural areas. The Ministry of Agriculture, Animal Industry and Fisheries should undertake persuasive discussions with multinationals and local communication firms on the need for investment in ICT packages and internet services in rural areas. Negotiations should be incentivized to induce the investors to render quicker and cheaper communication services that will enable smallholder farmers to access all forms of risk-related information.

Initiate a national system to review historical data to provide long time series and geographically disaggregated information on production and yields, commodity stock, and pest and disease risks. Regional and international food balance sheets should be an important starting point.

Develop a system of coordination among all the national information systems. The focus of the coordination should be directed to increasing credibility, reducing duplication and cost associated with disseminating agricultural risk information.

Table 2: Scores for information on thematic & sub thematic areas of ARM in Uganda.

Strongest information areas (%)	Weakest information areas (%)	
Prices	90	Plant health 30
Satellite images	85	Soils 36
Policies	74	Stocks and inputs availability 40
Trade	70	Costs of Animal diseases 50
Meteorological and Climate	70	Production and yields 50
Socio-economic & sectorial	62	
Communications	61	
Risks of endemics & emerging diseases	60	

Source: PARM IS-ARM Report, Uganda (2016).

6 Regional Agricultural Trade Intelligence Network (RATIN).

7 Uganda National Agro-Input Dealers Association (UNADA).

PARM Secretariat International Fund for Agricultural Development (IFAD)

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Uganda



Warehouse Receipt System¹:

Making progress in finance, market and post-harvest risks management

Policy Brief

October 2016

Key message

- 1 Post-harvest losses, commodity price fluctuations and drought are among the top rated risks facing the agricultural sector in Uganda.
- 2 The warehousing receipt system (WRS) issues a document that gives a farmer access rights to a well-managed storage facility. It also has an attached collateral scheme that eases farmers' access to financial services.
- 3 Two forms of WRS exist in Uganda; the unregulated warehouse receipting started in the 1990s, and the regulated warehouse receipting, which was introduced in 2006 with support from the European Union.
- 4 Effectiveness of the WRS is constrained by risks of double pledging with operators, lack of compliance with the quality standards of the dominant buyer - World Food Programme (WFP) - and the limited reach of the system to rural farmers.
- 5 The Ugandan Government should support training for warehousing agents, build on procedures for commodity quality standards and reform the regulatory body (Uganda Commodity Exchange) for warehousing.

Context

Agriculture forms the mainstay of Uganda's economy. It contributed to about 22.5% of the GDP, 54% of exports and 70% of employment in 2013. The **Risk Assessment Study for Uganda finalised by the Platform for Agricultural Risk Management (PARM) in 2015** noted post-harvest losses, commodity price fluctuations and drought as among the top rated risks facing the agricultural sector. The estimated losses to major grains like maize and cowpea after 90 days of harvest average 59% and 79% respectively (WFP 2014). With the seasonality of production and inadequate storage facilities, farmers are compelled to sell their produce immediately after harvest. When managed professionally, WRS has extensive benefits for farmers to store commodities for months after harvest, secure finance, better market and reliable input supply.

Types of WRS in Uganda

Warehouse receipt system (WRS) is described as a scheme that entitles a farmer to deposit storable commodities such as grains (e.g., cereals and pulses) in exchange for a document known as warehouse receipt (WR). The receipt is issued by a professional warehouse operator/manager to provide a proof of ownership of stated quantity and quality of commodity. The value on the receipt may be negotiable depending the legalities set out for WRS operations in a particular country.

In Uganda, the WRS Act 2006 stipulates for the licensing and regulation of warehouses, the operators and receipts. The law also recognizes constructive possession of financiers on security over pledged goods controlled by collateral managers. However, there is limited security for some financiers as the law is only limited to public warehouse operations, even though a lot of private collateral management activities are taken place. This increases risks of double pledging of goods and fraud cases. Two main categories of warehouse receipt systems exist in Uganda: the unregulated private warehouse receipting and the regulated public warehousing system. Differences between these two systems are outlined in **Table 1**.

Unregulated private WRS

The unregulated private warehouse receipting is the most popular type in Uganda. It was started in 1990s by the Eastern and Southern Africa Development Bank (PTA Bank) and an international inspection company (known as SGS). At the moment, the system is dominated by three major collateral managing companies; ACE, DCL and Coronet. Since the inception of its operation in 2008, Coronet has been working with about 102 groups of borrowers and nine local banks. The system focuses on major crops like cotton, maize, cocoa beans, wheat and rice. It provides farmer cooperatives with easy access to post-harvest services (like quality testing and

¹ WFP (2014): Reducing Food Losses in Sub-Saharan Africa (improving Post-Harvest Management and Storage Technologies of Smallholder Farmers.) An "Action Research" evaluation trial from Uganda and Burkina Faso. August 2013 - April 2014.

(i) Policy brief developed by **Balikisu Osman** for the Platform for Agricultural risk Management (PARM). The information is based on "Study on Appropriate Warehousing and Collateral Management Systems in in Sub-Saharan Africa" conducted by J. Coulter, Consulting Ltd and Sullivan & Worcester, UK LLP. The subject countries are Burkina Faso, Niger, Senegal, Ghana, Cote d'Ivoire, Madagascar, Cameroon, Mozambique, and Uganda. The full reports were coo-published by the Agence Française de Développement (AFD), Technical Centre for Agricultural and Rural Cooperation (CTA) and International Fund for Agricultural Development (IFAD) / PARM.



value-chain development) and production credit (for inputs, labour). Nine banks are lending for private warehouse activities in Uganda. Interest rates are as high as 23% per annum for local currency and 11% for hard currencies. Loan to value ratio ranges from 60% to 80%. Fraudulent related cases in this system amount to losses of about USD 800,000. Other problems include high cost of services to rural clients and lack of understanding of the transactional risks, on parts of the banks.

Piloted projects on unregulated WRS were initiated in rural areas of Uganda, with support from the Ministry of Trade and the United States Agency for International Development (USAID) in 2004. The projects aimed to enhance access to WRS services for poorer farmers in remote areas. It started with two coffee and cotton seed producer groups in the Kazinga Channel Zone of Uganda and later extended to the Eastern and Western part of the country. Evidence suggests these projects to be successful but suffered competition from fair trade groups that offered 50% premium over the indicative market price.

Regulated public WRS

Regulated warehousing system on the other hand involves the establishment of government warehouses open to depositors from the general public. But it may be operated by the state or leased to a private collateral manager. The system started in 2006 with technical and financial assistance from the European Union (EU), followed by the enactment of a WRS Act, and appointment of Uganda Commodity Exchange (UCE) as the main regulatory authority. Both individual and cooperative smallholder farmers were the prioritized clients to store commodities in the state or privately licensed warehouses. Warehouses are operated by chief warehouse examiner who trains staff on commodity inspection, compliance and quality checks. Farmers are also connected to an electronic platform – the eWRS – where they receive trainings on post-harvest management.

Between 2008 and 2013, deposits of maize were 22,600 tons at three of the five UCE licensed warehouses, which accounts for about 90% of the total deposits (Onumah and Nakajjo, 2013²). This was a small fraction of the quantities required to make the UCE viable after the end of the EU funding in 2010. Besides, the grain quality hardly conformed to the standard of WFP – the dominant buyer.

Table 1: Differences between the two WRS in Uganda.

Unregulated Private	Regulated Public
Started in 1990s by international companies	Started in 2006 with assistance from the EU
Dominated by three professional collateral management companies; ACE, DCL and Coronet	Regulated by the Uganda Commodity Exchange (UCE) under the WRS Act 2006
Main clients are farmer cooperatives and other groups.	Both cooperatives and individual smallholder farmers
Target farmers producing all kinds of crop	Work with grain producers
Interest rate is 23% with loan/value ratio at 65-80%.	Interest rate is 23% with loan/value ratio at 50-60%.

Usefulness for Agricultural Risk Management

Avoid post-harvest losses: The traditional handling of commodities produced after harvest causes pest and disease attacks both on-farm and off-farm. Training systems provided through the Uganda's eWRS regulated by the UCE and Sandbox Technologies enables farmers to learn effective post-harvest handling techniques for all types of weather conditions. Warehouses provide safer

year round storage facility for agricultural produce. This reduces the amount of commodity losses during damp weather and drying periods, while improving the quality. In the Iganga area of Eastern Uganda, the improved quality of WRS stock attracted larger traders offering better prices.

Manage seasonal price risks: The seasonality of farm production and lack of storage facilities among smallholder farmers in Uganda are factors contributing to fluctuations in inter/intra-annual commodity prices. The system of safer storage in warehouses allows farmers to keep their commodities for months after harvest. In the process, they may sell later when produce are out of season, to benefit higher prices, increase incomes and well-being. In 2006, beneficiary farmers of the USAID supported warehousing for cotton in Eastern Uganda, for instance earned about 22% increase in the market price per kg of seed cotton. The inter-seasonal arbitrage also smoothen price hikes for out of season food commodities, reduce affordability and access constraints on consumers.

Access financial packages: Credit and insurance facilities are crucial forms of buffer to smallholder agricultural farmers against anticipated and unanticipated risks. The collateral component of the warehousing ensures that farmers can use receipts to access loans from participating financial institutions. The UCE issued e-receipts for example entitles farmers to transfer their stocks to financiers in exchange for loans or to a buyer in fulfilment of a sales transaction. Also, in the pilot schemes, the USAID provided credit guarantee facility valued at USD 16 million to Stanbic Bank to support warehouse receipt operations. Notwithstanding, the entire system of warehousing also assures farmers of safety against threats of fire, theft and some major catastrophes. The activities of ACE and Coronet in particular operate with mandatory insurance policies on fire and burglary for all commodities under their management.

Policy Recommendations

Invest in training programs aimed at enhancing scaling up of private warehousing systems to more rural clients. The programs should target all forms of financial institutions (formal and informal) that can link up with rural-based clients and exporters to develop and/or extend their supply chains to private collateral managers. Training should focus on the understanding of the various components of the warehouse receipting system, including the transactional risks and potential mitigation measure.

Refine policy and regulation on warehouse produce quality standards to ensure conformity to testing procedures and standards of regional market and dominant buyers such as the WFP in the grains market. There should be an appropriate legal enforcement system to regulate the quality of warehouse commodities. Commercial grain drying and storage infrastructural facilities should be installed at vantage locations in the country to enhance large scale processing and better storage/warehousing of produce from smallholder farmers.

Reform the governance and ownership structure of the UCE. This should be accompanied with new capital and management for a fresh start. UCE authority should enjoy a high level of autonomy from the government, and have no budgetary dependencies. Leading buyers, banks and warehouse operators should have real stake in the management of the UCE.

Enact regulation to control the activities of the private warehousing systems. The regulations should be directed at reducing risk of fraud while making the private-based warehousing viable in operation.

Seek for well-experienced external partners. The government should leverage warehousing initiative with potential investors such as the Eastern Africa Grain Council (EAGC) and the AFGRI (South African operator with over 20 years of experience in warehouse management). The terms of reference for partners' operations should be flexible to enable them to pull back at any time when there appear to be conflicts of interest

² Onumah, G.E. and Nakajjo. (2013). Final Report: Study of the Efficacy of the Warehouse Receipt System in Uganda. Undertaken on behalf of the World Food Programme (WFP) Uganda and Uganda Commodity Exchange (UCE) by the Natural Resources Institute, University of Greenwich.





Plant Health Control



Uganda



Crop pests and disease management in Uganda: status and investment needs

Executive Summary

Study conducted by 

March 2017

This report provides a comprehensive overview of the root causes for pest and disease risk in Uganda; the pests and diseases that affect key value chains and current management options; and the Ugandan legal and institutional framework for pest management and key actors. A review of the cost-effectiveness of different extension and communication approaches is provided, as well as of existing information and communication technology (ICT) approaches, to inform recommendations for an investment plan for future pest management, including the potential to further utilise ICTs.

To reduce crop losses due to pests and diseases, the detailed investment plan for the medium term is proposed to ensure establishment of sustainable pest management systems and to help achieve Uganda's national targets for improving agricultural productivity and exports by 2020.

Why the need to invest in Uganda's pest management systems?

Agriculture in Uganda provides approximately 24% of gross domestic product (GDP), generates nearly 48% of export earnings, and provides direct and indirect livelihood support to 80% of all households. Agriculture is thus fundamental to the country's economic growth and to attaining middle income status by 2020.

The agriculture sector is one of three priority areas in the 2nd National Development Plan (NDPII), which covers the period 2015/2016 to 2019/2020. The plan includes four strategic objectives to increase production and productivity in the agriculture sector and stimulate export. The NDPII's more detailed Agriculture Sector Strategic Plan (ASSP) has a vision for 'a competitive, profitable and sustainable sector', and its mission is 'transforming the sector from subsistence farming to commercial agriculture'.

From the current US\$1.3bn in agricultural exports, the ASSP has a target of US\$4bn by 2019/20; 73% of this projected growth is expected from crops. Under the ASSP, the government has taken a commodity-based value chain approach as a cost-effective way to spur agricultural production and realise productivity. Selected priority value chains include bananas, beans, cassava, citrus, coffee, cotton, maize, rice, and tea.

Actual economic losses from plant diseases are hard to find in Uganda and in many other African countries (PARM 2017). However the Agricultural Risk Assessment Study by PARM/IFAD (PARM 2016) concluded that crop pest and diseases have very high frequency and very high average and maximum severity. Crop pest and diseases have the highest risk score in that report and deserve to be a priority.

What are the risks?

Crop pests, diseases and weeds are identified as the greatest risk to Ugandan agriculture and, unless addressed, the ASSP objectives are at risk. Losses due to pests and diseases are estimated at: 10-20% (pre-harvest); 20-30% (post-harvest); and up to 100% for perishable crops and export crops. Annual losses in the priority crops suffering the highest monetary loss due to pests are estimated at: US\$ 35-200 million (bananas), US\$60-80 million (cassava), US\$10 million (cotton) and US\$8 million (coffee).

Examples of key pests that are seriously constraining any increases in agricultural productivity in priority crops, include: coffee wilt disease, banana xanthomonas wilt (BXW), cassava brown streak virus, fruit flies and citrus canker.

Pest spread and potential economic impact depends on various factors including: the value chain affected; geographical location;



management practices available at farm level and; whether the pest is categorised as well-established or new:

1. **Well-established pests:** Two broad categories are identified that reflect the level of risk:
 - a. Likely to cause losses each season unless managed.
 - b. May occasionally occur in larger outbreaks.

The impact of such pests can be high where there is limited farmer awareness of solutions, limited extension support, lack of practical solutions, and counterfeit or poor quality inputs (chemicals and seed).

2. **New pests:** New and emerging pests and diseases can be serious impediments to production and the ability to respond effectively to such pests will be necessary to achieve ASSP targets. Actions will be different for the following categories:
 - a. Those not yet in the country.
 - b. Those that are newly present in the country but not yet occupying all ecologically suitable areas.

Key factors contributing to the introduction and spread of new pests and diseases include inadequate border and internal controls and limited enforcement of material movement regulations, particularly planting materials. Outbreaks may also go unnoticed due to lack of information on these pests/diseases to inform decision-making.

Of the priority pests identified for Uganda, most are already widespread and action is required to manage them. However, in recent years several major new pests have arrived in Uganda, including Tuta absoluta (moth), Maize Lethal Necrosis Disease (MLND) and certain species of fruit fly. Actions are therefore needed to address both categories of established and new pests.

What is already being done?

The policy and legal framework for pest management in Uganda has recently been strengthened with the 2015 Plant Protection and Health Act. However, an institutional framework is only fully adequate if it can be implemented. The Department of Crop Protection (DCP) and other stakeholders currently do not have sufficient capacity for implementing, monitoring and, where necessary, enforcing regulations. In addition, the proportion of the ASSP budget allocated to crop protection is relatively small and not adequate for the substantial increase in capacity required for DCP to fulfil all of its responsibilities to achieve an effective national pest management system.

Several donor-funded projects related to pest and disease management, or including relevant components, are also being implemented in Uganda, including World Bank and IFAD support to Agricultural Technology and Agribusiness Advisory Services (ATAAS). ATAAS aims to transform and improve the performance of ATAAS systems in Uganda and will end in December 2017. The World Bank supported program Agricultural Cluster Development Project (ACDP, US\$150 million) started in January 2017 and will end in March 2022. Although pest risk management is not an ACDP priority, there are various areas where planned actions intersect with the proposed investment strategy in pest management.

Investing in addressing Uganda's pest problems and reducing crop losses

To significantly reduce risk and incidence of pests and disease, three main areas are of central importance:

1. availability of and response to information on pest/disease occurrence;
2. access to pest management support services needed by farmers and other value chain actors; and
3. capacity of the Ministry of Agriculture, Animal Industry and Fisheries (MAIFF), including the DCP, to lead and co-ordinate crop pest risk management across the country.

Interventions in the above areas provide the three key components of the proposed investment plan, which details a 5-year program with an overall budget of US\$23.88 million. The plan is expected to reduce crop losses, as a result of reduced risk from pests and diseases, leading to increased production and productivity of key crops, and increased household level incomes for smallholder farmers.

The proposed investment plan takes into consideration MAAIF's existing plans and efforts and, in the medium term, aims to strengthen capacity of agricultural institutions (particularly DCP and extension) and to establish systems and structures for effective pest management. Complementarity with other large investments such as ACDP is also considered.

What can be achieved through the investment plan?

To establish sustainable pest management systems and structures for effective pest management in Uganda, the proposed investment plan aims to achieve a number of key outcomes under three main components:

Component 1 (US\$ 11 million): Establish cost-efficient information and response systems to detect and monitor plant pests and diseases, providing timely information to MAAIF (and other relevant stakeholders) to effectively respond to pest situations.

Effective response to pest risks requires knowledge of the location and abundance of pests. Currently, in Uganda, little information is gathered to support short or long-term pest management decision-making, which means that responses are often 'too little, too late'. The government has access to some contingency funds for emergency response, and the private sector is likely to contribute where commercial Value Chains are affected. However, response depends on monitoring systems to collect data on outbreaks or new pests from various sources.

To help address this situation and the root causes contributing to the introduction and spread of new pests, we propose that cost-effective mechanisms are established for collecting the information, and to put in place the procedures to ensure a timely and effective response. Proposed interventions include:



1. Operationalisation of emergency pest response plans (US\$0.32 million).

The 2015 Plant Protection and Health Act provides for a Plant Protection and Health Technical Committee (PPHTC) led by the Commissioner for Crop Protection, with broad stakeholder representation from public and private sector. A key role of the PPHTC would be to develop and oversee implementation and regular review of overall, and sector/value chain specific, emergency pest response plans. PPHTC should co-opt additional private sector and civil society participants to prepare the plans, which will specify roles and responsibilities of different actors, including financing mechanisms for emergency operations.

2. Effective pest monitoring at border points decreasing risk of new pest incursions (US\$0.30 million).

Preventing the entry and establishment of new pests is a cost-effective strategy. Although some pests spread naturally, cross border movement and trade is a key factor in spread of pests. Currently, only 5 of the 30 gazetted border posts are manned by DCP. Analysis to determine and monitor the risks is required, with deployment of additional trained and equipped inspectors focusing initially on borders where risks are greatest e.g. Entebbe airport and other major import routes.

3. Pest surveillance system established to provide early warning (US\$10.33 million) Note: system also provides advisory services.

Pest information will be collected from various sources, and integrated into database systems to provide early warning and the opportunity for effective tactical and strategic responses. This will be overseen by a joint working group established under the Agricultural Risk Management National Steering Committee (ARM-NSC), who will also ensure that the integrated data meets the needs of various users. The ARM-NSC is, according to the MAAIF Framework implementation plan for statistics and risk management, a unit to streamline collection and use of agricultural data. Plant clinics are a key source of surveillance data as they collect valuable data on pest problems, it is therefore proposed to scale up the current network of clinics from 100 to 1200. Regular updates of appropriate samples of households will allow tracking of pest problems and costs for strategic decision-making. 1,500 local government extension staff and supervisors will be trained and equipped with tablet computers (or smart phones).

Data will also be provided by specific surveillance undertaken by DCP or others as necessary, and through crowd sourcing tools (e.g. youth chat group U-report, which has been used to track cases of BXW), to verify pest occurrences and extend of spread.

Note: Although plant clinics have been budgeted under surveillance, a large part of their value is that they also provide pest management advisory services. Whilst the majority of the investment for this component is for establishing a pest surveillance/advisory system, once the system is in place and capacity strengthened, operational costs will be approximately US\$1.2 million/yr. Of this, US\$0.9 million is estimated cost of staff allowances that would be needed whatever tasks staff undertake.

Component 2 (US\$4.41 million): Improved access to pest management services by smallholder farmers and other value chain actors to effectively manage plant pests and diseases.

The root cause analysis found that farm level management of pests is inadequate for a number of reasons. Two major factors are: 1) farmers are not aware of management options and how to implement them; 2) farmers are unable to access quality inputs required for risk management.

To address these problems, activities are proposed under two key outputs:

1. Improving farmer awareness of pest and disease management, including through mass media (US\$2.39 million).

Although MAAIF is investing in more extension staff, they need regular training to keep up-to-date with new approaches, including using ICTs. Training of extension staff to deliver advice at plant clinics which also contributes to a pest early warning system, is budgeted under component 1. However, not all farmers can be reached directly so a number of media awareness campaigns are proposed, based on pest information system data identifying outbreaks, or indicating common problems occurring at particular times of year/climatic conditions. Campaigns will also focus on the importance of using good quality seed and clean planting material (see below). Opportunities for expanding the use of other national and international databases on pest management information to strengthen advice will be identified, and appropriate Application Program Interfaces (APIs) developed.

2. Improving access to high quality inputs (crop protection products and seed) (US\$2.01 million).

Adulterated and counterfeit products currently discourage farmers from investing in input use. However, whilst input use by Ugandan farmers is generally low, agricultural commercialisation is expected to lead to increased use, particularly as higher incomes result from improved market opportunities. A key component of the World Bank ACDP initiative plans to support intensification of beans, cassava, coffee, maize and rice. At the same time, ACDP will implement a pest management plan to mitigate negative effects (MAAIF, 2014). Therefore such actions are not included in the proposed investment. ACDP also proposes strengthening the seed regulatory framework. The proposed investment aims to complement these activities and target actions to increase the production and use of quality seed. For priority crops, where returns are lower (banana, beans and cassava), district staff will be trained to inspect planting materials, using standards that will be developed to support the quality declared seed (QDS) approach. District staff will need to be legally empowered to enforce seed regulations. As seed providers, the Uganda Seed Trade Association, and private seed companies should also be involved in efforts to increase quality seed use, as well as the collaborative Integrated Seed Sector Development (ISSD) initiative, led by CDI in the Netherlands, which has championed seed entrepreneurship with Ugandan farmer groups.



Component 3 (US\$5.49 million): Capacity development to monitor and combat pests and diseases. Whilst many of the activities in the above components include capacity strengthening, the focus here is on DCP, which plays a pivotal role in crop protection and has a legal mandate for seed and pesticide regulation. Strengthening DCP's capacity is necessary for achieving and sustaining the outcomes of the other components and should be led by DCP, although a number of training providers will be required e.g. the Centre of Phytosanitary Excellence in Kenya. The priority interventions proposed are:

1. Human resources: reviewing of DCP structure and staff training (US\$2.07 million).

Assuming the DCP is not split (see below), we propose investments to strengthen its ability to deliver on its current responsibilities and mandates. To achieve this, some additional staff are proposed, including the addition of a senior partnerships and communications manager to support DCP's role in crop protection. The development of a strategic plan is necessary to increase and train staff (in phytosanitary processes), to fill vacant positions and provide sufficient human resources to carry out all DCP's responsibilities. The strategy should also include working to obtain ISO 17025 accreditation for DCP, which demonstrates managerial and technical competence. The majority of costs (US\$1.4 million) are to cover new staff salaries that will mean a recurring cost of approximately US\$0.34 million/year for new staff following the end of the investment plan.

2. Improving infrastructure for pest and disease management (US\$3.41 million).

DCP's effectiveness is constrained by a lack of facilities and equipment in its laboratories, quarantine unit and for pesticide and seed testing. It is proposed to undertake a formal infrastructure needs assessment of existing facilities, including the refurbishment and maintenance of laboratories and greenhouses. It is also proposed to provide IT capacity to allow rapid communication and sharing of data/information.

Coordination (US\$3.15 million): A Project Management Unit will be established with full-time Ugandan staff to provide overall leadership and coordination, as well as necessary operational costs. Project monitoring and evaluation will be the responsibility of the unit and is costed at 10% of the overall budget to include relevant staff and operational costs.

How will the investment plan be implemented?

Multiple stakeholders will be involved in the implementation of the activities proposed in the investment plan to ensure that Uganda has a robust and reliable plant health system.

Central government has a key role to play, including providing national leadership in addressing crop pest and disease risks; implementing specific activities (particularly those delivering public goods); coordinating, guiding and overseeing the inputs of various stakeholders; and facilitating and managing the different partnerships entailed.

Partnerships also need to be established with other government ministries, departments and agencies in order to ensure implementation of actions that are complementary to pest management (e.g. extension services, diagnostic services and chemical regulation). For example, strong co-operation is needed between DCP and local government, as well as with the directorate of extension, to implement plant clinics, which contribute to both general surveillance and delivery of advisory services as well as other services. Other actors, particularly the private sector, have key roles to play and DCP should ensure that their interventions are dovetailed with the overall investment plan.

According to the ASSP, MAAIF is implementing a new structure proposed in a 2010 review, which includes dividing DCP and establishing a new Department of Crop Inspection and Certification (DCIC). Some stakeholders are uncertain as to the merit of the proposed changes, and there is continuing discussion about this proposal. The ACDP refers to DCIC as the lead agency in strengthening regulatory systems. But splitting the DCP in this way would necessitate a major change to the new Plant Protection and Health Act (and other legislation) to re-assign the responsibility for activities to the DCIC, which are currently assigned to the Commissioner of Crop Protection.

Who will finance the investment plan?

Finance for the investment plan is likely to come from a variety of sources. The overall budget has been estimated at US\$23.88 for a 5 year program of interventions. Some elements of the plan may be implemented as externally funded independent projects or private sector activities. Efforts should be made to embed such projects within the overall investment plan.

Government funding

With many of the 'public good' activities (e.g. supporting value chains and farmers that are not highly commercial, where there is limited involvement of the private sector), the government is expected to be the primary financier. Recurring costs will be required, as part of organizations' mandates, and these should be funded through regular budget lines as soon as possible, if not immediately. These include the costs of additional staff to be recruited to fill existing vacancies, as well as to staff the additional posts recommended. However, it should be noted that the financial requirements to build capacity and establish effective systems are considerably in excess of what the government is likely to be able to provide in the short term and additional donor support will be needed.



Donor support

Some of the donors that have, and still continue to support projects related to pest and disease management include the World Bank, USAID Feed the Future, IFAD, European Commission, FAO, Bill and Melinda Gates Foundation, and Embassy of the Kingdom of the Netherlands. A good example of an IFAD-funded project on pest and disease monitoring and management is the CABI-led Plantwise project¹. Investment in scaling-up the Plantwise approach is a significant proportion of the proposed investment.

While this donor list is not exhaustive, it is important that any efforts for future investment to manage pests and diseases recognise existing initiatives, to ensure effective coordination and avoid duplication of efforts, as promoted through the Paris Declaration on Aid Effectiveness (2005) and Accra Agenda for Action (2008). Such coordination from the government side would occur through DCP, which is currently inadequately resourced to fulfil that role.

The purpose of this proposal is to align all the initiatives around a single priority plan on crop pest and diseases agreed and led by MAAIF, and to bring around it additional resources that are needed.

Cost recovery/cost sharing

Regulatory agencies can recover some of their costs through fees for services to businesses such as import risk analyses, input (pesticide and seeds) registration procedures, phytosanitary export certification, and inspections at farms or pack-houses. Where such fees are levied, it is desirable for the income to be retained by the agency, rather than the government treasury. Several international agreements specify that fee rates should not exceed the cost of providing the services.

Private sector support

Private sector actors can also be expected to support the plan, especially as it relates to commodity value chains that are well organised and generating substantial foreign export earnings.

Another specific area in which private sector funding could be expected is in the implementation of emergency responses. Emergency response plans should detail, as far as possible, not only 'who does what' in the event of an emergency, but how it will be financed by the various stakeholders. Different value chain stakeholders could be involved in the development of the plan and coordinated by DCP.

What are the next steps?

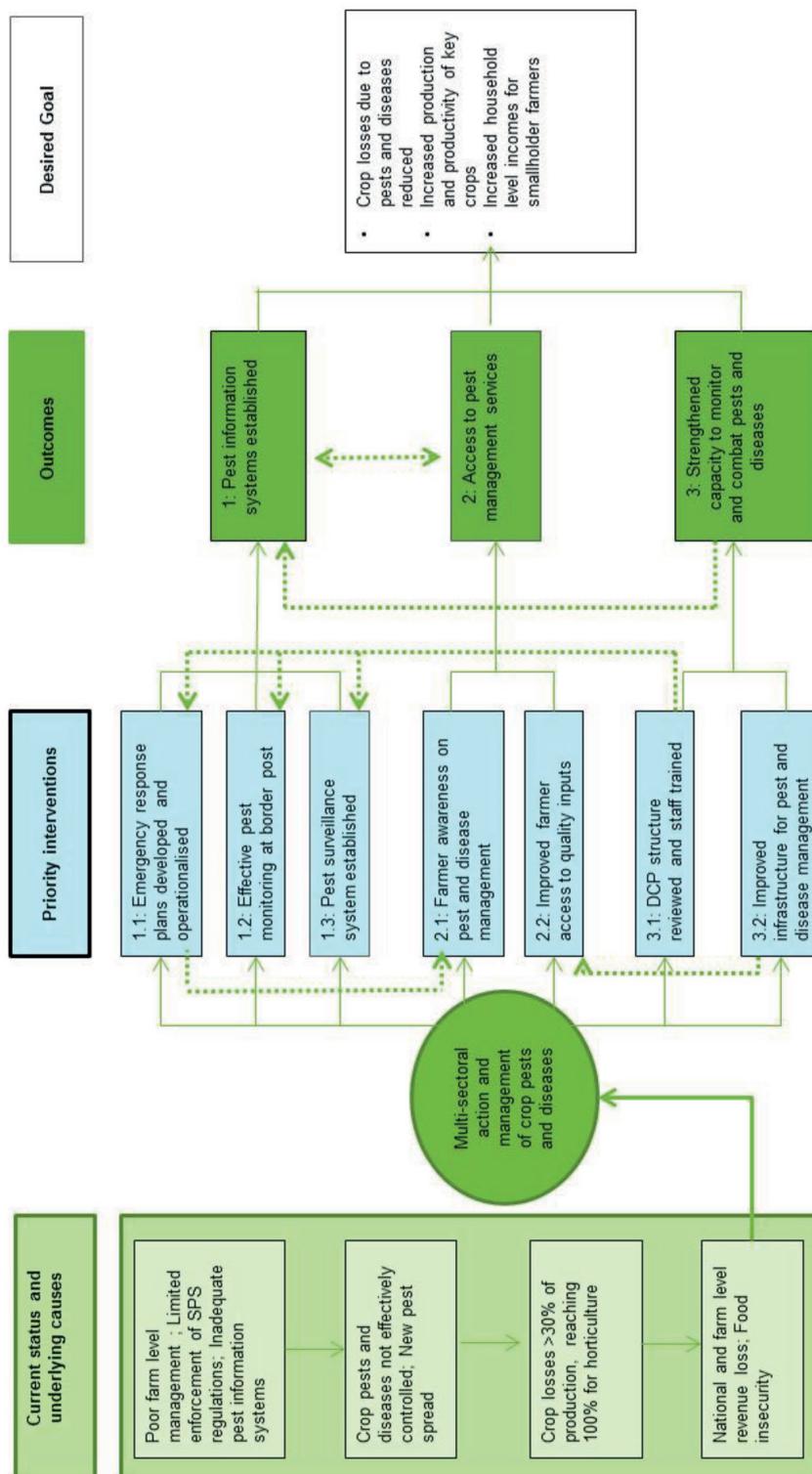
The immediate priority in the 5-year work plan would be to operationalise the plant protection and plant health technical committee to drive and oversee the implementation of the investment plan through:

- preparation of an implementation plan, including a detailed inception phase for year 1;
- preparation of detailed budgets for specific activities, within the overall framework of the investment strategy;
- engagement of stakeholders and promoting the investment plan;
- mobilisation of resources; and
- ensuring coordination and dovetailing of different crop protection initiatives to strengthen the plant health system.

Implementation of the investment plan is urgently needed in order to safeguard targets in the ASSP that details delivery against a major priority area in NDPII, including an increase in agricultural exports from US\$1.3bn to US\$4bn by 2019/20.

¹ Plantwise is funded by a consortium of donors including DFID, SDC, EU, Ministry of Foreign Affairs of Netherlands, ACIAR, Ministry of Agriculture of the People's Republic of China, Irish Aid and IFAD.

Graphical summary





A photograph of an elderly man with a joyful expression, wearing a light-colored plaid short-sleeved shirt. He is holding a large bunch of green bananas. The background is a lush green field of banana plants. The text 'Finance and Information for Risk Management' is overlaid in white serif font on the left side of the image.

Finance and Information for Risk Management



Uganda



Finance, Information and Risk Management (FIRM)

Executive Summary

November 2016

Introduction

Uganda agriculture is dominated by small-scale farmers, of which the majority owns less than two acres of land. Despite a good agro-climatic environment, yields in Uganda are low. Farmers rely on self-propagated seeds and outdated production and storage technologies. In Uganda, agriculture is not managed as a business by the majority of farmers.

This situation leads to a deadlock: small, non-commercial farmers are not attractive customers for financial institutions, as well as information, input, or equipment providers. Due to farmers' limited access to information, finance and markets, they cannot professionalize their farming business and manage agricultural risks. This keeps their risk exposure high, to which farmers respond by remaining diversified and relying on subsistence farming. The result is a poor performing sector which is more exposed to shocks like droughts than necessary.

FIRM

FIRM (Finance, Information and Risk Management) will break this deadlock by applying a holistic approach to service delivery and risk management for farmers. FIRM facilitates business between farmers and banks, insurers, input & equipment providers or extension services. FIRM enables that by sharing farmer profiles and risk information between farmers and their business partners. The platform also facilitates transactions by introducing a debit card.

The platform

At the core of FIRM is an information platform provided by FIT Uganda called FARMIS. The platform collects agronomic and marketing information from farmers. The system encourages farmers to keep records and to base their business decisions on improved planning. This is enhanced with risk information based on the Agri Risk Analyzer, which provides a risk assessment to farmers and provide insight in which risk mitigation solutions are optimal (given costs and benefits) for each farmer.

The platform will be accessible for farmers, banks, insurers, input & equipment providers and the public sector. Based on farmers' preferences, information will be shared with these partners to facilitate transactions. For example, if a farmer wants to receive a loan, banks can use the profile and risk assessment to determine whether the farmer is eligible for a loan and make a specific offer. Insurance companies can identify (groups of) farmers which can be insured. Irrigation equipment providers can identify which farmers will benefit from irrigation (based on the risk mitigation analysis). These actors can also cooperate to provide packaged services like irrigation loans, or credit-life insurance.

Upward spiral

The FIRM system creates an upward spiral: farmers can take informed decisions based on sound information on markets and the risks they are exposed to. Farmers are encouraged to invest more into their business and to actively manage their risks, for example by purchasing insurance, irrigation or improved seeds.

This management of risks makes farmers more willing to borrow and more attractive to financial institutions. The FIRM platform keeps marketing, distribution and operational cost low for financial institutions. Farmers can finally access loans to further increase productivity, lower risk exposure, and improve their market position.

Public-Private Partnership

Infotrade:

lead partner, operating the FIRM system.

**Agri Risk Analyzer (ARA):**

providing risk analytics.

**FINCA:**

partner bank providing credit to eligible farmers.

**Jubilee:**

partner insurance company, providing insurance to eligible farmers.

**Makerere University:**

development partner for ARA, technical support & training.

**MAAIF:**

Public partner, extension services.

**PARM:**

facilitator, stakeholder management.





FIRM Stakeholder Benefits

Farmers

- Improve farming business by using market & weather information and agronomical knowhow;
- Improved risk management through insight in the risk profile and mitigation solutions;
- Cashless transactions with a debit card;
- Linkage to banks, insurers, input & equipment providers, extension services.

Input & Equipment providers

- Access to a pool of farmers profiled and pre-screened on risks;
- Significant reduction of marketing, distribution and operational cost;
- Risk scores and mitigation advice stimulates demand for risk solutions like irrigation.

Banks & Insurance

- Access to a pool of farmers profiled and pre-screened on creditworthiness;
- Significant reduction of marketing, distribution and operational cost;
- Improved risk management due to risk scores and risk mitigation advice on farmer and portfolio level;
- Enhanced cooperation between credit and insurance providers.

Public Sector / Extension Officers

- Platform to deliver public services, such as information and extension;
- Improved insight in the risk profile of farmers and the ability to actively reduce risk on local and regional level;
- Staff trained on risk management.

Roadmap & Activities

The FARMIS platform is already in operation, and facilitates record keeping for farmers and the dis-semination of weather and market data. The FIRM project focuses on enhancing FARMIS with risk analytics. For Uganda, specific risk information has to be collected, verified and modelled. On the platform, linkage to banks, insurers, input & equipment providers and the public sector has to be created and managed. This will spark product development and innovation of marketing and distribution by the FIRM partners. Another important activity is the roll out of the debit card which farmers will use for transactions.

FIRM will be implemented with through a network of Production Information Advisors (PIA's), which will advise and support farmers, in coordination with extension services.

Business model

FIRM's business model is based on income from farmers (an annual subscription fee) as well as income from partners receiving farmer information (a pay per view model). The major share of investment is required for development expenses during the first three years of operation.

Outcome and Impact

Market reach

FIRM intends to reach 170,000 farmers after five years (by the end of 2021). Of these farmers, 60,000 have accessed loans, 13,500 have access to insurance, 34,000 have received capacity building and 60,000 specific risk management advice.

Impact

FIRM projects the following impacts:

- Improve farmers' resilience and an increase in income of USD 135 per farmer by higher yields, gained due to improved access to weather information, enhanced risk management and access to finance;
- Better sales prices due to access to market information, of USD 11 per farmer;
- A reduction of 4 percent point in interest rates based on the cost savings and improved risk assessment FIRM facilitates for banks. This translates to USD 21 per farmer;
- Discounted offers from input and equipment providers due to cost savings in their marketing and distribution, resulting in an average saving of USD 10 per farmer;
- Reduction of post-harvest losses due to access to market information and credit for financing post-harvest handling and storage. This counts for USD 25 per farmer.

Overall, the projected impact of the FIRM project is an increase of income of USD 31m for all farmers combined over the project period.

Funding Need

FIRM needs funding to overcome the (most-ly one-off) development cost. The funding requirement is USD 770,000, mostly to be spent on (further) development of the FARMIS platform, field network and the Agri Risk analyzer.



PARM Secretariat International Fund for Agricultural Development (IFAD)

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Uganda



Feasibility Study on Improving Delivery of Risk Management Services to Farmers

A Public-Private Partnership built on The Finance, Information & Risk Management (FIRM) Model

Concept Note

April 2017

Study conducted by





1. Background

Agriculture is still the mainstay for a large part of the Ugandan population. The sector contributes 70% of the employment in the country. The agricultural sector is, however, at rates below the average GDP growth in Uganda.

The production structure of agriculture in Uganda is dominated by small-scale farmers (90% of the farms), the majority of who own less than 2 acres of land each. Despite good agro-climatic conditions with two rainy seasons in most parts of the country, yields of smallholder farmers remain low. Limited access to quality inputs, finance, and market information, low adoption of modern technology, poor agricultural risk management strategies, and lack of storage and market infrastructure are constraints to the sector.

Both public and private sector have, so far, struggled to address some of the major needs of the farming population. The lack of sustainable services to farmers, such as agricultural credit, market information, insurance, holds agriculture back. This report analyzes key constraints for growth in the agricultural sector in Uganda and present an innovative approach to address some of the key challenges, in particular access to information, finance, and risk management tools in order to leverage investment in the agricultural sector.

The Platform for Agricultural Risk Management (PARM) is working on strategic partnership with NEPAD and the Government of Uganda to mainstream agricultural risk management in the country. This study proposes to build a public private partnership (PPP) starting from a private initiative called the Finance, Information & Risk Management (FIRM) Model led by FIT Uganda. This broader PPP will enhance the delivery of new risk management and finance services to farmers, and the provision of externalities and public goods associated with better access to information and tools for managing agricultural risks, and the creation of new capacities on agricultural risk management and related advisory services.

2. Problem Analysis – Lack of Services for Farmers

UBOS estimates that out of a total population of 19.3 million people in 2010, the number of agricultural households was at 3.95 million. 79% of farming households were male headed and 21% female headed. Ugandan farmers are can be divided into three major categories: subsistence/small scale, medium, and large. The current production structure of agriculture in Uganda is dominated by small-scale farmers comprising of an estimated 2.5 million households.

Uganda has significantly lower on-farm crop and livestock yields than on-station yields in spite of an excellent agro-climatic environment (yields on research stations are 2 to 5 times higher than farm yields). One key reason for the low output is the low investment in agricultural production. Farmer rely on self-propagated seeds and use poor and outdated technologies, both in production and storage. 92% of farmers depend on local seed as the main planting material. 96% of farming households still rely on the hand hoe as the source of farm power. A key problem is that agriculture is not run as a proper business by a majority of farmers.

The lack of large-scale adoption and efficient utilization of appropriate technologies by farmers is not only due to limited knowledge by farmers but also to the difficulty to access credit to purchase high-value inputs and production means. Only 9.1% of the agricultural households have accessed credit in the past. Financial Institutions (FI) are reluctant to finance agriculture due to three challenges: the high credit risk of individual farmers, the high systematic risks all farmers are exposed to (like droughts), and the high operational costs to service the sector. Consequently, FIs require high interest rates which do not match the current returns on investment (ROI) most farmers generate. Without further innovation, the agricultural sector remains in a credit deadlock.

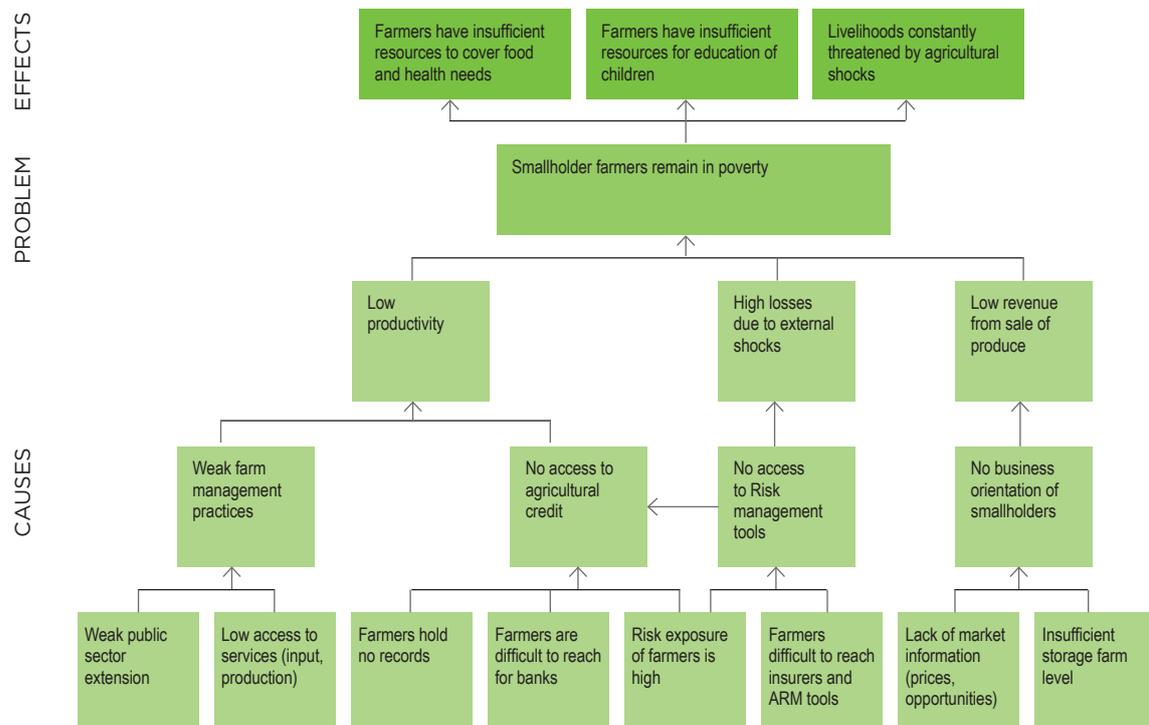
The low productivity and high risk exposure make smallholder farmers an unattractive target for financial institutions (FIs). Smallholder farmers have very little means to manage their own risks as providers of risk management services rarely reach out to smallholder farmers. There is a vicious cycle in that farmers do not get access to credit due to their high risk exposure: either FI find it too risky to lend, or the farmers themselves do not engage in borrowing because they are not able to manage the risks. Without credit farmers are not able to finance risk management measures (such as irrigation, improved technology and inputs). In addition, farmers cannot transfer some of their risk to the insurance sector as insurers have difficulties to reach out to smallholder farmers in a cost-effective manner.

Access to information is another challenge. The most important source of agricultural information for farmers is from radio and farmer to farmer communication. In the most recent agricultural census, radio was the main source of information on weather (85%), farm machinery (44%) and credit (50%), whereas farmer to farmer communication was the major source of information on crop varieties (43%), new farming methods (40%), diseases and pests (45%) and agricultural market information (51%). Due to budget restrictions and logistical challenges the public sector has not been in position to provide farmers with market information. In recent years several private sector companies have entered the market for information services for farmers. But the cost of collecting and analysing data, and to provide information to farmers is high compared to income stream that can be derived from providing farmers with SMS containing information they require. Therefore, the business proposition of providing only information services to farmers is not viable for the private sector. But without market information farmers are not aware of market opportunities and often sell to middlemen at low farm-gate prices.

Smallholder farmers store a large portion of their produce at home due to poor transport system to the markets and the lack of sufficient storage capacity for their produce in the trading system. Storage of produce at home, often on the floor of their own homes, leads to average harvest losses of 17 to 25% for maize, of 1 to 24% for millet, rice and, sorghum, and to 12 to 13% for wheat and barley.

A cross-cutting issue is the lack of knowledge and capacity of farmers. The extension services have failed in recent years to support farmers in developing viable farm businesses. Farmers need support to develop farm records (that allow them to access finance), to identify investment needs on their farms (to reduce risk exposure and to increase productivity), and to understand and harness business opportunities, including ways to manage the corresponding risks. These support functions have not been carried out by the agricultural extension system in Uganda and the private sector has not yet developed extension models that can be operated in a profitable manner.

All these causes have led to a problematic situation where smallholder farmers are left in a poverty trap: the lack of access to finance, information, and other services such as risk management keep productivity and revenue low and lead to high losses due to weather risks, poor storage, etc. Poor smallholder farmers are not able to meet all the expenses of their families for food, health, and education. The following graph summarizes the causes and effects of poverty for smallholders in Uganda.





This analysis shows that many challenges of farmers are inter-related: for example, the lack of proper documentation and the difficulty for financial institutions to access farmers in rural areas, prevents farmers from accessing credit; this lack of funding means that farmers continue to rely on home-grown seeds that lead to low productivity and high risk exposure. The risk exposure, in turn, is another reason why financial institutions are reluctant to finance farmers and farmers are reluctant to borrow from FI. In order to help farmers to lift themselves out of poverty, a model has to be designed that is able to tackle different challenges at the same time and in a viable manner.

3. The Solution - Delivery of an Integrated Service Package of Finance, Information, and Risk Management (FIRM)

The proposed solution for the problems listed in the previous chapter is to develop a business model for an integrated platform linking farmers, traders, financial institutions, and risk management service providers. On the basis of this platform a range of services can be offered, mainly Finance, Information, and Risk Management (FIRM). These services are key to tackle the root causes of farmers' poverty in Uganda. By applying a holistic approach to service delivery in rural areas, a range of constraints for growth can be addressed simultaneously.

At the core of FIRM is an information platform provided by FIT Uganda. On this platform all users receive access to information against a fee. The FIRM project focuses on the further development this platform (already hosting FIT Uganda's Infotrade Premier and Markets System) and adds additional services, such as access to risk assessment, finance, knowledge, insurance, and other risk management tools. In the FIRM approach, financial institutions, insurers, and other service providers are linked to the platform to identify customers. The FIRM model also fosters financial inclusion by providing its farmers with a debit card that allows for cash-less transactions; through this debit card farmers are also able to build up financial records which can be used during credit appraisal.

As an information broker, FIT Uganda is well positioned to manage this system. FIT Uganda's Infotrade platform collects information from farmers on agronomic activity and marketing, weather as well as price information. The Infotrade system encourages farmers to keep records and to base their business decisions on improved planning and record keeping by farmers.

The objective is to create a market driven platform that is beneficial for a broad range of stakeholders, ranging from farmers, to private sector, and public sector:

- 1. Farmers** receive knowhow and information (on weather, markets, etc.) required to grow their business; FIT Uganda supports farmers to develop farm handbooks that allow them to access credit. The FIRM model include a risk appraisal tool (Agri Risk Analyzer) that allows farmers to understand their risk exposure and to define their investment needs based on the risk assessment. The FIRM platform also allows other service providers (e.g. insurers) to access a potential new client base.
- 2. Financial institutions** gain access to a pool of farmers that has a commercial orientation and is able to provide information required to access credit. The in-built risk appraisal service of FIRM allows financial institutions to get a better understanding of the risk exposure of potential customers. By using the FIRM platform, financial institutions can keep the distribution cost low.
- 3. Insurance companies** and other service providers for risk management (such as irrigation equipment providers) also gain access to a large number of potential customers at a very low cost. Service providers can tailor their offers to farmers based on the risk exposure identified through the risk appraisal tool.
- 4. Public sector** can make use of the FIRM platform to deliver public services, such as the provision of knowledge and information. FIRM operators and extension officer can team up to deliver services to farmers in a cost-efficient manner. In addition, the Government of Uganda can make use of the results of risk assessments on village level to support the community investment in storage facilities or irrigation.

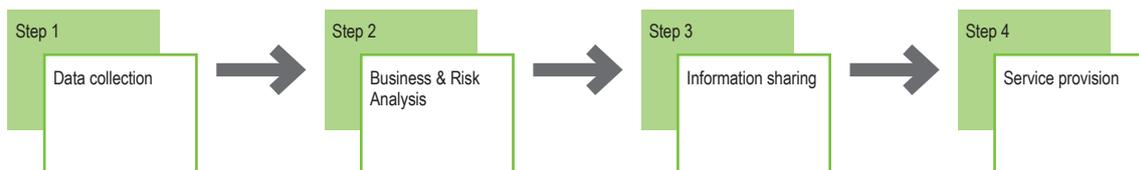
This system creates an upward spiral: farmers can take informed decisions based on sound information on the markets and the risks they are exposed to. Farmers are encouraged to invest more and to actively manage their risks. This risk reduction makes farmers more willing to borrow and more attractive to financial institutions. The FIRM platform also keeps acquisition and distribution cost low for financial institutions. The newly accessed agricultural credit can be used by farmers to increase productivity, lower risk exposure, and improve their market position.

Compared to existing models to reach out to farmers with various services, the FIRM model integrates three major innovations in its platform:

1. Creation of a unified platform to deliver finance, information, and risk management: The integration of farming information, risk analysis, access to financial services and access to providers of risk solutions, on the backbone of a rural mobile trading and payment solution is unique for Uganda;
2. Use of innovative technology to foster financial inclusion: FIRM works with mobile network operators and Interswitch to create a unique alternative payment solution in rural areas and to enable the use of debit cards;
3. Integration of risk appraisal technology to direct investment and access credit: The Agri Risk Analyzer (ARA) is a new propriety tool for analyzing risks of farmers. The model is based on cash flow analysis at farm and household level as used by many financial institutions. The ARA looks at both systematic risks (droughts, etc.) and idiosyncratic risk (health and life). The tool also calculates the ROI of risk mitigation (like irrigation) to support farmers' and bankers' decisions on how to apply their funds. Such a tool goes steps further than traditional credit scoring methodologies, which solely rely on historical data (often unavailable in agriculture).

3.1. The FIRM process

FIRM uses a 4 step process that consists of (1) farmer enrolment and data collection, (2) preparation of farm handbooks and risk appraisal, (3) analysis of data and dissemination of analysis to different target audiences, and (4) delivery of various services (e.g. credit, insurance).



3.1.1. Step 1: Farmer enrolment and data collection

FIT Uganda enrolls farmers in the FIRM program. Farmers share their information on their personal situation, their business and their financials. They also obtain an FIT Uganda debit card which allows them to conduct transactions. The whole process is facilitated by local Production Information Advisors (PIA). Each PIA covers approximately 300 farmers.

The enrolled farmers are assisted to develop basic farm handbooks and to analyze their farm business. At the same time FIRM collects the following data in a structured and uniform way:

1. Farming data (e.g. crops, land size, input & operational costs)
2. Household data (e.g. family size, household expenditure)
3. Financial position (e.g. savings, collateral, outstanding loans)
4. Risk data (e.g. use of irrigation, insurance, improved inputs)

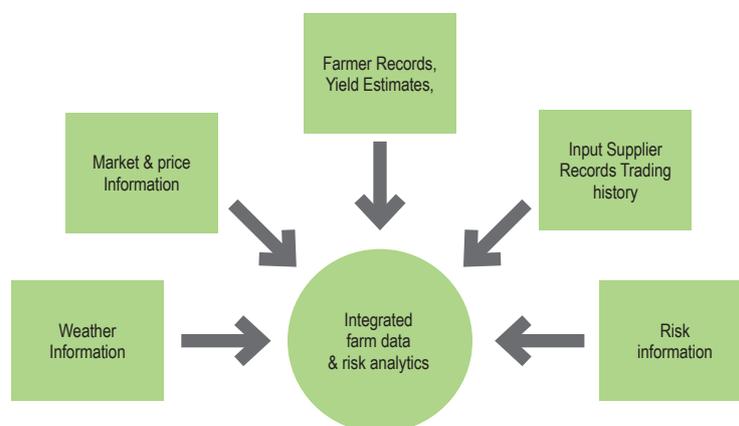
3.1.2. Step 2: Business and risk analysis

The information provided by farmers is scrutinized by FIT Uganda. All the data collected from the farmers is analyzed on the basis of the Agri Risk Analyzer.

The ARA processes the data and calculates:

1. A risk score (1-5 scale) indicating the risk exposure of the farmer
2. A sensitivity analysis providing how different risks contributes to the total risk
3. An overview (ordering) of most effective and efficient risk mitigation options, like insurance, irrigation or improved inputs.

The FIRM model uses data collected from farmers as well as market, price, and weather information that is systematically collected and analyzed by FIT Uganda. All the different data sources are used to perform an integrated farm data and risk analysis:

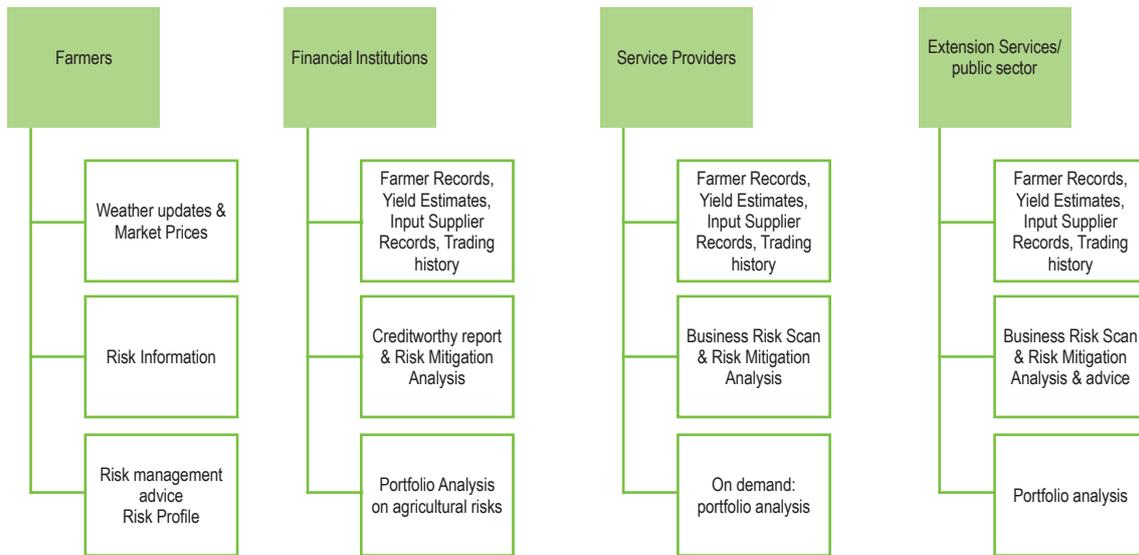


The Agri Risk Analyzer conducts a risk assessment which delivers a risk profile of the farmer. The information is now shared with the farmers and the business partners, who are part of the FIT Uganda transaction platform. The (risk) information will be used by partners to select viable customers and farmers to define risk management and business strategies that suit their needs. Banks, for example, will select those farmers with a relative high credit risk score. Insurance companies will select farmers of which the profile indicate that they are exposed to a hazard which can be insured (e.g. drought). Providers of irrigation equipment or improved seed will also look for farmers of which the risk profile indicate that the farmer might benefit from their products.

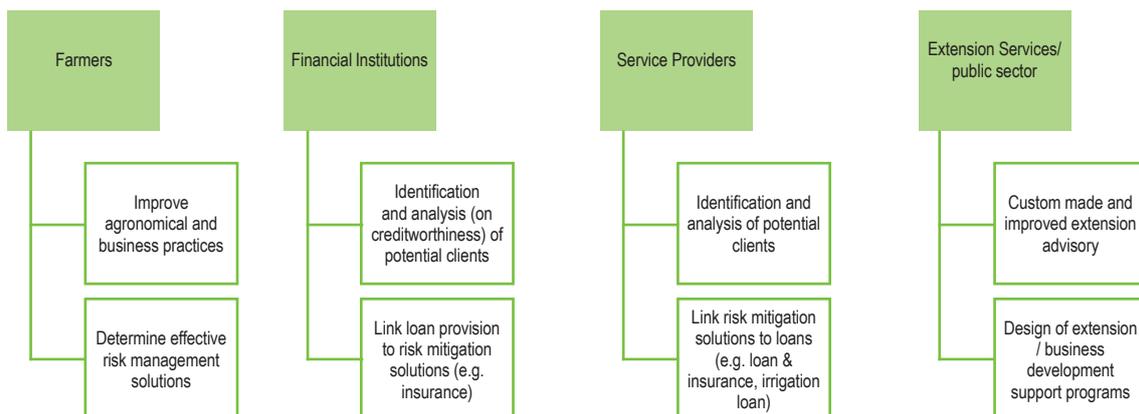
3.1.3. Step 3: Information sharing

The results from the data and risk analysis are processed to provide information to the different stakeholders.

- a. Farmers receive feedback on their business performance and receive advice on what type of services (e.g. credit, insurance, other risk management tools) may provide them with good returns.
- b. Financial institutions receive packaged and risk screened information on potential customers.
- c. Other service providers, e.g. insurers, also receive processed information that allows them to identify business potential.
- d. Lastly, public sector institutions and extension services receive information on key challenges of farmers in specific locations; based on this information extension officer can design their support to farmers.



The different stakeholders can use the information received to improve their farm business (farmers) or provide tailor made services to farmers (financial institutions, insurers, extension services, etc.):



3.1.4. Step 4: Service provision

Lastly, based on information received, FIRM stakeholders can offer services to farmers in a cost efficient manner using the data platform of FIRM that has developed profiles of all participating farmers. The physical and IT infrastructure of FIT Uganda and local PIA can be leveraged to reach out to farmers.

Based on the opportunities identified the business partners (financial institutions, insurers, and others) will approach the farmer with tailor made propositions. The transactions can be settled on the FIT Uganda platform. Farmers can buy inputs and sell their produce with their Debit Card. At relevant agro dealer shops, buyers' stations and other locations Point of Sales (POS) terminals are installed operated by a Local Money Agent. The POS terminals settles the transactions and are linked to mobile phones. Partners like financial institutions and insurance companies can distribute their products via the Debit Card as well.

FIT Uganda itself provides farmers with weather updates (free Infotrade Basic service), farm management advice and a risk scan (*Infotrade Premier service*), market information, linkage to business partners, and payment processing (*Infotrade Markets service*). All these services are paid for through subscription fees from farmers.



Besides the technical support farmers receive from the Production Information Advisors (PIA), FIRM connects farmers to extension programs and NGOs who can use the profiles to fine-tune their efforts or develop new programs.

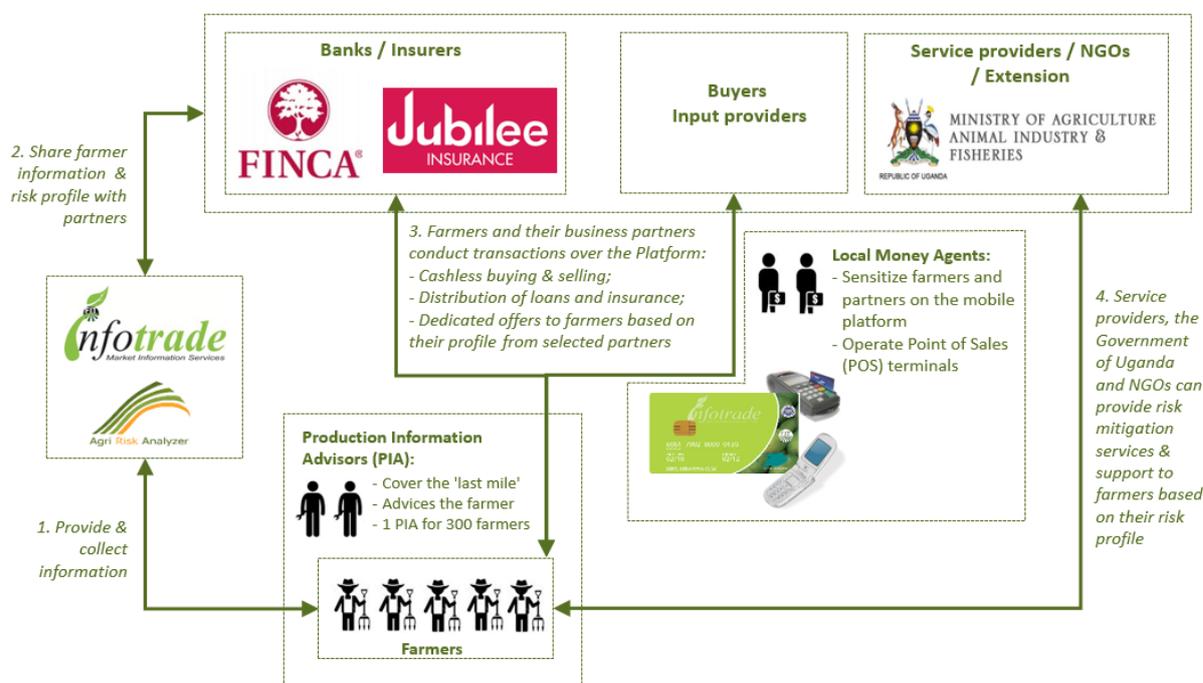
4. Structure of FIRM

4.1. The FIRM Partners

FIRM is a collaborative effort that brings together private and public sector. The main FIRM contributors are:

- FIT Uganda as home of FIRM and information service provider
- Agri Risks as developer of the ARA and support for risk analytics
- FINCA Uganda as providers of agricultural credit
- Jubilee Insurance as provider of agricultural insurance
- Ministry for Agriculture, Animal Industries and Fisheries (MAAIF) as provider of extension services
- Makerere University as knowledge partner and trainer of extension workers and other FIRM partners

FIRM is designed as an open platform that can accommodate additional partners. The following graph shows the different partners of FIRM and their role in the system:



4.2. Institutional Set-Up

FIRM is housed in FIT Uganda. Strategic management of FIRM is conducted by a Steering Committee that consists of the FIRM developers, FIT Uganda and Agri Risk Analyzer, as well as all sponsors of FIRM. The Steering Committee meets on a quarterly basis.

The Steering Committee is supported by an Advisory Committee that includes all stakeholders in the FIRM process. The Advisory Committee is a sounding board for the Steering Committee to discuss future development of FIRM. The advisory committee with members from financial sector, insurance sector, Interswitch, farmers' representatives, MAAIF and Makerere University meets twice a year. In this committee members of the private and public sector discuss the strategic development of the PPP.

The public component of the Public Private Partnership associated with FIRM (FIRM-PPP) will have its own institutional set up with the appropriate institutions such as the directorate for extension services of MAAIF and Makerere University and fully coordinated with the FIRM set up. The exact shape of this coordination set up will be determined in a later stage.

FIRM day-to-day operations are carried out by the FIRM Program Manager of FIT Uganda. The program manager heads the FIRM team at Infotrade and coordinates the PIAs spread over the country. The following flowchart shows the organizational structure of FIRM:



4.3. The Role of FIRM Partners

4.3.1. Information services - FIT Uganda

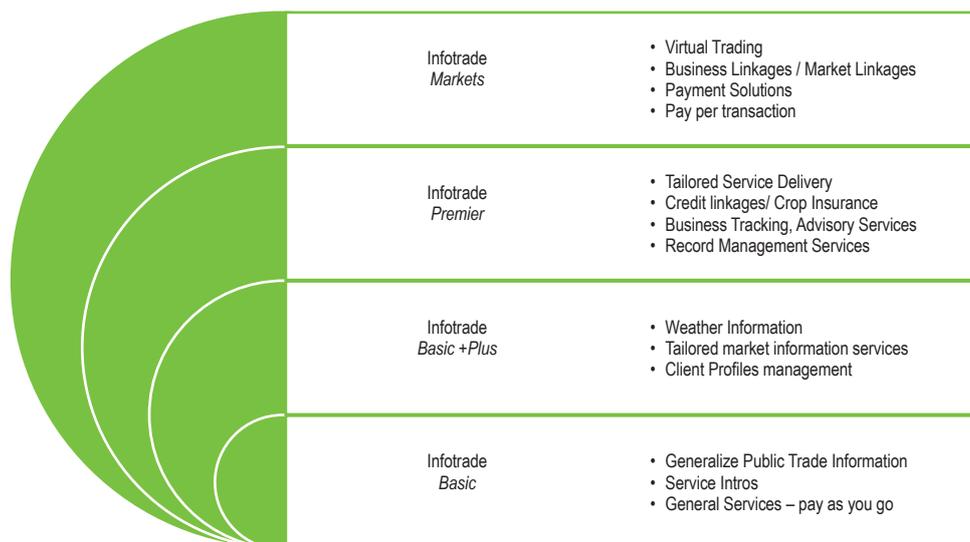
FIT Uganda (a.k.a. Infotrade) has over 18 years of experience in providing business development services in Uganda. FIT's main proposition is market information services and the mapping and profiling of farmers, traders and services providers. FIT Uganda Ltd has 17 staff members.

The FIT Uganda proposition is:

- Infotrade Basic: an online platform that aggregates and disseminates price information from 35 districts for 46 Agricultural products;
- Infotrade Premier: offers the FARMIS application (Farmer Record Management System) that enables collection of farmer data such as biometric data, land ownership, baseline data, production records, trade data, etc.;
- Infotrade Markets: a trade and payment system which enables trading and linkage to finance and other services. The service enables electronic payment in the rural areas. Each of the farmer on the system obtains a free online account for trading. Two FI are currently part of the system: FINCA and Postbank.



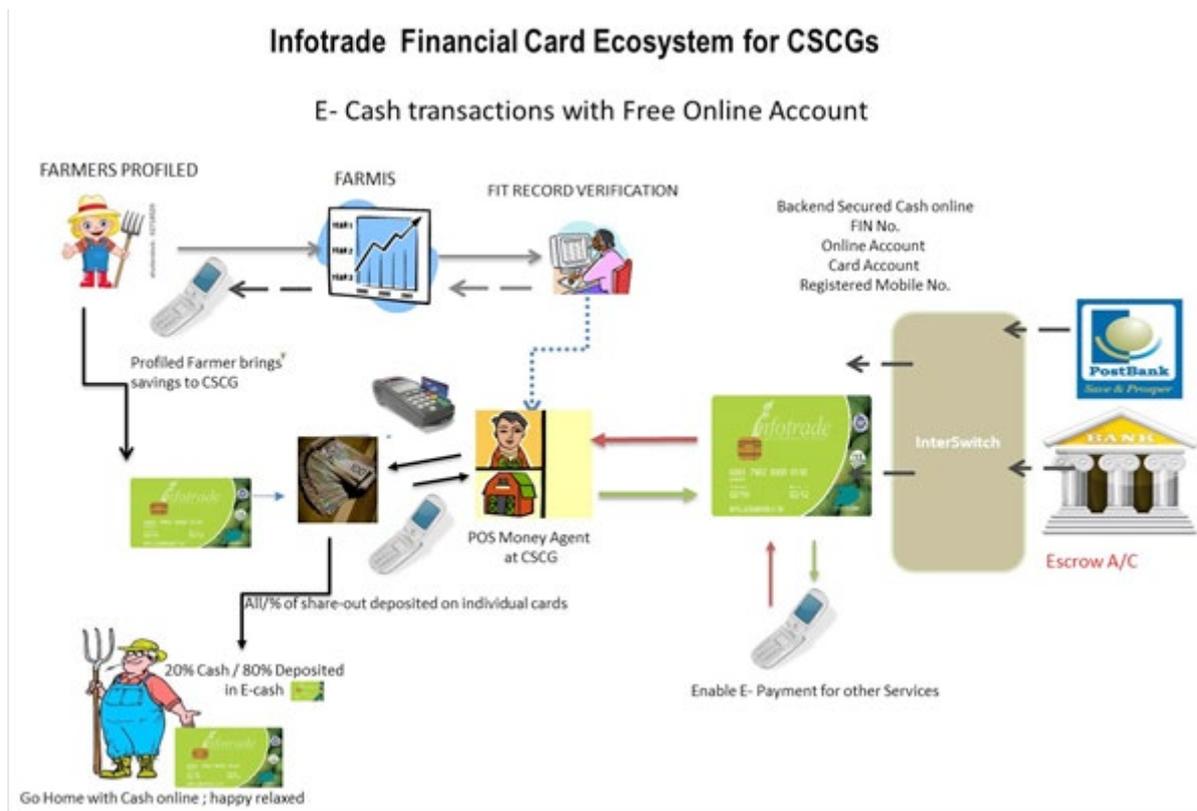
FIT Uganda is ISO Certified 9001:2008. It offers Agricultural Market Information Services (price data, weather information, farm tips and market alerts) for over ten years using SMS, Voice and Text. FIT has long standing history in reaching out to farmers working with radio station for information dissemination and also built a track record of generating third party income from the products and services promoted. Its strategic partnership with payment gateways and creation of a farmer's debit card are recent add-ons that position the current as an innovator in the delivery of services to the farmers/ traders. The following graph shows the current business proposition of FIT Uganda's services:



Infotrade services can be accessed via mobile phone. In 2014, 52.4 mobile phones were recorded per 100 people. Production Information Advisors (PIAs) close to the farmers ensure that technical support is provided and that additional information can be relied in fast and efficient manner to customers. The following graph shows the Infotrade interface for smartphone users.



On top of these information services FIT Uganda will provide farmers with a range of additional services as part of the FIRM model: developing farm business records, analyzing risk exposure, and linking farmers with services providers such as FIs, insurers, or others. FIT Uganda also provides farmers with access to other financial services through its Infotrade Maali Card for farmer/trader card programme. The model involves the use of a financial transaction platform powered by Interswitch and is integrated with farmer identification profiles that are collected as part of FIRM. Maali Card is a pre-paid debit card with a complete end-to-end technology platform. The card provides the opportunity for farmers as well as traders to store, save, receive, send, and spend money electronically. This technology allows users to both save cost and time in their financial transactions. The card will eventually replace the use of cash boxes or pots in the villages. Through this systems farmers and traders can make e-card deposits through the POS money agent or mobile money using USSD Technology. The following graph shows the working modality of the *Maali* Card system:



4.3.2. Business and risk analysis - The Agri Risk Analyzer

Agri Risks, a company headquartered in the Netherlands, has developed the Agri Risk Analyzer. This is a low-cost, easy-to-use risk-assessment tool for farmers, agribusinesses and financial institutions, which provides insight into their systematic risk exposure. These risks are related to weather risks, pest-&-diseases and price risks. The tool also calculates (individual) health and life risks. The Agri Risk Analyzer provides an assessment of the total risk and gives a breakdown of the risk into its components. This is based on a farmers' cash flow statement and is similar to cash flow analysis. Financial Institutions are used to within their credit process. The Agri Risk Analyzer also provides insight in which risk management solutions are the most efficient to reduce risk. It enables evidence-based decisions on risk mitigation (e.g. irrigation, improved seeds) and risk transfer (e.g. insurance).



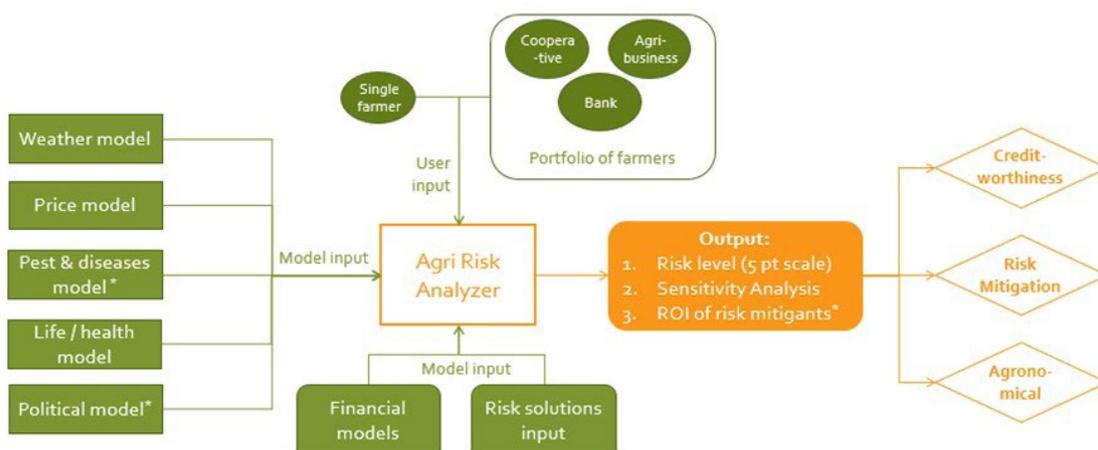
The Agri Risk Analyzer (ARA) is designed to provide insight in the systematic risks of farmers and farmer groups. The ARA assesses the farmers' exposure to the major systematic risks in agriculture¹.

The risk indicator provides:

- The risk level of a farmer on a 5-point scale;
- A decomposition of this risk into its sub components (weather risk, price risk, etc.);
- An overview on available risk mitigation solutions for each risk component and the costs and benefits associated with each tool.



The Agri Risk Analyzer is modelling the farmers' cash flow in a similar fashion as financial institutions normally do. Cash flow analysis is commonly based on assumptions, such as expected yield, expected prices and expected household expenditures and income. The ARA is analyzing what happens to the farmers' cash flow when these assumptions are not met. This is done with Monte Carlo simulation, which generates a probability distribution of the expected cash flow by simulating different scenario's. The simulations are based on actuarial or market based models for weather events, market events, etc., which are used by other professional parties like insurance companies, market traders, etc. In total, 10.000 scenarios are calculated which delivers a distribution of expected cash flow of the farmer. The figure below provides an overview of the inputs / outputs of the model.



* Work in progress

¹ The current release of the Agri Risk Analyzer covers weather related risks (droughts, excessive rainfall, temperature), market related risk (price, forex, inflation, interest) and health and life risks. The models are developed but data (e.g. historical weather data) for Uganda has still to be acquired. Pest and diseases risk will be developed in partnership with Makerere University. A partnership with a knowledge partner for political risk has to be developed.

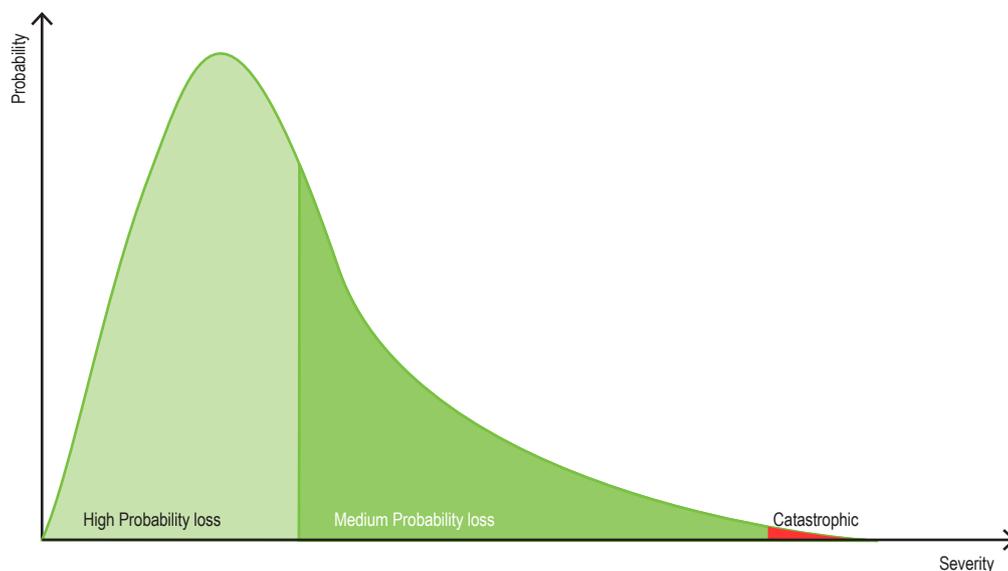
The model provides three outcomes:

- *Risk level.* Depending on the objectives of the user, the ARA defines a level of cash flow which is seen as the 'point of default'. At this point of default, the farmer is assumed to default on a loan, or default on a delivery contract, or default on him/herself by not able to cover the costs of household expenditures, etc. With the calculated cash flow distribution, the ARA is able to provide what the 'distance to default' of the farmer is. This distance to default is translated to a Probability of Default (PD) which is useful for financial institutions and translated to the 5-point scale risk level, which is useful for more simple interpretations;
- *Sensitivity analysis.* Based on the software used by the Agri Risk Analyzer, a sensitivity analysis is made. The software produces the correlations between the overall calculations of the cash flow distribution and the underlying components (sub risks): the yield variability, price variability, etc. The correlations provide the inputs for a sensitivity score of each sub risk. The ARA identifies the main sources of risk and the scenarios that can threaten the sustainability of the farm.
- *Risk solutions.* The model contains basic data about certain risk mitigation solutions, like irrigation. The model knows the cost (investment + operational costs) and expected benefit of the solution. These parameters are factored into the simulation. The simulation is run with and without the solution. The comparison of results is the key metric to make a return on investment (ROI) analysis.

These outcomes will be the main basis for providing agricultural risk management advice to farmers and FIs. The advice to farmers will be complemented with the work of the advisors and extension services in order to empower farmers to interpret the results and design a full risk management strategy and plan that considers all kinds of risk management tools from diversification and improved seeds to insurance and finance.

The ARA decomposes the risk into different layers that help farmers to understand which risk management solutions are most useful to them. For example, by looking at severity and frequency of events, the ARA is able to determine if and what type of insurance may benefit a farmer. A quick ROI analysis is made, based on the expected cashflow of the farmer, the expected cost and payout of available insurance policies and alternative available risk mitigation sources like financial buffers or drought resistant seeds. Based on these inputs the ARA calculates whether insurance is a suitable risk management option for the farmer and evaluates alternatives as well. The outcome is a ranking of preferred risk mitigation solutions.

For high probability, low impact events farm level solutions are most appropriate. Other risk transfer measures (financed through agricultural credit and insurance) are usually a better approach when risks have a medium probability and severity. Low probability, high impact event (for example, droughts) are difficult to avoid by farmers individually and are also hard to insure, particularly if they are systemic.





4.3.3. Agricultural Credit - FINCA

FINCA is a regulated deposit taking microfinance institution. Their current customer base stands at over 150,000 savings clients (total portfolio USD 21m), and 55,000 loan clients with a loan portfolio in excess USD 28m.

FINCA Uganda offers savings, loans and money transfers across a network of 29 branches countrywide. FINCA has over 650 employees. FINCA is continuously focused on refining key aspects of their business and focus on customer centricity. This has resulted in strong and sustained growth in portfolio and outreach. While FINCA Uganda has made great strides in providing agricultural financing, they are committed to going to the extra mile to not just increase the number of borrowers and locations where clients can access loans, and also to increase the quality, efficiency and speed with they can be accessed and used for productive purposes. FINCA will also focus on an emerging and important segment in the agricultural space, especially youth agricultural entrepreneurs.

The role of FINCA is the provision of agricultural credit. The microfinance deposit-accepting institution (MDI) receives processed information of prospective customers in rural areas. Based on the ARA generated risk assessment the institution can make an informed decision on extending loans to farmers. The integration into the FIRM value chain provides several advantages to the financial institution: lower cost of accessing customers, established relationship of trust through FIRM network, well prepared farm business information, and use of information platform.

4.3.4. Agricultural Insurance - Jubilee Insurance Company

Jubilee Insurance Company is a subsidiary of the largest insurance group in East Africa, Jubilee Holdings Ltd. with operations in Uganda, Kenya, Tanzania, Mauritius and Burundi. Jubilee is an affiliate of the Aga Khan Development Network and the oldest (since 1937) composite insurance provider in East Africa. Jubilee has ISO 9001 certification and is rated AA- by Global Credit Rating Co.

Jubilee offers all classes of term insurance businesses, including health insurance (J-CARE). In agricultural insurance Jubilee offers multi-peril crop insurance, livestock, greenhouses and poultry insurance. The crop insurance covers multiple perils such as drought, pests and diseases, hailstones damage, flooding and windstorms.

Based on information generated through FIRM Jubilee Insurance has the opportunity to identify prospective customers for its products and to use the FIRM structure to approach these farmers, potentially even in conjunction with the provider of agricultural credit FINCA. Jubilee can make use of the FIRM distribution channel to not only sell agricultural insurance but other products as well, e.g. health insurance.

Agricultural insurance is currently on the rise in Uganda and the public sector has intensified its efforts to support this development. For the fiscal year 2016/17 UGX 5 billion has been allocated for subsidizing agricultural insurance and the same amount is foreseen for 2017/18. On the back of this development, the provision of agricultural insurance will become more affordable to farmers and the provision of this service strengthens the value proposition of FIRM.

4.3.5. Extension services - Ministry of Agriculture, Animal Industries, and Fisheries (MAAIF)

MAAIF's functions are derived from the constitution of the Republic of Uganda, the Local Governments Act (1997), and the Public Service reform Programme (PSRP). The role of the ministry is to create an enabling environment in the agricultural sector by enhancing crop production and productivity, in a sustainable and environmentally safe manner, for improved food and nutrition security, employment, widened export base and improved incomes of the farmers.

A major role of the ministry is to provide advisory services to farmers as outline in the National Agricultural Extension Strategy 2016. The extension system has undergone many changes in recent years and has, effectively, been dismantled in 2015. MAAIF is currently in the process of hiring extension officers.

In the FIRM model advisory services to farmers play an important role. The FIRM PIA play an important role in providing farmers with the technical knowhow on various topics: developing farm handbooks, the importance of information services, the access to credit and insurance, the assessment of farm risks etc. There is, however,

the need to further strengthen the capacity of farmers in many other areas, for example related to farm management practices, pest and disease management, etc. For these tasks the public sector has to take a leading role through its extension services. Extension officers that are trained by Makerere University will work hand-in-hand to ensure that farmers receive access to the knowledge and services they require. In order to allow extension officers to provide farmers with practical advice on how to manage their risk, capacity development courses on ARM are specifically targeted to this group of professionals (see also next paragraph on capacity development by Makerere University).

4.3.6. Capacity development - Makerere University

The College of Agricultural and Environmental Sciences (CAES) is one of the 9 academic units of Makerere University, which is dedicated to advancing agricultural development through research, training, and service delivery in Uganda and the in East African region. The College offers undergraduate and postgraduate programs in Agricultural, Forestry, Environmental and Geographical Sciences, Food Technology, Nutrition and Bioengineering and Agribusiness Management. Through strong laboratory and field-based research programs, the College generates technology and identifies innovative approaches for improving agricultural production and ensuring positive changes in farmers' livelihoods.

CAES is in the process of developing a short training course on ARM. This training course is not only aimed at graduate students of Makerere University but is open also for extension staff and other services providers that are part of the FIRM model (e.g. financial institutions, insurers, etc.) as well as FIRM PIAs. Building up the capacity of extension officers is particularly important to ensure that farmers receive up-to-date knowhow on how to manage the many risk they are facing and to learn what risk management tools (information, finance, etc.) are available to them. The use of FIRM tools such as ARA is envisaged as part of the training.

CEAS will also have an important role in the further development of the Agri Risk Analyzer, especially in constructing a pest & disease module for Uganda. With students of the faculty field work will be done to collect data, e.g. on yields and risk mitigation solutions.

5. Technical Feasibility

5.1. Implementation modality

FIT Uganda collaborates with Production Information Advisors (PIAs). Each PIA provides training to at least 300 farmers in profiling, book keeping, saving, credits services and money transfers. FIRM will also provide custom made risk management trainings for farmers, extension officers, FI's and insurers. With support from IFAD, Makerere University is developing a short training course on ARM that is available also to the partners of this project (e.g. extension officers).

Farmers will be enabled to identify their risk profile and get insight in the viable solutions to mitigate that risk. FI will learn more about the impact of systematic risks onto the risk profile of one single borrower and on an agricultural portfolio. They will also be encouraged to design risk solutions into their credit process (e.g. combine loans with insurance). Service providers will learn about the risk factors farmers are exposed to and how their service contributes to the solution, which potentially can spark further product innovation.

FIRM will mobilize new farmers by Production Information Advisors. Through this agent model, FIRM links farmers directly with credit and insurance providers. In order to raise awareness, FIT Uganda will start a marketing campaign to subscribe farmers for Infotrade services. Farmers are reached directly via mobile phones (SMS text and voice messages), radio (12 FM radio stations), printed media, and word of mouth via local leaders and extension networks. Another outreach strategy is through cooperatives, farmer association and companies with outgrower schemes. In addition, marketing efforts will also make use of trainers, agents of mobile money, and FINCA's credit officers. Once farmers are users of the Infotrade services, the main distribution channels are the FIT Uganda websites and farmers can be reached on their mobile phones.



5.2. Technical skills and human resources

The FIRM consortium brings together expertise on data collection and dissemination, (credit) risk expertise, financial services, insurance and agronomical expertise. The lead partner, FIT Uganda, has been in business in rural areas for over 18 years. This project will build upon existing services, which are supported by highly skilled employees both in-house (17) and in the field (35) as well as a network of agents.

All other partners bring significant expert human resources to the partnership

- The Agri Risk Analyzer (ARA) is built by actuarial (insurance) experts, agricultural finance specialist, and risk modelling experts. Although the ARA team is small, the innovative capacity of the ARA is unique worldwide.
- FINCA brings many years of experience with agricultural finance in Uganda, and has a countrywide outreach with 28 branch offices. FINCA has more than 650 dedicated staff many of whom have a longstanding experience in servicing rural areas.
- Jubilee Insurance is active in insurance for over 90 years. Even though agricultural insurance has not been the major focus of the company in the past, Jubilee staff have a wealth of experience in designing risk transfer solutions for households in Uganda.
- MAAIF's extension officers still need to be recruited. The Extension Strategy foresees a total workforce of 4,666, mainly at the district and sub-county level. This figure is, however, rather ambitious considering the budget limitations. Nevertheless, the HR capacity of MAAIF for the provision of extension services will be considerable. Paired with the capacity development efforts of Makerere University as part of the FIRM model, this workforce will play an important role in assisting farmers to better manage their risks.
- CAES has about 200 academic staff and 145 administrative and support staff. This vast pool of experts on different topics in agriculture is an important asset for the development of holistic training courses on ARM as well as conducting these course. In addition, ARA will be customized for Uganda by experts from the Makerere University and data collection will be done by students.

5.3. SWOT analysis

STRENGTHS

- Strong existing customer base of FIT Uganda
- Alliance of strong partners with a broad range of skills and knowledge
- Cost sharing among a broad range of stakeholders
- Tailor-made services (finance, information, risk management) that can be sold to farmers based on sound business and risk analysis
- Flexible (information) platform structure that allows for integration of additional business partners

WEAKNESSES

- Limited financial resources to finance start-up investment

OPPORTUNITIES

- A large number of farming households that are not provided with basic services (information, credit, insurance, etc.)
- Government support for agricultural risk management (e.g. nomination of ARM focal point, subsidies for agricultural insurance)

THREATS

- Macro-economic shocks
- Regulatory changes
- Competition from other products and services
- Limited willingness to pay for services by farmers

5.3.1. Risks mitigation

The SWOT analysis revealed a number of threats to the success of FIRM. The project partners have developed mitigation strategies to contain these risks:

1. Macro-economic risk (changes in the macro-economic, social or political landscape of Uganda, which potentially can lead to project disruptions, or major disruptions in the agricultural and/or financial sector): By establishing a broad partnership FIRM and sharing the financial burden FIRM is able to absorb to a fair degree the shocks caused by macro-economic instability. And given the risk profile of the country (with low likelihood of, e.g. countrywide droughts) it is not expected that agricultural productivity declines to such extent that there will be a lack of demand for the FIRM services.

2. Regulatory risks (the risk that legislation or regulatory rulings will be unfavorable for project implementation): FIRM is a partnership between the public and the private sector. Private sector partners of FIRM are well connected to the Government of Uganda (GOU).
3. Competition from other products and services: FIRM has a very unique business proposition through the variety of services it offers. Nevertheless, for specific products (e.g. agricultural credit) competition exists in the Ugandan market. Through its close interaction with farmers, FIRM will be able to listen closely to the market demands and tailor its services to the needs of its customers.
4. Limited uptake from services from farmers: in general, farmers are reluctant to pay for services from their low cash reserves. FIT Uganda has a longstanding experience with the difficulty of selling information services to farmers. This realization is one of the major reason why FIRM has evolved; by putting together services packages that are tailored to individual farmers need, FIRM provides a good value proposition to its clients which is expected to result in good uptake. And FIT Uganda has already successfully rolled out its services to farmers through Product Information Advisors (PIA); this outreach model provides a deep penetration into the rural areas.

6. Financial Feasibility

AVAILABLE UPON REQUEST

7. Outcomes and Goals

AVAILABLE UPON REQUEST

8. Conclusion and Recommendations

This study has outlined the major challenges that smallholder farmers are currently facing in Uganda and how these challenges can be tackled by a strong private-public partnership for provision of rural services. This document shows that all the ingredients for a successful implementation are available and that the FIRM model can be introduced quickly due to the existing networks of some of its partners (i.e FIT Uganda, FINCA, MAAIF).

This study has also shown that there are realistic chances of success for the FIRM model. Financial viability of the approach is achievable even under the rather conservative estimates of this paper. Given the novelty of the model, however, start-up costs are high and an additional investor is required to set up the system. The projected revenue streams and financial resources of existing partners are sufficient to guarantee the long-term viability of the approach.

This paper has outlined the importance of creating a strong alliance between the private and public sector. The proposed partnership model (FIRM-PPP) factors in the needs of the private sector partners, such as FIT Uganda, and their profitability goals. At the same time the FIRM model builds on the engagement of the public sector to use this model as a platform to improve information, agricultural risk management knowledge and extension services capacities on ARM. This proposal, therefore, also presents an opportunity to create public goods (such as access to information and knowledge) and to generate positive externalities in the form a more resilient agricultural sector and rural households.

Finally, this document has outlined the positive development impacts that the FIRM model is able to generate, particularly in the context of a partnership between the private and the public sector. The improved income and livelihood of tens of thousands of farmers is surely worth the investment that this approach requires. Furthermore, the successful implementation of such a model in Uganda also opens up the potential to implement similar schemes in other countries such as Kenya or Tanzania.



Annexes

Logical Framework

AVAILABLE UPON REQUEST

Work plan and timeframe

AVAILABLE UPON REQUEST



PARM
PLATFORM FOR
AGRICULTURAL RISK
MANAGEMENT

A woman in a brown and gold patterned top and dark red skirt sits in a market stall, surrounded by large piles of sweet potatoes. In the background, other people are visible, including a man in a yellow shirt and a woman in a colorful headscarf. A blue bowl filled with small green items is on the right. The scene is outdoors under a cloudy sky.

Developing capacities and sharing knowledge



Uganda



Capacity Development and Agricultural Risk Management in Uganda

Concept Note

November 2016

Capacity development activities on agricultural risk management (ARM) aim to drive a sustainable institutional and behavioural change towards agricultural risks among different stakeholders. The Platform for Agriculture Risk Management (PARM) and Makerere University have developed in partnership an advanced ARM training course to create a pool of certified ARM experts among the extension service to support farmers across Uganda. The first ARM training has been successfully delivered from 27 to 31 March 2017 in Kampala. The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Directorate of Agriculture Extension Service (DAES), is willing to add in the already existing MoU with Makerere University the delivery of more advanced ARM training course in the future, as envisaged in the ARM Capacity Development Strategy for Ugandan Extension Service.

Agriculture is a risky business. Extreme weather conditions and climate change are likely to affect negatively the performance of crop production and livestock activities. High food prices and global market uncertainties pose a major threat to food security, especially for the poor.

Global, regional and national interests call for opportunities to develop sustainable tools to manage risk in agriculture beyond a humanitarian intervention to disasters and to implement an ARM system covering other risk layers for farmers, private sector and government.

Agriculture risk management, however, requires knowledge and skills to assess the risks and to implement appropriate tools successfully.

Developing capacity at country level among relevant stakeholders is essential to plan strategies and mainstream solutions in the national policy agenda.

PARM CD activities in Uganda

Uganda is a country exposed to different risks in agriculture related to production and postharvest, markets, infrastructure and institutions.

As part of the overall initiative, PARM supported capacity development (CD) activities on agricultural risk management oriented towards the understanding of the structure of risk management cycle considering the diversity of risk sources and risk management options, from agricultural practices to improved seeds, irrigation or financial tools.

As part of the CD activities, two general ARM seminar ARM were held in 2015 in Kampala and Mbale aiming at raising awareness and providing basic knowledge on ARM.

An advanced ARM training course has been also organized and delivered in partnership with Makerere University targeting extension service. The 5-days training has successfully delivered in March 2017 with the aim to create a pool of certified ARM experts among the extension workers to support farmers across Uganda.

Advanced ARM training course

The course has been hosted at the College of Agricultural and Environmental Sciences (CAES) premises. CAES has a strong reputation of high performance for teaching, research and outreach programmes in the field of agricultural science and business related subjects.

The duration of the course was one-week. The target audience was composed by extension workers, public officers, financial institutions. CAES has carried out face-to-face teaching and led work group exercises, with external experts as guest lecturers. Active learning and experience sharing were adopted as training approach.

The course aimed to be Training of Trainers (ToT). The trainees were targeted to be equipped with facilitation and training skills by CAES/MAAIF to conduct the future decentralized training on ARM at district, sub-county, farmer and farmer-group levels.





The CAES faculty has developed the curriculum and related training material of the advanced ARM training course including the following topics:

- **General Concept of Agricultural Risks and Risk Management;**
- **Risk assessment / measurement and Prioritization;**
- **Risk Management Tools** including:
 - Farm level postharvest handling
 - Warehouse receipt systems
 - Commodity exchanges
 - Improved technology
- **Financial and insurance tools;**
- **Integrating Gender in Agricultural Risk Management.**

A Participant Action Plan has been also developed by to follow ARM actions and trainings of the participants to the ARM course in the field.

Chief Administrative Officers, District Production Officers, District Local Council Chairpersons, and Resident District Commissioners, have been invited for the first day for awareness creation and buy-in workshop.

In the future, the course will be considered to be included in Makerere University/CAES graduate and postgraduate programmes. The overall vision is to create a country self-sustained capacity on ARM placing CAES as centre of excellence for Uganda and, potentially, East Africa.

Strengthening capacity on ARM is in fact crucial to make the job of extension service more effective and efficient in delivering information, best practices, and technologies to farmers in Uganda.

After the first ARM training, DAES/MAAIF is willing to add in the already existing Memorandum of Understanding (MoU) with Makerere University the organization and delivery by Makerere/CAES faculty of more advanced ARM training courses in the future, as envisaged in the ARM Capacity Development Strategy for Ugandan Extension Service.

ARM training courses can be financed by Agricultural Technology and Agribusiness Advisory Services Project (ATAAS)/IFAD project for 2017.

The main components of the ARM capacity development strategy in Uganda for the future will therefore be:

- ARM concepts and practices included into extension policy, strategy and delivery in Uganda;
- ARM training course provisions in partnership with Makerere University/CAE;
- Institutionalization of the ARM course into academic program of Makerere University.

MAAIF and Makerere/CAES Partnership on ARM training courses: the way forward

Agricultural activities in Uganda urge for a push towards a more value chain and business oriented approach, and the extension service needs to accompany this change. The advanced ARM training course at CAES/Makerere University was timely designed this purpose.

To ensure the sustainability of the process, MAAIF is willing to establish a knowledge-based partnership on ARM with Makerere/CAES.

“Capacity development activities can create a common ground for discussion between existing and potential partners”



PARM

PARM works in strategic partnership with NEPAD / CAADP in several sub-Saharan African to mainstream agricultural risk management into the national agricultural policy and investment plans. PARM supports ARM capacity development activities oriented towards the understanding of the structure of risk management cycle considering the diversity of risk sources and risk management options.



MINISTRY OF AGRICULTURE,
ANIMAL INDUSTRY & FISHERIES

MAAIF

DAES/MAAIF has developed the National Agricultural Extension Service Policy and Strategy to build a renovated agriculture extension service also through strengthening its capacity. Increasing knowledge and practices on agricultural risks management has a central role to overcome past weaknesses and to adopt a business approach to farming for pushing agricultural productivity in Uganda.



MAKERERE UNIVERSITY

CAES

Makerere University/CAES has successfully delivered a 5-days training in March 2017 with the aim to create a pool of certified ARM experts among the extension workers to support farmers across Uganda. Makerere University/CAES has the capacity to replicate the ARM course to support the strengthening ARM capacity among the renovated extension service.

What is PARM? The Platform for Agricultural Risk Management (PARM), an outcome of the G8 and G20 discussion on food security and agricultural growth hosted by the International Fund for Agricultural Development (IFAD), is four year multi-donor partnership between developing countries and development partners to make ARM an integral part of the policy planning.

PARM Secretariat International Fund for Agricultural Development (IFAD)

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Uganda



Agricultural Risk Management (ARM) Capacity Development Strategy for Ugandan Extension Service

Concept Note

April 2017

In collaboration with



MINISTRY OF AGRICULTURE,
ANIMAL INDUSTRY & FISHERIES



MAKERERE UNIVERSITY



1. Background

In 2014, the Government of Uganda decided to restructure the entire national agricultural extension system. The reform – called “Single Spine Extension System” – aimed to overcome past weaknesses transferring extension function from the National Agriculture Advisory Service (NAADS) to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) with the creation of the Directorate of Extension Service (DAES).

The newly-formed Directorate of Extension Service (DAES) of the MAAIF has developed the National Agricultural Extension Service Policy and National Agricultural Extension Service Strategy (NAEP and NAES, respectively) to build a renovated agriculture extension service expected to be more effective and efficient in delivering information, best practices, and technologies to farmers in Uganda. Extension service has therefore become a key player for improving agricultural productivity at farm level: strengthening its capacity is crucial to reach national agriculture targets.

NAEP's overall vision is to build an agriculture sector more competitive, profitable and sustainable for country's socio-economic transformation and welfare of the population, as well as to contribute to the United Nations' Sustainable Development Goals.

In this context, agricultural risks management has a central role. Scarce resources and the need to modernize agricultural sector push for improving farm management practices. An extension service empowered with agricultural risks management knowledge would contribute to downstream innovative solutions helping farmers minimize their agricultural risks and related losses, and to adopt a business approach to farming to push agricultural productivity and export orientation of the sector.

The Platform for Agricultural Risk Management (PARM), a G8-G20 initiative hosted by the International Fund for Agricultural Development (IFAD), provides technical support to Governments on Agricultural Risk Management (ARM). In Uganda, PARM has initiated its process in 2014 supporting the identification and prioritization of the major risks affecting the agricultural sector through a Risk Assessment Study (RAS). Among the outcomes of RAS, plant pest and disease was identified as the major risk affecting farmers.

Along ARM processes and studies, PARM also implemented Capacity Development (CD) activities to:

- Raise awareness about risk and risk management strategies
- Understand risks and risk management issues
- Assess agricultural risks and access all available relevant sources of information
- Manage best tools to be used to mitigate, transfer and cope with risks beyond a humanitarian approach to disasters, through national institutions.

In particular, to reach the largest number of extension workers and farmers and provide them with the necessary knowledge to manage agricultural risks, MAAIF and PARM elaborated, with the technical support of Makerere University/ College of Agriculture and Environmental Science (CAES), an advanced ARM training course. The target audience of the ARM training was extension workers to enable them, in turn, to train smallholders on managing agricultural risks and increase their capacity to manage farming activity with a more business oriented approach.

The mainstreaming of ARM CD activities and trainings in national policy is the purpose of the the ARM CD strategy for Ugandan Extension Service.

2. Ugandan policy framework and the ARM Capacity Development Strategy 2016-2020

The overall purpose of ARM CD activities in Uganda is to improve knowledge and practices on agricultural risks management among producers (particularly smallholders and farmers' organizations) through increasing the capacity of the Government and service providers to understand and advice them on the matter. To ensure the sustainability of the process, MAAIF aims to establish a knowledge-based partnership on ARM with Makerere University/ College of Agricultural and Environmental Sciences (CAES), with the facilitation of PARM.

Trainings on ARM knowledge and practices development for extension service are in line with objectives and policy areas of National Agricultural Extension Service Policy (NAEP). In particular, ARM CD activities enter in the NAEP Objective 2: To build institutional capacity for effective delivery of agricultural extension service, Policy

Area 2.1: *Human Resources Management and Capacity Development*; and Policy Area 2.2: *Strengthen Agricultural Education and Training*. NAEP policies then link with Objective 2 of National Agricultural Extension Service Strategy (NAES): *To empower farmers and other actors of the value chain to effectively participate and benefit equitably from agricultural extension processes and demand for service*, and Objective 4 of NAES: *To build institutional capacity for effective delivery of agricultural extension service*.

The overall target of the policy document and strategy is to create an highly motivated and qualified extension service to professionalize the farming community and strengthen value chain activities, from production to value addition and post-harvest management. Agriculture risk management is an essential component for all the farming activities.

To achieve these targets, Policy Area 2.1.d (NAEP) identifies the need for collaborations with academic institutions to deliver agricultural training to extension service. Strategy 3.1.2 (NAES) foresees the establishment of formal agreements (MoU) to foster these collaborations, and Strategies 4.1.3 and 4.1.4 address the need to design and implement relevant capacity building programs.

In this framework, MAAIF has already started cooperating with Makerere University and PARM for the delivery of first advanced ARM training course in March 2017. About 25 extension service providers from the central region of Uganda have attended the ARM training and are expected to use their ARM skills to train farmers and farmers' organizations.

Replicating the ARM training courses during 2017-2020 would help to reach more extension workers, also located in other geographical areas, to achieve national targets of creating an highly motivated and qualified extension service to professionalize the farming community on agricultural risk management.

3. Key Working Areas

In line with the NAEP, the Directorate of Extension Service (DAES) of MAAIF is willing to undertake work to achieve three objectives in collaboration with PARM:

3.1. Integration of ARM concepts and practices into extension policy, strategy and delivery in Uganda.

A well-functioning extension services is key to deliver ARM related services to farmers, e.g. on information, access to inputs, better technologies, financial and insurance services, etc. ARM is also a way of bringing good practices to farming and developing a more business oriented approach to farmers. Therefore, MAAIF, with support of PARM, is working to identify policy and strategy areas in which ARM-relevant elements can be incorporated.

Following the NAEP, this current ARM CD strategy for Ugandan extension service underlines the relevance of ARM knowledge and practices for the extension services, linking MAAIF with national training institutions such as Makerere University/CAES to develop a pool of ARM trainers among the extension service, thus ensuring sustainability and transferability of ARM knowledge.

3.2. ARM training course provision and partnership with Makerere University

PARM has worked with Makerere University/ College of Agriculture and Environmental Science (CAES) to operationalize the first ARM training course delivered in March 2017.

Due to the established ARM knowledge and competencies of Makerere University/CAES staff, the courses can be easily replicated in 2017 and during next years. The positive feedback of the participants who attended the first ARM training are encouraging for the relevance of the course for the capacities of extension service providers.

The first ARM training targeted extension service providers from the central region of Uganda. The next courses could include extension service providers from other regions (i.e. each course can target a precise region) to have a full geographical coverage of the country after few ARM trainings.

The general ARM course is intended for agricultural extension workers, including non-state agricultural extension service providers (private sector, civil society, farmers' organizations, etc.)

The target number of participants is 25- 35 for a 5-day training.

At individual level, at the end of the course each participant is expected to:

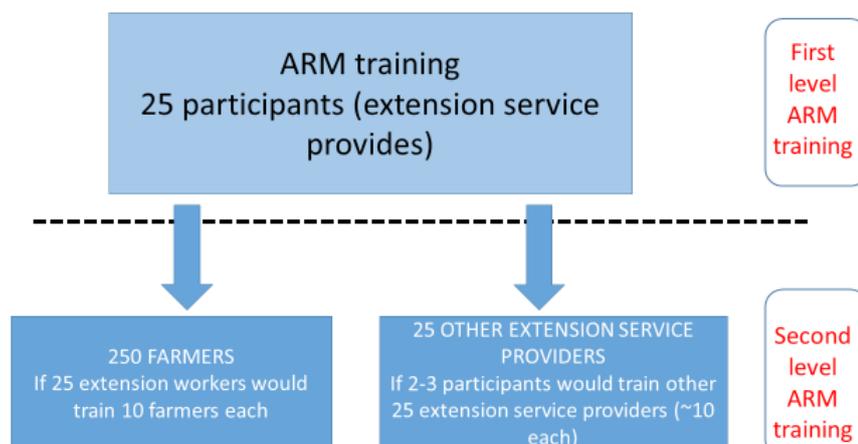
1. better appreciate the importance of risk and commitment to risk management in business-oriented agriculture at local governments, non-state agencies, and farm level planning
2. understand the meaning and importance of a holistic approach to ARM and to assess and prioritize risk in agricultural planning based on the methodology and documentation developed by PARM
3. identify, understand and design/customize appropriate ARM tools such as on-farm and community level practices, diversification strategies, financing products, interaction with markets, etc. that are sensitive to unique and special needs of agriculture
4. implement their action plans under supervision and follow up by their institutional leadership and course trainers, respectively.

The course aims to be a Training of Trainers (ToT) and, from the initial cohort of trainees, a group of trainers will be selected and specifically equipped with facilitation and training skills by CAES/MAAIF to conduct the future decentralized training of ARM at district, sub-county, farmer and farmer-group levels.

The group of extension workers/trainers will be able to conduct risk assessment, provide farm level guidance on how the farmers and other actors (such as farmers' organization, private sector, etc) could manage the risks they are exposed to, and provide information and brokerage on available ARM services, such as information and inputs access, technologies availability, financial and insurance services, et.. CAES will provide framework to maintain quality, ownership and accountability for the decentralized ARM training across the country.

The effect of the ARM training goes then beyond the single courses. For example, if from the initial cohort of trainers, 25 extension workers from different districts will become ARM trainers to farmers and, possibly, few of them (2-3 per ARM training course) may also be engaged in training other extension workers through MAAIF/DAES local training centres, . The cascade effect will results with 250 ARM trained farmers, and 50 extension workers in total from each ARM training¹ (Figure 1).

Figure 1: ARM training cascade effect



¹ 25 extension workers form the first training and 20-30 extension workers being trained by 2-3 extension workers trained at Makerere University.

Therefore, financing extra 1 to 2 ARM training courses during 2017 (targeting 25 participants each) would be already a good push for ARM *capacity building activities*. With a total of 3 training in 2017, about 4% of the extension service expected to be recruited for 2017/2018 would gather ARM knowledge from first level ARM training. The cascade effect would enable ~750 farmers on ARM knowledge and practices and, possibly, other 75 extension service providers through the second level ARM training, reaching 7-8% of the extension service expected to be recruited for 2017-2018 (Table 1).

Considering these numbers and cascade effect, three ARM course each year (for 2018-2010) would help cover the ARM capacity building needs of over 3% only with the first level training, and 6% with the second level training, not to mention thousands of farmers that will benefit from the knowledge and practices shared at farm level.

Table 1: Sub-County Staffing Plan

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
District staffing plan recruitment	394	335	456	173	150
Sub-County Staffing Plan recruitment	1,534	1,662	230	3,100	3,022
TOTAL	1,928	1,997	686	3,273	3,172
Convergence of newly recruited District and Sub-county staff		4% (first level ARM training)	11% (first level ARM training)	2% (first level ARM training)	2% (first level ARM training)
		7-8% (including second level ARM training)	22% (including second level ARM training)	4% (including second level ARM training)	4% (including second level ARM training)

Sources: NAES

The costs are limited considering the potential benefits. Considering, for example, an estimated cost of each ARM training course at 20,000- 30,000 USD², a investment of 100,000³ USD to Makerere University to run four ARM training courses would be able to cover ARM capacity building activities for 2017 and part of 2018⁴. The costs of ARM training delivered by Makerere University can be financed by Agricultural Technology and Agribusiness Advisory Services Project (ATAAS)/IFAD project for 2017⁵.

Investment plans for the following years are illustrated in Table 2.

Table 2: Investment plan for newly recruited extension workers

	2017/2018	2018/2019	2019/2020	2020/2021
Investment*	100,000	75,000	75,000	75,000
	(4 ARM training)	(3 ARM training)	(3 ARM training)	(3 ARM training)
Conver of newly recruited Sub-county staff	16-18%*	22%	4%	4%

* Considering an average unit cost of 25,000 USD for four ARM training course. The cost of the second level trainings (the trainings carried out by extension workers trained by Makerere University) is not included in this cost.

Further trainings on agricultural risk management specific tools (e.g. ICT, insurance, pest and disease, etc.) and/or targeting more specific sub-sectors⁶ (livestock, fisheries, etc) can be discussed and run on request by Makerere University (or other research centres and institutions).

These trainings can support also capacity development needs of other MAAIF departments.

² Amounts subjected to Makerere University approval.

³ Considering an average unit cost of 25,000 USD for four ARM training course.

⁴ The cost of the second level trainings (the trainings carried out by extension workers trained by Makerere University) is not included in this cost.

⁵ ATAAS objective is to increase the agricultural productivity and incomes of participating households by improving the performance of agricultural research and advisory services. Therefore,ATAAS aim fits with the ARM CD needs of the Ugandan extension service.

⁶ Considering always the PARM holistic approach.

3.3 Institutionalization of the ARM course into academic program of Makerere University

PARM entrusts CAES with engaging in the process to institutionalize ARM courses in formal University training (undergraduates and graduate degree courses) and continue to provide ARM training course for agricultural extension service in collaboration with MAAIF.

Aspects of Agricultural Risk Management training can be included in Makerere training courses for degrees in Agribusiness, Agriculture, Horticulture, Agricultural and Rural Innovations, Disaster Risk Management, Environment, Statistics, Commerce, Finance, Economics, etc. It is also plausible that specific content from ARM can be integrated into Masters Degree in the same disciplines.

Implementation of the ARM integration into university curricula requires facilitated consultative processes, including benchmarking with existing external programmes such as those in Partners Enhancing Resilience for People Exposed to Risks Universities (Periperi U) and Mountain of the Moon University. Mainstreaming Agricultural Risk Management training into university curricula will involve reviewing the existing programmes to identify areas of fit; conducting interactive sessions with academic staff for buy in and guidance; interviewing major players in selected key sectors for opinion; and finally holding sensitization workshops to highlight the framework for mainstreaming Agricultural Risk Management training in curricula. This activity would follow the University schedules for curriculum review. In the meantime, CAES is in the 2nd year of the 5-year cycle of curriculum implementation, having reviewed its curriculum in 2015. So if ARM contents for integrating into existing course units or proposals for developing stand-alone course units were identified now, courses with ARM content would be launched in 2019.

Timeframe

PARM and MAAIF are willing to work together with the following timeframe (Table 3):

Table 3: Timeframe of ARM CD activities

Activity	Description	MAAIF/PARM role	Deadline
Finalization of the ARM CD strategy	Agreement on the current ARM CD strategy for the extension service in Uganda	MAAIF and PARM drafting the ARM CD strategy. MAAIF agreeing on contents and timing	12 th May 2017
MoU with Makerere University/CAES for 2017	Inclusion in the already existing MoU with Makerere University two ARM training courses for extension service during 2017 delivered by Makerere/CAES. The two ARM training will be financed by ATAAS/IFAD project.	PARM facilitating the initiative MAAIF adding in the MoU ARM training courses upon agreed costs for each training and number of ARM trainings	30 th June 2017
MoU with Makerere University/CAES for 2018 onwards	Understanding how to cover the costs for ARM training from 2018 onwards		30 th September 2017



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