Platform for Agricultural Risk Management

Managing risks to improve farmers’ livelihoods

Capacity Development

Uganda

Capacity Development Seminar for Farmers’ Organisations (CD1)

Presentations Vol. II
December 2015
Managing risks to improve farmers’ livelihoods
Capacity Development Seminar (CD1) on Agricultural Risk Management

PARM learning event for farmers’ organisations

Volume II
PRESENTATIONS
Mbale | 9th – 10th December 2015

Report prepared by:
Jan Kerer, PARM Consultant

In collaboration with:
The Ministry of Agriculture
Animal Industry and Fisheries (MAAIF)
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SESSION 2 : Risks in smallholder farming

Presentation 1 : Overview of the risks in smallholder farming

Presentation 2 : Rethinking risks in smallholder farming through a holistic approach

SESSION 3 : Methods and tools for risk assessment

Presentation : Tools for the estimation of risks

Presentation: Risk Assessment Study in Uganda

DAY 2 : MANAGING RISK

SESSION 4 : Access to Finance

Presentation: Agricultural risk and access to finance

SESSION 5 : Information Systems for ARM

Presentation : Main sources of information

SESSION 6: Risk Management Instruments

Presentation 1: Overview of Agricultural Risk Management Tools

Presentation 2: Agricultural insurance

CONCLUSION
SESSION 1 : INTRODUCTION
INTRODUCTION OF THE GROUP

Take 2 minutes to discuss with your neighbor:

• What do you think of when you hear "agricultural risk management"?
• What is your expectation of this training and what do you hope to learn?

Introduction round:

• Your name
• Your organization and position
• Your understanding of what agricultural risk management is
• Your expectations of the training
OBJECTIVES OF THE TRAINING

• The seminar pursues the following learning objectives (for participants):
  • Develop an understanding of risks and risk management
  • Learn how to assess risk and define priorities for risk management
  • Understand how risks influence business and investment decisions
  • Learn what tools are suited for different risk situations

• The seminar also pursues the following additional objectives (for organizers):
  • Identify knowledge needs of farmers to build up a plan on Capacity Development on ARM in Uganda
  • Gather feedback on current risk management to develop new initiatives for risk management in Uganda

STRUCTURE OF THE TRAINING
SECTIONS OF THE TRAINING

- Session 2. Understanding risk
- Session 3. Risk Assessment
- Session 4. Access to finance
- Session 5. Information
- Session 6. Tools & Instruments

AGENDA FIRST DAY - MORNING

First day from 9 a.m. to lunch:

- Session 1: Presentation of participants & introduction
- Session 2.1: Understanding risks in smallholder farming
- Session 2.2: Rethinking risks in smallholder farming through a holistic approach
- How to understand and manage risks
- How to measure risks
- How to get access to finance in risky businesses
- Where to get relevant & timely information
- Which tools and roles of the stakeholders
AGENDA FIRST DAY - AFTERNOON

First day from lunch to 5:30 p.m.:

• Session 3.1: Risk assessment methods
• Session 3.2: Prioritization of risks
• Session 3.3: Risk assessment exercise

AGENDA SECOND DAY - MORNING

Second day from 9 a.m. to lunch:

• Session 4.1: Access to finance in risky environments
• Session 4.2: Group exercise: Mbale Happy Farmers Bank
• Session 5.1: Access to information
AGENDA SECOND DAY - AFTERNOON

Second day from lunch to closing:

• Session 6.1: Risk management tools
SESSION 2 : RISKS IN SMALLHOLDER FARMING
Overview of risks in smallholder farming

8 December, 2015 | Mbale Resort Hotel

OBJECTIVES

By the end of this session, participants should be able to:

- Understand the concept of risk (agriculture risks), key components and effects
- Identify the main sources of agriculture risks
CONCEPT OF RISK

Understanding risk and its factors is very important in dealing with agricultural systems, particularly in smallholder farming.

What is a Risk?

The possibility of an undesirable state of reality (adverse effects) may occur as a result of natural events or man made activities.

KEY COMPONENTS

- **PROBABILITY**: the likelihood of experiencing any natural or human hazard at a location/region in a particular future time

- **ELEMENTS at risk**: identifying those elements which would be affected by the hazard if it occurred

- **POTENTIAL EFFECTS/IMPACT**: Expected losses from a hazard (severity) to a specific element at risk
Quantification of the level of risk is an essential aspect of both preparedness and mitigation planning.

**Risk Causes and Effects**

- **Possibility of man made activities**
- **Possibility of natural event**

**Elements at risk in Agriculture**

**Event occurs and impacts Agriculture**

**Negative Effects**

- **Losses physical damage**
- **Losses economic**
- **Number of lives lost**

**Risk Context**

Risk vs. Probability - probability of the event occurring and the consequences of the event.

The probability of a severe earthquake may be very small but the consequences are so catastrophic that it would be categorized as a **high-risk event**.

Risk vs. Threat

- A threat is a low probability (may be unable to assess the probability) event with very large negative consequences.

vs. a risk: a higher probability event, there is enough information to make assessments of both the probability and the consequences.

Risk vs. outcome (always negative?)

- Combination of danger (crisis) and opportunity
- Risk and reward
- Risk and Innovation
**Who is at risk? Smallholder farmers: Their significant role in the economy**

**POVERTY CYCLE OF SYSTEMIC RISK**

1. High exposure to systematic risks
2. Farmers choose low risk – low yield strategies to prevent catastrophic loss
3. This keeps them unattractive for banks (no access to finance)
4. Farmers can't invest in productivity improvement & risk mitigation
GROUP DISCUSSION: RISK EXAMPLE

...the peak of rains is expected to occur around mid-April; however short-lived dry spells are expected to interrupt the seasonal rains ... By mid-May, the rains are expected to relax with cessation occurring around early/mid June 2015

What are the adverse effects on agriculture
How such effects could be mitigated

GROUP DISCUSSION: RISK EXAMPLE

...there is an outbreak of Foot and Mouth disease in Kigweri and Kite Yongera Parishes in Ngoma Sub County and Ngoma Town Council.

What are the adverse effects on livestock
How such effects could be mitigated
Risks faced by farmers are numerous and varied, and are specific to the country, climate, and local agricultural production systems.

**Types of Risks**

1. Weather-related risks
2. Biological and environmental risks
3. Market-related risks
4. Policy and political risks
5. Infrastructural risks
6. Management and operational risk
7. Human or personal risks

**Sources?**

**Farming Risk**

**Weather Risks**

Weather risk may affect both the quantity and quality of agricultural products.

<table>
<thead>
<tr>
<th>Risks</th>
<th>Factors / Drivers</th>
<th>Effects / Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather risks</td>
<td>Rainfall variability</td>
<td>Lower yield, Loss of productive assets or income</td>
</tr>
<tr>
<td>Weather risks</td>
<td>Temperature variability</td>
<td>Lower yield, Loss of productive assets or income</td>
</tr>
<tr>
<td>Weather risks</td>
<td>hail storms</td>
<td>Lower yield, Loss of productive assets or income</td>
</tr>
<tr>
<td>Weather risks</td>
<td>strong winds</td>
<td>Lower yield, Loss of productive assets or income</td>
</tr>
</tbody>
</table>
WEATHER RISKS: EXAMPLES

Below average rainfall likely to reduce yields leading to food insecurity
Projected food security outcomes, May to June 2015

WEATHER RISKS: CLIMATE CHANGE

Observed drying and warming of Uganda’s climate

Potential EFFECT:
• Reduced maize and coffee production
• Exacerbated impact of drought
## BIOLOGICAL RISKS

<table>
<thead>
<tr>
<th>Risks</th>
<th>Factors / Drivers</th>
<th>Effects / Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pest &amp; diseases</td>
<td>Crop and livestock pests and diseases</td>
<td>Lower agricultural production &amp; yield</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loss of income</td>
</tr>
<tr>
<td></td>
<td></td>
<td>…</td>
</tr>
<tr>
<td>Contamination</td>
<td>Contamination related to poor sanitation</td>
<td>Reduced food safety and health impacts on population</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loss of income</td>
</tr>
<tr>
<td></td>
<td></td>
<td>…</td>
</tr>
</tbody>
</table>

### EFFECT:
- 3/4 households experiencing this shock it hits their INCOME and, inevitably, for almost all (...) it hits FOOD PRODUCTION
- 1/5 households were forced to change their DIETARY PATTERNS

Crop pests & disease: reported in central and eastern Uganda by 11% and 8% of households respectively
# MANAGEMENT AND OPERATIONAL RISKS

<table>
<thead>
<tr>
<th>RISKS</th>
<th>FACTORS / DRIVERS</th>
<th>EFFECTS / IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor management decisions in asset allocation and</td>
<td>Lack of knowledge and information</td>
<td>Poor yields and lack of market</td>
</tr>
<tr>
<td>livelihood/enterprise selection;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor decision making in use of inputs;</td>
<td>Lack of knowledge and information</td>
<td>Poor yields and lack of market</td>
</tr>
<tr>
<td>Poor quality control; forecast and planning errors;</td>
<td>Lack of knowledge and information</td>
<td>Poor yields and lack of market</td>
</tr>
<tr>
<td>forecast and planning errors; breakdowns in farm or</td>
<td>Lack of knowledge and information</td>
<td>Poor yields and lack of market</td>
</tr>
<tr>
<td>firm equipment; lack of preparation to change product,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>process, markets; inability to adapt to changes in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cash and labor flows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of inappropriate seeds;</td>
<td>Low access to reliable input dealers</td>
<td>Poor yields</td>
</tr>
</tbody>
</table>

# INFRASTRUCTURE RISK

<table>
<thead>
<tr>
<th>RISKS</th>
<th>FACTORS / DRIVERS</th>
<th>EFFECTS / IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>Lack of storage facilities at farm level</td>
<td>Loss of harvest due to attacks from</td>
</tr>
<tr>
<td></td>
<td>Lack of storage facilities at market level (warehouses)</td>
<td>insects, mice, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loss of income due to sale of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>produce directly after harvest</td>
</tr>
<tr>
<td>Transport</td>
<td>Insufficient investment in rural areas</td>
<td>High transport cost</td>
</tr>
<tr>
<td></td>
<td>Degraded, inadequate maintenance</td>
<td>Low market access</td>
</tr>
<tr>
<td>Communication</td>
<td>Insufficient investment in rural areas</td>
<td>Lack of information on markets,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prices, etc.</td>
</tr>
<tr>
<td>Energy</td>
<td>Inadequate rural electification</td>
<td>Loss of production</td>
</tr>
</tbody>
</table>
MARKET RISKS

PRICE RISK
refers to the uncertainty about the prices producers will receive for commodities or the prices they must pay for inputs

<table>
<thead>
<tr>
<th>Risks</th>
<th>Factors / Drivers</th>
<th>Effects / Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price risks</td>
<td>Low prices, market and</td>
<td>Loss of income, savings</td>
</tr>
<tr>
<td></td>
<td>demand, volatility</td>
<td>and investments</td>
</tr>
</tbody>
</table>

PRICE VARIABILITY MAIZE

Nominal wholesale price of Maize: similar fluctuations across country
PRICE VARIABILITY BEANS

Nominal wholesale price of Beans: similar fluctuations across country

MARKET RISK: TRADE

Uganda: major surplus producer and exporter of maize
EU WARNS ON AGRICULTURAL EXPORTS FROM UGANDA (2015)

WHY?

... Interception of products with harmful organisms: ... not meeting set of regulation of the EU rules → restriction of the TRADE (exports) → estimated loss of more than 64 million USD → Impact on 2.5 million farmers mostly producing red pepper and roses

POLICY AND POLITICAL RISKS

<table>
<thead>
<tr>
<th>RISKS</th>
<th>FACTORS / DRIVERS</th>
<th>EFFECTS / IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy risk</td>
<td>Regulatory changes</td>
<td>Changes in costs, taxes, market access, production, income</td>
</tr>
<tr>
<td></td>
<td>E.g. inspection system, pack houses, certification, traceability system etc.</td>
<td>Changes in costs, taxes, market access, production, income</td>
</tr>
<tr>
<td>Political risk</td>
<td>Political upheaval</td>
<td>Changes in costs, taxes, market access</td>
</tr>
<tr>
<td></td>
<td>Disruption of markets</td>
<td>Changes in costs, taxes, market access</td>
</tr>
<tr>
<td></td>
<td>Unrest</td>
<td>Changes in costs, taxes, market access</td>
</tr>
</tbody>
</table>
**HUMAN RISKS**

Refer to factors such as problems with human health or personal relationships that can affect the farm business

<table>
<thead>
<tr>
<th>RISKS</th>
<th>FACTORS / DRIVERS</th>
<th>EFFECTS / IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness and death</td>
<td>Low health standards Malnutrition</td>
<td>Loss of productivity, loss of income, increased costs</td>
</tr>
<tr>
<td>Accidents</td>
<td>Low labour standards</td>
<td>Loss of productivity, loss of income, increased costs</td>
</tr>
<tr>
<td>Personal tragedies (divorce, death of relatives, etc.)</td>
<td></td>
<td>Increased costs</td>
</tr>
</tbody>
</table>

**HEALTH RISK – EXAMPLE 2013**

Serious illness/accident of income earner reported by 10% households in central Uganda

**EFFECT:**

- Hits their income (more than 90%) because of the reduced earning capacity.
- 8% changed their eating patterns
KEY QUESTIONS

1. Based on your experience and working environment, what are the main sources of risks for smallholder farmers?

2. For each identified type of risk, which are the main factors/drivers?

3. What are the main effects/impacts on smallholder farmers?

THANK YOU
THE REPUBLIC OF UGANDA

Session 2.2.
Holistic risk management

OBJECTIVES OF SESSION

By the end of this session, participants should be able to:

• Understand the relationship between different risks in agriculture.
• Understand the correlation of risks: i.e. widespread risks versus localized risks
• Understand what a holistic approach to risk is
WHY HOLISTIC RISK MANAGEMENT?

A story of 2 dogs...

A holistic approach means the focus on:
- the whole farm / farm household income
- all sources of risk and correlation of risks
- all options and tools available

VARIETY OF RISKS

The types and severity of the risks confronting farmers vary by farming system, agro-climatic region
VALUE CHAIN EXAMPLE: **MAIZE & BEANS**

VALUE CHAIN EXAMPLE: **COFFEE**
RISKS AT DIFFERENT STAGES

- Inputs: Low quality inputs, Fake inputs
- Growing: Bad weather
- Growing: Pest and diseases
- Storage: Grain borer, Mice
- Selling: Low prices

RISK MANAGEMENT CYCLE

1. Analyze risk exposure
2. Evaluate risk mgmt options
3. Select risk mgmt tools
4. Implement risk mgmt tools
5. Monitor results
## RISK MANAGEMENT ELEMENTS

- **(Risk avoidance)**
- **Risk reduction**
  - irrigation;
  - integrated pest management systems;
  - improved seed varieties;
  - diversification
- **Risk transfer**
  - insurance
- **Risk coping**
  - savings

## RISK REDUCTION

1. **Farmer Awareness**: understanding and analyzing risk is a complex task. Farmers are surely aware that they are threatened by risk but do not have the means and tools to actively protect themselves. Integrating risk management into extension messages and farmer trainings is required.

2. **On-farm risk management**: through improved farm management practices a portion of the risk can be avoided at household level, for example through risk diversification, etc.

3. **Technology adoption**: adoption of low-cost technology for risk management has huge potential in Uganda. For example, trials on low-cost storage improvement have shown high returns on investment for farmers in terms of risk reduction.
4. **Information systems**: understanding and analyzing risk is also required at the government level. Data collection on risk related issues is still weak and requires improved information system at various levels (i.e. local, regional, and national). Provision of timely information (e.g. on prices) to farmers is important to contain e.g. price risk.

5. **Early warning**: some risks, e.g. droughts or other climatic events, can be predicted with a fair degree of certainty. Translating these informations into policy actions and providing farmers with timely information to allow them to take necessary precautions is one important risk management element.

6. **Improved input markets**: the widespread use of counterfeit inputs can only be addressed by joint public-private efforts. Establishing user hotlines, enforcing quality standards in the value chain, and educating farmers are important elements of an improved input sector. Working with the input supply chain and increasing quality assurance is equally important.

7. **Improved pest & disease management**: early detection of disease outbreaks is the starting point for improved pest management; improved input markets also contribute to lower risk exposure. Swifter action by the respective government entities, commodity associations is essential to combat diseases at early stages.
RISK REDUCTION cont’d

8. Improved infrastructure: besides low-cost solutions for storage at farm-gate level, the infrastructure of value chains has to be upgraded to allow for increased commercialization of sectors. Finding sustainable mechanisms for storage, quality assurance, and price stabilization at aggregate level through warehouse systems can help to overcome some of the price and storage risks farmers are facing.

9. Price stabilization: the reasons for price volatility fluctuate between commodities (e.g. tea and coffee vs. maize). Designing price stabilization mechanisms through e.g. the commodity exchange, vertical integration, etc. are potential answers to this issue.

RISK TRANSFER

1. Agricultural insurance: completely eliminating risk from agriculture is not feasible. For those elements of risk that can not be managed on the individual’s level (e.g. through risk reduction & diversification), tailor made insurance is required. Current efforts by the insurance industry require support to further increase outreach. Increasing farmer awareness, providing sufficient data to develop new products, and financial support to the insurance sector are potential actions for the future.

   In addition, developing insurance system on aggregate levels, e.g. regional or national might be beneficial for the government to lessen the financial burden of emergencies to the budget.
RISK COPING

1. **Savings Mobilization:** despite risk reduction and transfer, farmers will still be negatively affected by risks. Therefore, farmers have to build up a buffer through savings to prepare for harsh times.

2. **Transfer systems:** In order to avoid that farmers have to reduce food intake, etc. the government is needed to lessen some of the negative impact to its citizens. The design of transparent security mechanisms (e.g. through voucher systems, cash/food for work programs, etc.) is needed to avoid inefficiencies in the system and to ensure that markets are not disrupted.

RISK MANAGEMENT AT FARM LEVEL

- Behavior of a smallholder farmer depends on household characteristics, farm size/assets, production system and the context
- Wide range of methods for managing risks at farm level:
  - Before shock happens: crop diversification, share-cropping
  - After shock happens: credit, temporary employment, savings
- Risk management at community level: risk pooling by sharing food stocks, relying on kin support networks
- Traditional method are least effective at handling low frequency, highly correlated risks (e.g. drought) that affect many people simultaneously ...
RISK MANAGEMENT TOOLS & STRATEGIES

- Improved inputs
- Crop diversification
- Work off farm
- Contract farming
- Insurance
- Rotating credits in community
- Warehouse & storage

CORRELATION OF RISKS

- Managing risks in agriculture is particularly challenging, as many risks are highly correlated, resulting in whole communities being affected at the same time.
- Covariance: the degree to which they are correlated across households within a community or region ranging from independent (affecting one person) to highly covariate (affecting everyone at the same time).

Local risk → Systemic risk
## RISK LOSSES

<table>
<thead>
<tr>
<th>Type of risk</th>
<th>Farm level</th>
<th>Community level</th>
<th>Countrywide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market/prices</td>
<td></td>
<td>Changes in price of land</td>
<td>Changes in input/output prices due to shocks, trade policy etc.</td>
</tr>
<tr>
<td>Production</td>
<td>Hail, frost, personal hazard</td>
<td>Rainfall, landslides, pollution</td>
<td>Floods, droughts, pests, contagious diseases</td>
</tr>
<tr>
<td>Financial</td>
<td>Changes in income from other sources (non-farm)</td>
<td></td>
<td>Changes in interest rates/value of financial assets/access to credit</td>
</tr>
</tbody>
</table>

## RISK TYPES

<table>
<thead>
<tr>
<th>Type of risk</th>
<th>Severity</th>
<th>Frequency</th>
<th>Type of loss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Life</td>
<td>Assets</td>
<td>Production/Income</td>
</tr>
<tr>
<td>Catastrophes</td>
<td>HIGH</td>
<td>LOW</td>
<td>WIDE</td>
</tr>
<tr>
<td>Smaller drought, new pest outbreaks</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>SOME Loss of life</td>
</tr>
<tr>
<td>Local weather and pest problems</td>
<td>LOW</td>
<td>HIGH TO MEDIUM</td>
<td>Accidents, illness predictable</td>
</tr>
</tbody>
</table>
### Risk Management Levels

<table>
<thead>
<tr>
<th>Risk Characteristics</th>
<th>Layer of Risk</th>
<th>Level of Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>High frequency &amp; low severity</td>
<td>Retention</td>
<td>Farm / household / community</td>
</tr>
<tr>
<td>Medium frequency and severity</td>
<td>Transferable</td>
<td>Markets</td>
</tr>
<tr>
<td>Low frequency and high severity</td>
<td>Disaster and market failure</td>
<td>Governments (and Donors)</td>
</tr>
</tbody>
</table>

#### Relation Between Risks

- Some risks can be a consequence or side effect of another risk or constraint
  - Example: pests as a result of dry spell
- Sometimes the effects of risk cancel each other out
  - Example: yields and prices
**RISK MANAGEMENT SYSTEM**

A Holistic approach:
- involves farmers, government, and others
- requires cooperation
- requires investment

**Market, Weather, Input, Diseases, Post harvest losses...**

Risk Management as a system

- Warehouses, Input support, Disaster compensation
- Diversification, Insurance, Savings, Contracting...

**RISK MANAGEMENT SYSTEM – EXAMPLE**

A Holistic approach:
- involves farmers, government, and others
- requires cooperation
- requires investment

- Reduced Price risk

Risk Management as a system

- Warehouses
- Contract farming
SESSION WRAP UP

- The risk management system of smallholders is complex: many elements all interrelated
  - Need of Information and Risk Assessment capacities
- Risk characteristics determine different types of risk and different options to manage
  - Frequency, severity and correlation
- A risk management system for Uganda requires different layers of responsibility

GROUP WORK

Key questions:
1. What are the main knowledge and skills needs to better manage the risks affecting farmers?
2. Please define your role and responsibilities in improving risk management for farmers (from farmers perspective and from extension officer/government perspective)
THANK YOU
Session 3.1. Tools for risk assessment

8 December, 2015 | Mbale, Uganda

OBJECTIVES OF SESSION

By the end of this session, participants should be able to:

• Understand how risk can be measured
• Learn a step-by-step methodology to assess their risk exposure
• Understand how risks can be prioritized
FREQUENCY VS. SEVERITY

Risks are assessed based on two questions:

SEVERITY. How big is the loss from a shock?
FREQUENCY. How often does a shock occur?

GROUP DISCUSSION. Look at the following farm. Which of the two risks poses are more severe threat to the livelihood of the farmer? Why?

Farmer Ben in Mbale grows maize on ½ hectare of land.

In a good year he can harvest 1,000 kg maize ½ hectare. But because of low quality pesticides he gets attacked by minor pests every year. In the last 5 years (2010-2014) he lost 10% of harvest (100 kg) on a yearly basis.

Then, in 2015 the long rains did not bring enough rains and the whole area suffered a severe drought. Ben lost 40% of his maize (400 kg) due to insufficient rain.
FREQUENCY VS. SEVERITY – FARMER BEN

Pest risk: low severity, high frequency – Ben loses 100 kg every year for 5 years, in sum he lost 500 kg

Drought risk: high severity, low frequency – Ben loses 400 kg in 2015

Mathematically, pest risk is more severe BUT we do not know yet long term cost of drought, for example, maybe Ben had to sell land to cover cost of food in 2015. Then he has less land in the future to plant and generate income.
It is not easy to quantify severity of a shock:
1. Not always easy to identify root cause of problem (e.g. bad input)
2. Long term costs are not always known
3. “Normal” yields are not always known

For the assessment we always need to consider two questions:
1. How much does the risk cost us every year?
2. What is the worst that can happen (worst-case scenario)?

IMPACT OF RISK

IMPACT ON FARMERS. (Smallholder) farmers face severe consequences from risks. Farmers are, for example, forced to reduce food consumption.

The impact of shocks often permanently damages the farmers’ capacity to generate income: for example, the sale of livestock and land means reduced income sources for the future.

Reaction to crisis by farmers (Kapchorwa and Oyam)
Uncertainty is one of the main characteristics of risk: uncertainty on when something will happen (frequency) and how severe the impact will be (severity).

A risk matrix can help to prioritize different risks faced by farmers in Uganda.

### RISK MATRIX

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>very high</td>
<td>very high</td>
</tr>
<tr>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>medium</td>
<td>medium</td>
</tr>
<tr>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>very low</td>
<td>very low</td>
</tr>
</tbody>
</table>

### OVERVIEW

Uganda’s agriculture is affected by a multitude of risks. Often, risks are inter-related and the impact is increased by the constraints that farmers face, in particular smallholders.

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input risk</td>
<td>Seeds do not germinate or pesticides/herbicides do not kill pests/diseases</td>
</tr>
<tr>
<td>Weather risk</td>
<td>Yields are low because of droughts, heatwaves, etc.; fields are flooded/washed away</td>
</tr>
<tr>
<td>Biological risk</td>
<td>Pest &amp; diseases kill crops and lower yield; kill animals or reduce production (e.g. milk)</td>
</tr>
<tr>
<td>Infrastructure risk</td>
<td>Produce is rotting away in storage, gets attacked by mice/insects/etc.</td>
</tr>
<tr>
<td>Price risk</td>
<td>Lower income due to low prices on markets</td>
</tr>
</tbody>
</table>

In some part of the country, also security issues can lead to losses, e.g. cattle raiding in the North East.

Farmers are also affected by personal risks, such as health.
## RISK SEVERITY

Overview on risk severity for Uganda in UGX

<table>
<thead>
<tr>
<th>Risk</th>
<th>Average loss per year</th>
<th>Worst case scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price risk food &amp; cash crops</td>
<td>865,346,274,719</td>
<td>4,275,978,025,931</td>
</tr>
<tr>
<td>Crop pest &amp; diseases</td>
<td>678,150,000,000</td>
<td>983,400,000,000</td>
</tr>
<tr>
<td>Post harvest revenue loss</td>
<td>352,847,686,256</td>
<td>464,321,205,832</td>
</tr>
<tr>
<td>Livestock pest &amp; diseases</td>
<td>252,530,792,628</td>
<td>252,530,792,628</td>
</tr>
<tr>
<td>Droughts</td>
<td>146,528,517,300</td>
<td>1,265,399,487,000</td>
</tr>
<tr>
<td>Counterfeit inputs</td>
<td>54,615,000,000</td>
<td>73,920,000,000</td>
</tr>
<tr>
<td>Karamoja cattle raids</td>
<td>8,389,247,081</td>
<td>10,486,685,913</td>
</tr>
<tr>
<td>Floods</td>
<td>548,694,300</td>
<td>4,314,926,943</td>
</tr>
<tr>
<td>Hailstorms</td>
<td>225,644,100</td>
<td>1,641,163,656</td>
</tr>
<tr>
<td>Thunderstorms</td>
<td>69,214,200</td>
<td>940,487,262</td>
</tr>
</tbody>
</table>

## RISK MATRIX UGANDA

Risk assessment on the national level

<table>
<thead>
<tr>
<th>Risk</th>
<th>Severity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop pest &amp; diseases</td>
<td>very high</td>
<td>very high</td>
</tr>
<tr>
<td>Post harvest loss</td>
<td>very high</td>
<td>very high</td>
</tr>
<tr>
<td>Price risk food &amp; cash crops</td>
<td>very high</td>
<td>high</td>
</tr>
<tr>
<td>Livestock pest &amp; diseases</td>
<td>high</td>
<td>very high</td>
</tr>
<tr>
<td>Droughts</td>
<td>medium</td>
<td>medium</td>
</tr>
<tr>
<td>Counterfeit inputs</td>
<td>medium</td>
<td>very high</td>
</tr>
<tr>
<td>Karamoja cattle raids</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>Floods</td>
<td>very low</td>
<td>high</td>
</tr>
<tr>
<td>Hailstorms</td>
<td>very low</td>
<td>high</td>
</tr>
<tr>
<td>Thunderstorms</td>
<td>very low</td>
<td>high</td>
</tr>
</tbody>
</table>
Risks do not affect all regions and all farmers in the same way.

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Risk</th>
<th>Food crops</th>
<th>Cash crops</th>
<th>Livestock</th>
<th>Fisheries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input risk</td>
<td>Quality inputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weather risk</td>
<td>Droughts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Floods</td>
<td></td>
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<tr>
<td></td>
<td>Hailstorms</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Thunderstorms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All other natural risks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological risk</td>
<td>Crop pest &amp; diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Livestock pest &amp; diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infrastructure risk</td>
<td>Post harvest revenue loss</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price risk</td>
<td>Price risk food &amp; cash crops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security risk</td>
<td>Northern Uganda insurgency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Karamoja cattle raids</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SEVERITY & FREQUENCY – EXAMPLE COFFEE

<table>
<thead>
<tr>
<th>Probability of Event</th>
<th>Potential Severity of Impact</th>
<th>Negligible</th>
<th>Moderate</th>
<th>Considerable</th>
<th>Critical</th>
<th>Catastrophic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly probable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occasional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remote</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improbable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SEVERITY & FREQUENCY – EXAMPLE DAIRY

HOW TO DEVELOP RISK ASSESSMENT?

Starting point:
1. Draw a map/structure of your agricultural segment, value chain, etc. (It sometimes help to draw it in chronological order, e.g. “farmer first buys seeds”, “farmer grows crop”, etc.).
2. Assign risks for each of the stages (e.g. quality of inputs for the first phase where farmer buys seeds) or as a constant risk (e.g. security issues during each phase).
3. Assess the frequency and the severity of the risk (exact quantification is not always possible, sometimes enough to distinguish between high, medium, and low impact).
4. Prioritize risks based on the assessment (if possible, just 2-3 major or high priority risks; there is always an element of subjective assessment).
5. Identify the root causes for the priority risks identified.

After these five steps strategies and tools can be developed.
HOW TO DEVELOP RISK ASSESSMENT? cont’d

Example: Maize

<table>
<thead>
<tr>
<th>Buying inputs</th>
<th>Impact</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buying low quality inputs</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Buying fake inputs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Growing</th>
<th>Impact</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad weather (not enough rain, ...)</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Pest and diseases (MLND, ...)</td>
<td>Medium</td>
<td>Medium</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage</th>
<th>Impact</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain borer</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Mice, ...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Selling</th>
<th>Impact</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low prices compared to production cost</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

It is not always possible to exactly determine the cost of each risk due to:
1. Lack of data/information
2. Interlinked risks (herbicides and pest)
3. Effect of other constraints (e.g. lack of roads)

We have to be creative!

How to determine effect on whole district/value chain from information from a few farmers only? → we need to get to a minimum of observations to draw conclusions, e.g. visit at least 5-10% of locations for a district, interview at least 50-60 farmers (for example through focus group discussions).
QUANTIFYING RISK

INPUT RISK
• Difficult to assess: did seed not germinate because of low quality, fake, weather factors, wrong management, etc.?
• Sometimes only possible to assess frequency through e.g. newspaper reports, personal experience, etc.?

WEATHER RISK
• Difficult to know what is “normal” yield; but farmers mostly know what they harvest in average years.
• Direct effect of reduced yields can often be calculated for some years (5) based on memories of farmers.
• Important to look both at average losses and worst cases

QUANTIFYING RISK cont’d

PEST & DISEASE RISK
• Not easy sometimes to separate weather from pest risks (often attack together)
• Still, often people know how much they lost due to specific pests/diseases in most recent years (or a worst case year)
• Direct and indirect cost, e.g. livestock cost for disease control, treatment, and vaccination. Direct losses are associated with animal mortality, reduced milk production, and use of animal for traction.

POST HARVEST RISK
• Difficult to assess due to two opposing effects (weight loss and price).
• Regional data is available from APHLIS (http://www.erails.net/UG/aphlis/aphlis-uganda/Home/) for major crops.
QUANTIFYING RISK cont’d

PRICE RISK
• Important to assess whether price drop is not simply due to very high prices in recent years.
• Price data is available at Farmgain (http://farmgainafrica.org/) and Infotrade (http://www.infotradeuganda.com/)
• We need to look at how profit margins have developed (e.g. how much did production cost 5 years ago and how much was revenue; compared to production cost of today and revenue of today).

RISK ASSESSMENT EXERCISE

GROUP WORK.
1. Split up according to common interest/knowledge (e.g. commodity/area/etc.)
2. Develop an overview/map of your commodity/area/etc. based on value chain, timeline, or similar
3. Assign risks for each step
4. Assess frequency and severity of each risk (quantification might no be possible; simple ranking into high, medium, low severity and frequency might be enough).
5. Prioritize risks based on your assessment; identify two top priority risks
6. (Identify root causes of two top priority risks)
THANK YOU
3.3. GROUP WORK

1. Split up according to common interest/knowledge (e.g. commodity/area/etc.)

2. Develop an overview/map of your commodity/area/etc. based on value chain, timeline, or similar

3. Assign risks for each step

4. Assess frequency and severity of each risk (quantification might not be possible; simple ranking into high, medium, low severity and frequency might be enough).

5. Prioritize risks based on your assessment; identify two top priority risks

6. (Identify root causes of two top priority risks)
Risk Assessment Study (RAS) - Uganda

8 December, 2015 | Mbale, Uganda

CONTEXT OF RAS

• When talking about food and nutrition security a lot of emphasis is on increasing productivity (or improving distribution)
• But investing in reducing losses can be an equally beneficial approach -> ARM
• Government of Uganda has taken the conscious decision to integrate ARM into 5 year investment plan (in a holistic manner)
• The Risk Assessment Study contributes to this process by putting facts and figures on the table that help to prioritize activities connected to ARM
OVERVIEW. Uganda’s agriculture is affected by a multitude of risks. Often, risks are inter-related and the impact is increased by the constraints that farmers face, in particular smallholders.

**Input risk** Counterfeit inputs

**Weather risk** Drought, flood, hail, thunderstorms, landslides, etc.

**Biological risk** Pest & diseases for crop & livestock

**Infrastructure risk** Post harvest loss

**Price risk** Price risk for food & cash crops

**Security risk** Karamoja cattle raids

INPUT RISK

- Low yields due to low adoption of improved inputs
- 90% of crops use home-saved seed and planting material
- High reported incidence of counterfeit inputs, mainly maize seeds and herb-/pesticides
- Estimated losses between USD 10.7 and USD 22.4 million annually due to counterfeit maize, herbicide and inorganic fertilizer sales
WEATHER RISK

Uganda is affected by a range of weather events. The most common events are floods, droughts, hailstorms, and landslides.

**Droughts:** highest single-event losses (app. USD 683 m in 2010/11)
Frequency of catastrophic events is low (1 in 25 years)
Rainfall deficit (small scale drought) is frequent
Average losses in past 10 years: USD 44 m

**Floods:** most frequent event (771 PMO records)
Regional concentration in Eastern
Average losses USD 166,270

**Hailstorms:** high frequency (similar to floods)
Low impacts, on average USD 68,377 p.a.

**Mud-/landslides:** concentrated in Eastern
High number of events in recent years
Low impact on national level

PEST & DISEASE RISK: CROPS

- Outbreaks of pests and diseases are part of agriculture.
- Problems both with endemic problems (e.g. coffee, cassava, banana) and threat of new disease (e.g. MLND, FMD, swine fever).
- Existing climatic conditions already favour certain diseases and climate change threatens to increase problems.
- Economic impact of pest and diseases includes yield loss plus opportunity cost and expenditure incurred to control the pests and diseases.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Estimated Annual Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bananas</td>
<td>USD 35 - 200 million</td>
</tr>
<tr>
<td>Cassava</td>
<td>USD60 - 80 million</td>
</tr>
<tr>
<td>Cotton</td>
<td>USD 10 million</td>
</tr>
<tr>
<td>Coffee</td>
<td>USD 8 million</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>USD 113-298 million</strong></td>
</tr>
</tbody>
</table>
**PEST & DISEASE RISK: LIVESTOCK**

- Recurring threat to livestock
- Often connected to other risks (e.g. weather); pronounced together with drought risk in the North
- Cost per animal varies per agro-climatic zone: USD 14.27 in semi-humid agro-pastoral system, USD 5.31 humid mixed crop-livestock system and USD 7.62 semi-arid pastoral system.
- Economic cost for diseases in estimated at USD 68.3 m per year for Eastern, Central, and Western Regions. By including livestock from the Northern Region loss is estimated as high as USD 91.6 m p.a.

**POST HARVEST RISK**

- Lack of storage is a constraint that leads to price risk and pest and disease risk
- Country-wide problem: in 2012, 0.62 million tonnes (18.3% of a total cereal production) was lost. Average weight losses of wheat and barley 12-13%, maize 17-25%, millet, rice, and sorghum 12-24%.
- Recurrent issues with higher losses in wet years
- Concentrated losses, e.g. only 21.5% of maize growers are affected. Risk is higher for smallholder farmers.
- Farmer are stuck between price and weight loss.
- The average annual revenue loss is USD 97,179,571.
- The vast majority of losses derives from maize (72.34% on average).
MARKET RISK

- Volatility of agricultural prices higher than core inflation.
- Farmers are affected by price volatility both as producers and consumers.
- Agricultural production is very price-sensitive
- Common across most value chains but due to differing reasons, e.g. maize, coffee, tea, ...
- Significant price drops (above 15%) for beans, maize, millet, rice, and sorghum have occurred frequently in recent years.
- Losses for major food crops can be as high as USD 165 m in a single year; and average in recent years was over USD 100 m.

REGIONAL RISKS

SECURITY RISK. Cattle raiding still exists in Karamoja
Losses to pastoralist range from USD 1.9 million to 3.1 million p.a.

RISK ZONES. Some risks are prevalent in all parts in the country, e.g. market price risk or input risk.
Pest & diseases are also prevalent everywhere but depend on main crops/livestock of the districts.
Concentration of risk varies for some risks, for example natural hazards.
RISK ASSESSMENT

- Looked at agriculture and risk context
- Described the risks, root causes, and impacts
- Mapped existing ARM initiatives and analyzed “missing pieces”
- Develop risk scoring based on severity, frequency, and worst case scenario

<table>
<thead>
<tr>
<th>Risk</th>
<th>Average Severity</th>
<th>Average Frequency</th>
<th>Worst Case Scenario</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop pest &amp; diseases</td>
<td>very high</td>
<td>very high</td>
<td>very high</td>
<td>5.00</td>
</tr>
<tr>
<td>Post harvest loss</td>
<td>very high</td>
<td>very high</td>
<td>high</td>
<td>4.75</td>
</tr>
<tr>
<td>Price risk food &amp; cash crops</td>
<td>very high</td>
<td>high</td>
<td>high</td>
<td>4.35</td>
</tr>
<tr>
<td>Livestock pest &amp; diseases</td>
<td>high</td>
<td>very high</td>
<td>medium</td>
<td>4.10</td>
</tr>
<tr>
<td>Droughts</td>
<td>medium</td>
<td>medium</td>
<td>very high</td>
<td>3.50</td>
</tr>
<tr>
<td>Counterfeit inputs</td>
<td>medium</td>
<td>very high</td>
<td>low</td>
<td>3.40</td>
</tr>
<tr>
<td>Karamoja cattle raids</td>
<td>low</td>
<td>high</td>
<td>very low</td>
<td>2.37</td>
</tr>
<tr>
<td>Floods</td>
<td>very low</td>
<td>high</td>
<td>very low</td>
<td>1.75</td>
</tr>
<tr>
<td>Hailstorms</td>
<td>very low</td>
<td>high</td>
<td>very low</td>
<td>1.75</td>
</tr>
<tr>
<td>Thunderstorms</td>
<td>very low</td>
<td>high</td>
<td>very low</td>
<td>1.75</td>
</tr>
<tr>
<td>All other natural risks</td>
<td>very low</td>
<td>high</td>
<td>very low</td>
<td>1.75</td>
</tr>
</tbody>
</table>

SCALE OF RISKS

- The overall economic impact of agricultural risk is estimated to amount to USD 606 million to USD 804 million.
- Losses amount to between 10.61% and 14.08% of total annual production (agricultural GDP of USD 5.71 billion)
- Losses amount to between 2.3% and 3.1% of the GDP of Uganda.
IMPACT OF RISK

IMPACT ON FARMERS.

• Case studies Kapchorwa and Oyam show that (Smallholder) farmers face severe consequences from risks; the loss of revenue leads to other risks (e.g. health).
• Farmers are, for example, forced to reduce expenditures and food (32%).
• Other reactions are: sale of livestock, land, productive assets (leads to lower income generating capacity)

RANKING OF RISKS

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

• **Price fluctuations**: Inter-annual price variability for all major food crops and cash crops (mainly coffee and banana/matooke, also cassava, maize, and potatoes (USD 262.22 million p.a.)
• **Crop pests and diseases**: The annual losses for major crops are in the range of USD 113 million to USD 298 million (mainly banana, cassava, coffee, and cotton).
• **Post harvest losses**: mostly for maize, but also barley, millet, rice, sorghum, and wheat cause losses of USD 97.17 million p.a.
• **Livestock pests and diseases**: The total economic cost for diseases in cattle alone are estimated at USD 76.5 million p.a.
• **Droughts**: The average annualized losses amount to USD 44.4 million. But drought of 2010/11 damage of USD is 383.45 million in 2011 alone.
• **Low quality inputs**: Yields for maize, millet, rice, and sorghum are only 20% to 33% of the potential yield. Counterfeit inputs lead to losses to farmers of USD 10.7 to 22.4 million p.a.
WAY FORWARD

- **Improved institutional framework**: ARM housed in MAAIF with dedicated people
- **Increased capacity**: provide skills at regional level to analyze and manage risks (farmer organizations, extension messages, ...)
- **Improved data collection and analysis/information systems**
- **Workshop on Thursday**: focus on prices, pests & diseases
- etc.
SESSION 4: ACCESS TO FINANCE
Session 4.1. Access to finance in risky environments

8 December, 2015 | Mbale, Uganda

OBJECTIVES OF SESSION

By the end of this session, participants should be able to:

- Understand how financial institutions handle agricultural credit
- Understand how banks analyze farm businesses
- Understand what role risks play for agricultural credit
AGRICULTURAL CREDIT

• Investment is required to
  • improve profitability, or
  • increase business
• Credit has to be productive
  • Credit from financial institutions requires farmers to
    • think about their business
    • think about their risks

CLASSIFICATION OF AGRICULTURAL CREDIT

• Short Term Credit:
  • Provided for one year, purpose is for purchasing of fertilizers, pesticides etc.
• Medium Term Credit:
  • Provided for one to five years, Purpose is purchasing of spry machines or drainage improvements etc.
• Long Term Credit
  • Provided for a period exceeding five years, purpose for purchasing tractors, harvesting machines & install of tube wells/ agriculture land etc.
CHALLENGES OF AGRICULTURAL FINANCE

Main reasons why banks/MFIs avoid agriculture financing:

- High delivery costs, poor access to rural farmers
  - Analyzing farming household is complex (mixed activities, unknown costs)
  - Lack of financial instruments tailored to agriculture specificities
- Unprofitable farming practices
  - Low-tech farming, fragmented plots, inadequate irrigation facilities, monopolized inputs pricing, state-controlled harvest markets, poor road infrastructure, inadequate storage and transport services, no testing services
- Lack of (banking) infrastructure
  - Poor personal identification system
  - No loan registration office

CHALLENGES OF AGRICULTURAL FINANCE

Main reasons why banks/MFIs avoid agriculture financing:

- Collateral
  - Collateral is not acceptable, not liquid, expensive to register or has a complicated procedure of recovery uncollateralized lending difficult/impossible recovery
  - Government intervention or production and price risk are some unpredictable factors that can have a drastic impact on profitability
- Weak collaboration among farmers
- Risk factors influence income of farmers
LOAN APPRAISAL

- During the loan appraisal the financial institutions analyses farmers cash flow (income and expenditures, assets, and risks)
- Farmer has to provide truthfully all information related to his/her business and life situation
- Loans are assessed based on 5 C:
  - Character,
  - Capacity,
  - Collateral,
  - Capital &
  - Condition
GOOD AGRICULTURAL PRACTICES (GAP)

What are good practices in agriculture?
• Ways of farming that conserve, improve and ensure efficient use of natural resources
• They aim to help farmers achieve profits with sustained production levels while protecting the environment

Why good practices in agriculture?
• Because traditional methods of farming cannot cope with the increasing needs of the ever-expanding human and livestock populations
• Conservation stops and reverses land degradation
• Agricultural conservation boosts productivity and contributes to reducing land degradation and increases food security

CASH FLOW ANALYSIS

• Cash flow analysis is crucial to understand repayment capacity of farmer
• Cash flow looks at all farming related expenses and revenue as well as all non-farming related expenses and revenue (e.g. food, school fees)
• Analysis is based on the household
RISK SENSITIVITY OF CASH FLOW

Loan officer has to assess the risk sensitivity on the cash flow of farmer

• How big is the loss of revenue if risk affects farmer? -> severity
• How likely is it that the farmer gets affected by the risk? -> frequency

Example: price drop

<table>
<thead>
<tr>
<th></th>
<th>Normal cash flow</th>
<th>10% price drop</th>
<th>20% price drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price of maize</td>
<td>2,000 UGX</td>
<td>1,800 UGX</td>
<td>1,600 UGX</td>
</tr>
<tr>
<td>Harvest</td>
<td>100kg</td>
<td>100kg</td>
<td>100kg</td>
</tr>
<tr>
<td>Revenue</td>
<td>200,000</td>
<td>180,000</td>
<td>160,000</td>
</tr>
<tr>
<td>Production cost</td>
<td>170,000</td>
<td>170,000</td>
<td>170,000</td>
</tr>
<tr>
<td>Profit</td>
<td>30,000</td>
<td>10,000</td>
<td>-10,000</td>
</tr>
</tbody>
</table>

RISK ANALYSIS IN LOAN APPRAISAL

• During the loan appraisal the financial institutions analyses farmers risk exposure and how farmers mitigate risks

• Only farmers that are able to manage the most important risks can access credit
RISK ANALYSIS - EXAMPLE

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Competition</strong></td>
<td>The business competition from other competitors for his clientele could be a threat to the running of the business. Clients vast experience and in-depth knowledge about the dynamics in his business. Client has also got a large clientele base because his products are of the highest quality.</td>
</tr>
<tr>
<td><strong>Operational/health risk</strong></td>
<td>Overcrowding of birds in the poultry farm, which could result in outbreak and easy transmission of disease. Client practices a good husbandry system, he also makes disinfects the poultry house regularly leaving little chance for outbreak of diseases. He is also planning on extending the poultry house.</td>
</tr>
<tr>
<td><strong>Payment risk</strong></td>
<td>If the business does not succeed in generating enough cash flow to service the faculty. Client undertakes contracts from credible institutions and sometimes receives down payments. He also operates a vibrant account which would be monitored closely to prevent overwithdrawals.</td>
</tr>
</tbody>
</table>

GROUP WORK – MBALE HAPPY FARMERS BANK

1. Split up into small groups based on commodity/value chain
2. Develop a cash flow analysis for 1 farmer
   - Use simple numbers
   - Use few (2-3) expense and revenue items
3. Discuss risk sensitivity of farmer
4. Develop risk analysis for farmer
5. Present results to plenary

The plenary is credit committee of Mbale Happy Farmers Bank and decides if farmer can receive a loan.
THANK YOU
SESSION 5 : INFORMATION SYSTEMS FOR ARM
OBJECTIVES

By the end of this session, participants should be able to:

- Know the importance of reliable information for their risk management
- Know reliable sources of information
IMPORTANCE OF INFORMATION SYSTEMS

• Information systems are knowledge infrastructures which facilitate the dissemination of information for risk awareness and mitigation, market decisions, and policy decision-making.

WEATHER AND CLIMATE

• Meteorological and climate information
  – Agriculture production in Uganda is rain-fed i.e. dependent on weather and climate
  – Weather influences farmers’ decisions e.g. choice of agric. enterprise to engage in, crops to grow, when to plant, etc.
  – Main source of information is UNMA. Others FEWS NET and web-based totoagriculture.org
DATA COLLECTION

- Sparse distribution of weather stations
- Spatial variability of the different meteorological zones not covered
- Operation affected by vandalism and insufficient maintenance of equipment
- Data is from weather stations, satellite, Regional & Global Met. Centres.

STATUS OF MET STATIONS

<table>
<thead>
<tr>
<th>Station type</th>
<th>Existing (No.)</th>
<th>Fully operational (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synoptic</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Agro-meteorological</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Hydro-meteorological</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Rainfall stations</td>
<td>150-300</td>
<td>60</td>
</tr>
<tr>
<td>Automatic Weather Stations</td>
<td>33</td>
<td>1</td>
</tr>
<tr>
<td>Radar</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Upper Air</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pilot Sounding</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Satellite receiving stations</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
**RELIABILITY OF MET INFORMATION**

**Quality**
Moderate; limited by poor infrastructure (spatial coverage, status) and technology

**Availability**
- Time series data available at a fee (cost recovery)
- Some stations since 1800s
- Gaps in data depending on status of stations.

**Timeliness**
- Daily, 3-day forecasts
- Monthly reviews and updates
- Seasonal forecasts at start of season (MAM, JJA, SOND)
- Usually provided in timely manner

**Information Access**
- Radios
- Internet
- Mailing list
- Bulletins & press releases

**FARMER ACCESS TO WEATHER INFORMATION**

Ag. HH NOT in farmers groups
- 3%
- 12%
- 0%

Ag. HH in farmers groups
- 2%
- 10%

85%

87%

Others e.g. NGOs
Farmer to farmer
Extension staff (NAADS)
Radios
PRODUCTION AND YIELD

• Collaborative effort of UBoS & MAAIF
• Few annual stats collected to low capacity to collect and process data; information published annually is generated by imputation.
• Production data available for 15 selected crops aggregated at national level, for the period since 1980 to 2014
• Downloadable from http://countrystat.org/

QUESTIONABLE NATIONAL STATISTICS
ASPECTS OF PRODUCTION DATA

**Quality**
- Moderate;
  - Limited by capacity to collect & analyse at MAAIF

**Availability**
- Production at national level
- 15 primary crops covered
- Since 1980 to current (2014)
- Disaggregated data not available
- Yields not available

**Timeliness**
- Annual, by mid year

**Information Access**
- UBOS Annual Statistical Abstracts
- Access by policy makers only.

INPUTS

- Provided by Agricultural Input Market Information and Transparency System (AMITSA) – aims to improve access to market and technical information on agric. inputs within COMESA and EAC Region.
- Monthly prices of fertilizers, seeds (maize and bean), pesticides and herbicides in 11 markets collected from members
- Prices available from 2010, albeit with some gaps for specific commodities
- [http://www.amitsa.org/](http://www.amitsa.org/)
INPUT DEALERS

Fertilizer dealers

AMITSA members

Accessibility by smallholders

- AMITSA provides contact of dealers in genuine inputs (members)
- Price of fertilizers from AMITSA available monthly to Infotrade subscribers and online
- Dealers offer advice to farmers on the use of fertilizer and other inputs
- Information on availability of genuine inputs or prices **not** accessible to majority of smallholders.
MARKET/PRICE INFORMATION

- Primary providers are Infotrade and Farmgain, redistributed by Grameen
  - Infotrade - 35 markets, 47 commodities
  - Farmgain - 18 markets, 37 commodities
- Wholesale and retail prices
- Available thrice a week/weekly from main district markets
- Bulk data (historical) available for trend analysis at a fee, up to 20 years

ACCESS TO MARKET INFORMATION

- Notice board
- Blackboard
- SMS
- Radios
- Mailing list
- Call centre
- Internet
PESTS AND DISEASES

- Information needed on:
  - location of outbreaks to avoid getting infected materials, spreading
  - Appropriate control methods
- Farmers report outbreaks to extension staff, who relay to MAAIF as appropriate.
- Information on control is provided during extension visits, radio and farmer-to-farmer sharing

SMALLHOLDER ACCESS

- Ag. HH NOT in farmers groups: 7% (Farmer to farmer) 48% (Extension staff (NAADS)) 5% (Radios)
- Ag. HH in farmers groups: 19% (Farmer to farmer) 33% (Extension staff (NAADS)) 21% (Radios)
### Summary of IS

<table>
<thead>
<tr>
<th>IS</th>
<th>Availability</th>
<th>Timeliness</th>
<th>Quality</th>
<th>Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather</td>
<td>Time series available Daily, 3-day, seasonal</td>
<td>Start of season</td>
<td>Moderate</td>
<td>Radio, farmer to farmer, extension</td>
</tr>
<tr>
<td></td>
<td>Regional, district</td>
<td></td>
<td></td>
<td>agents'</td>
</tr>
<tr>
<td>Production/yield</td>
<td>Time series since 1980 (selected) Annual production at National level</td>
<td>Mid year</td>
<td>Moderate</td>
<td>Annual statistics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>abstracts, countrystat.org/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Majority no access</td>
</tr>
<tr>
<td>Market prices</td>
<td>Time series limited (a few since 2000) District level Weekly</td>
<td>On demand (current)</td>
<td>Good</td>
<td>SMS, radio, blackboard, notice</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>board, mail, web</td>
</tr>
<tr>
<td>Pests and diseases</td>
<td>No systematic collection, outbreaks reported</td>
<td>Varied</td>
<td>Moderate</td>
<td>Radio, farmer to farmer, extension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>agents'</td>
</tr>
</tbody>
</table>

### What differentiates IS for ARM

- Presents specific indicators on the variability of agricultural related variable such as rainfall, market prices, production, the frequency and severity of shocks
- Includes historical data with time series that allow to calculate indicators of variability or frequency or severity of shocks
Weakness of the Ugandan IS

• Information is not presented in the form of indicators of variability or frequency / severity of events
• Time series not easily available
• Household level (micro) data not available (national)
• No integration between the different systems

Conclusion

• Most information systems don’t reach the majority of smallholder farmers in Uganda.
  – Awareness
  – ICT (phone)
  – Costs (SMS, subscription, etc)
  – Coverage/level-perception of relevance
THANK YOU
SESSION 6: RISK MANAGEMENT INSTRUMENTS
Session 6.1
Overview of risk management tools

9 December, 2015 | Mbale Resort Hotel

OBJECTIVES

By the end of this session, participants should be able to:

- Understand the know about the major risk management tools at disposal to reduce risk
- Identify risk management tools suitable to their own context
CONSERVATION AGRICULTURE

Why Conservation Agriculture?

- Sustainable intensification
- Profitability
- Land degradation (physical, biological and chemical)
- Water and Nutrient Use Efficiency and Risk Management
- Energy and Labor Use Efficiencies
- Mitigation and adaptation to CC and climate variability

POST HARVEST LOSSES

- Major Season - April to August/September.
- Minor Season – September to December.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Major season Losses (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field (Over-Maturity, Harvesting, Heaping)</td>
<td>5.0</td>
</tr>
<tr>
<td>Shelling or Threshing</td>
<td>1.5</td>
</tr>
<tr>
<td>Drying</td>
<td>0.5</td>
</tr>
<tr>
<td>Storage (Mold)</td>
<td>15.0</td>
</tr>
<tr>
<td>Storage (Insect Pests)</td>
<td>8.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30.0</strong></td>
</tr>
</tbody>
</table>
WHERE DO MAJOR LOSSES OCCUR?

- Field (over-maturity, harvesting, and heaping).
- Storage (mold).
- Storage (insect pests).

Tactics or tools to significantly mitigate PHL of maize in Uganda are known hence focus needs to be on targeted research and scaling up of these tactics or tools!

KEY POST HARVEST PESTS

- Angoumois grain moth *(Sitotroga cerealella)*
- Rice Weevil *(Sitophilus oryzae)*
- Maize Weevil *(Sitophilus zeamais)*
- Red Flour Beetle *(Tribolium castaneum)*
- Larger grain borer *(Prostephanus truncatus)*
- Lesser grain borer *(Rhyzopertha dominica)*
- Termites *(Microtermes spp)*
SOLAR DRYERS

- Estimated cost UgShs 12 million to construct
- Can cost approx UgShs 6 million to construct
- Any can cost about UgShs 2000 to dry per 100-kg bag of maize
- Can dry 1.2 MT from 25% MC to 16% MC in 2 days

ARTIFICIAL DRYERS

- Costs about UGX 10,000 to dry 100kg of maize
- Costs about $20,000 to buy
MOISTURE Meters

Affordable Moisture Meters $50-$70

Comparisons

- Dickey John meter - $1,600.
- John Deere SW08120 model - $250.
- USDA-ARS CGAHR (Paul Armstrong) meter - $50 - $70.

STORAGE BAGS

ZeroFly® Storage Bag is a deltamethrin (DM)-incorporated bag used to prevent damaging pest infestations

*SMALL (<100kg)* Opilon 2: Zero Fly Bags.
Insecticide infused polypropylene bags provide a powerful fumigation action against insects, limiting infestation at the grain within the bag. Non-hermetic. Short period where insects were able to survive before contact with inner lining of bag.

Price: $1.20 per unit
STORAGE BAGS

Purdue Improved Cowpea Storage bags

Price: $1.20 per unit

AFLATOXIN CONTROL

Sporulation on moist soil

Broadcast @ 10 kg/ha 2-3 weeks before flowering

30-33 grains m²

Wind

Spores

Insects

Fungal network in killed grain

Aflasafe in 5 kg boxes

3-20 days
WAREHOUSING

• Shift the responsibility of post-harvest handling away from the small and medium scale farmer

RISK MANAGEMENT BY FARMER GROUPS

Form farmer associations/community based organizations for

• Easy access to affordable credit in a form of high quality inputs (repaid after harvest).
• Provision of post-harvesting machinery and equipment at farm gate level.
• Community storage facilities (elimination of the hassles involved in storing large quantities of maize).
• Guaranteed markets to members.
• Group marketing to obtain better prices.
• Technical advisory and training services to farmers (Agronomist/Extension Agents/Technical).
FARMER GROUP MODELS

• The Area Cooperative Enterprise Model

SACCOS
Savings & Credit services

Information
(quasi warehouse receipt)

Area Cooperative Enterprises (ACEs)
Bulking, Marketing & Value Addition, PH management

Rural Producer Organizations (RPO) - FARMER Production

SAVINGS/CREDIT

PRODUCE

CONTRACT FARMING

Benefits

• Farmers keep their land rights
• Access to markets and value chains
• Support with finance, training, seeds, fertilizers etc.

Pitfalls

• Lack negotiating power
• No choice: only access to markets is via a single dominant buyer
• The buyer can dictate the terms of that contract - farmers end up as disempowered laborers on their own land
CONTRACT FARMING

Practical challenges:

• Quality and quantity produced did not meet the expectations of either company or farmers
• Supervision and follow-up of farmers
• Farmers sold the best quality produce to other traders
• Provisions came too late, forcing them to improvise and causing crop failure
• Overcharging for inputs – who determines the purchasing price (lack of competition)

CONTRACT FARMING

Important aspects for farmers:

• ensure minimum price guarantees
• request visual demonstration of quality standards
• request provision of inputs at or below commercial rates
• agree on tailored dispute settlement mechanisms
• set aside a portion of land for food crops to meet the needs of the family and the community
• (organize into producer organizations and cooperatives to increase negotiating power with buyers)
CONTRACT FARMING – CASE STUDY

Devine Chocolates, London and Kuapa Kokoo (“good cocoa growers”)

- Fairtrade chocolate company which is 44% owned by cocoa farmers (over 80,000 from 1250 village societies)
- Produces up to 5% of Ghana’s cocoa
- Benefits:
  - fixed prices
  - fair-trade premium
  - ownership dividends
  - inputs, training, and extension services to farmers

CONTRACT FARMING – CASE STUDY

Masara N’Arziki Farmers Association (“Maize for Prosperity”)

Key Benefits to Farmer:
- availability of quality inputs and timely delivery to the farmer and farm gate.
- solution of farmer constraints.
- technical support and business management training for the farmers.
- community storage facilities.
- assured market for all the grain produced.

Key Components (Smallholder Farmer Development):
- 1. To ensure easy access to affordable credit in the form of high quality inputs.
- 2. Appropriate training of maize farmers for higher productivity.
- 3. Ensure higher yields thereby increasing incomes of farmers and the nation as a whole
- 4. Group marketing to obtain better prices
- 5. Guaranteed markets for members
- 6. Improve the standard of living of the member farmers
- 7. Provide a model for sustainable farmer credit schemes
THANK YOU
OBJECTIVES OF SESSION

By the end of this session, participants should be able to:

• Understand what role insurance plays in risk management strategy
• Understand insurance terms
• Understand how insurance works
• Understand the different types of insurance
WHY AGRICULTURAL INSURANCE?

KEY TERMS OF INSURANCE

Insured risk – the identified event that a person transfers to an insurance company by payment of a fee. Only loss from the occurrence of this event will lead to the insurance company paying the insured.

Insurable risk - a risk, for which the insurer can estimate its likelihood to occur through historical statistics and therefore will be willing to offer protection at certain cost.

Coverage - The time period over which the insured is protected by the insurer from the identified event

Insurance - a promise between two parties to protect against losses. It allows a person to pay a small amount of money in advance in exchange for a promise that when a bigger loss occurs, the insurance company will return the insured person to his initial financial position.
KEY TERMS OF INSURANCE

**Insurer** - a company selling insurance. These are companies specialize in pooling risks from individuals.

**Agent** – a person selling insurance in the name of the insurer.

**Insured** - the person buying the insurance protection from the insurer.

**Sum Insured** - the total value of the property to be insured. The maximum amount agreed upon that can be compensated from insurer in the event of the identified risk.

**Compensation** – the amount paid out to the farmer after an insured event.

**Contract** - a legally binding agreement made between two or more persons or companies.

**Exclusion** – all risks or circumstances that are explicitly mentioned in the insurance contract that are not insured.

---

KEY TERMS OF INSURANCE

**Premium** - a calculated fee that acts as a small contribution that each client of the insurance company contributes to the pool. The accumulated money from the pool is used to compensate the few who actually suffer losses.

**Risk pooling** – An insurance company gathers together people who want insurance protection and sets itself up to operate a pool. It takes contributions in the form of premiums from many people exposed to similar risks and pays the few who incur losses. In this way the financial burden is spread among all those who contribute to the pool. Risk pooling is based on the assumption that the losses of the unfortunate few will be compensated by the fortunate many. The total premium contributions are used to compensate the losses.
INSURANCE CONTRACT

A farmer is insured only if he/she has a valid legal arrangement with an insurance company through an insurance contract.

For an insurance contract to be legal the following must be true:
1. The insured (Farmer) must have insurable interest - the farmer must be in a position where he or she would incur a financial loss if damage occurred to assets or property. For example, a farmer cannot insure a neighbor’s cow.
2. The fee (premiums) have been paid
3. To have the capacity to sign a contract, farmer must be an adult of above 18 years and of sound mind

INSURANCE COMPENSATION

What happens when there is a loss?
1. Determination of the cause - when there is a loss, the real cause, of the damage without interference of other events must be identified. An insurer can only compensate if the loss is directly caused by an insured risk and not any other risk.
2. Compensation without profit - the insurer returns the insured to the exact or a lower financial position immediately before the loss. This means that the insured should not get any extra benefit or profit from the compensation.
GROUP DISCUSSION: COMPENSATION

1. John has a Nissan Pickup that is insured against theft that he uses to transport his harvest from his farm and his neighbors' Tom's harvest to the market. If the Nissan Pickup is stolen, what will John ask from the insurance company? Compensation for a Nissan Pickup or a Pajero?

2. If the Nissan Pickup caught fire, what will John ask from the insurance company?

3. Can Tom insure John's car from theft?

4. What can Tom insure?

TRADITIONAL INSURANCE PRODUCTS

1. Single peril crop insurance (example: hail)
   - covers only 1 risk
   - payout is based on individual risk assessment by insurance company

2. Multi peril crop insurance (MPCI)
   - covers all risks defined in the insurance contract
   - payout is based on individual risk assessment by insurance company

3. Livestock insurance

Traditional crop insurance is difficult to deliver in smallholder farmers due to:

- high cost of individual loss assessments
- difficulty to obtain individual loss data from the past
- moral hazard and adverse selection
INDEX INSURANCE

- **New way of insurance**: looking at the water and nutrition requirements of plants
- Insurance is **based on plant science**
- Payout is based on **estimates of loss due to unfavourable weather**
- Insurance is **limited to weather parameters only**

INDEX INSURANCE PRODUCTS

<table>
<thead>
<tr>
<th>Index</th>
<th>Risks covered</th>
<th>Data used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall</td>
<td>Drought, excess rain</td>
<td>Daily rainfall</td>
</tr>
<tr>
<td>Temperature</td>
<td>Frost, diseases</td>
<td>Daily temperature</td>
</tr>
<tr>
<td>Area yield</td>
<td>All losses that can result in a drop in yield at district level</td>
<td>District yield data</td>
</tr>
<tr>
<td>Satellite</td>
<td>Drought, flood, excess rain, animal mortality</td>
<td>Satellite data from various satellites</td>
</tr>
</tbody>
</table>

All types of index insurance require reliable sources of verification for insured event (for example, weather stations, production statistics, etc.) that are trusted by both the farmers and the insurers.
HOW DOES INDEX INSURANCE WORK?

1. The product is designed to cover specific risks.
2. To be insured a farmer must pay a set amount (“premium”) to the insurance company.
3. Weather events are measured throughout the season at the nearest weather station.
4. The insurance payout is calculated using the information collected by the weather station.
5. The same percentage payout is made to all the farmers registered at that weather station, there is NO field visits or assessment.
6. The worse the weather, the bigger the payout.
7. The payout is made automatically

BENEFITS OF INDEX INSURANCE

1. Peace of mind
2. Risk transfer
3. Risk pooling
4. Objective measure of loss
5. Fast claims process
6. Preservation of source of income
7. Boost access to credit
CHALLENGES OF INDEX INSURANCE

1. Difficult to develop products suited for all crops and locations.
2. Availability of weather stations, etc. is limited.
3. Weather measured at weather station and weather observed at farms can be different.

GAME: MBALE GOOD HARVEST INSURANCE

1. Each farmer group has a total land of two hectares. The farm grows maize only. No irrigation is available.
2. The game runs for 3 years (rounds). In each year, the score is calculated and total scores after three years decide the winners.
3. The farm can take loan or can self finance. They can till one hectare without assistance of loan. But they can not till the other hectare without loan. The cost of loan is 25%
4. Standard yield is 2 ton/hectare. But for each farmer group, group yield varies (by drawing cards):
   • Excess yield than the predicted yield – (25% more)
   • Yield equaling to the predicted yield
   • Less yield than the predicted yield – (25% less)
5. The farm can decide to buy weather index insurance. Weather insurance protects them from bad weather but not from pests. For pests they can buy traditional insurance if they wish so. For weather insurance, they need to pay 5% of the investment cost and for pest insurance too they need to pay 5% of the investment cost.

6. In each year there are various possible weather events (by drawing cards):
   - Delayed rains - 50% loss
   - Severe drought - 100% loss
   - Normal weather - 0% loss

7. Cost of investment per hectare is UGX 100,000. Price for maize is UGX 100,000 per ton.

Thank you for your attention