Food loss Assessment Study on Maize and Sunflower Value chains in Uganda – Causes and Recommended Solutions and Strategies

H. Muyinza¹, M. Otim², W. Nanyeenny² and M Annette³

¹National Agricultural Research Organisation and National Focal Point RBA Project
²Consultants, Uganda
³UN Food Agriculture Organization (FAO)

Correspondent: Email: hmuyinza14@gmail.com

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Introduction and Background

- Post-harvest losses are high estimated at 30% on cereals, 40-50% on root crops (World Bank report 2011)
- Losses are particularly high at smallholder level in Uganda
- Yet accurate estimates of the magnitude of losses and waste are still lacking, in developing countries
- Thus accurate estimates and critical loss points needed to be identified
- Viable and cost effective options for loss reduction were also needed
Study was done as part of a project under the 3 UN agencies efforts to reduce postharvest losses in Uganda

- **Project title:** Mainstreaming food loss reduction initiatives for smallholders in food-deficit areas (RBA/GLO/001/SWI)
- **UN’s agencies:** FAO, WFP, IFAD based in Rome
- **Financial partner:** Swiss Agency for Development and Cooperation (SDC)
- **Period of Study:** October 2015-April 2016
- **Reference policy:** Commitments taken by African Heads of State in Malabo, in 2014.
- **Study’s regions:** Apac and Lira districts in Northern Uganda
- **Crops:** maize and sunflower
Aim of the study and methodology

- Assess the levels of food losses
- Identify critical points along the selected food supply chains (FSCs)
- Analyze major causes of these losses
- Propose appropriate and feasible solutions and strategies in order to reduce food losses
- Test and validate the proposed options
Case study Methodology

- **Preliminary Screening** of Food Losses (‘Screening’). Based on secondary data, documentation and reports, and expert consultations.
- **Survey Food Loss Assessment** (‘Survey’). Provided some indicative levels based on the observations, direct measurements and responses from sampled supply chain actors.
- **Load Tracking and Sampling Assessment** (‘Sampling’).
- **Monitoring and Solution Finding** (‘Synthesis’). Was used to develop an intervention.
Maize and sunflower loss assessments

- case study methodology developed by FAO under the Save Food initiative was used
- adapted to specific conditions and local context in Northern Uganda

2 Key crops

- Maize: major food security crop and important non-traditional export with export earnings of above USD 42.3 million in 2013
- Sunflower: high potential for income generation especially in N. Uganda
Results

Critical loss points

- Following review of literature and through key informant interview
- Harvesting
- Storage and associated grain processing stages
- Milling identified as critical loss points
Causes of losses

1. Harvesting causes
- Carelessness and insufficient supervision thus spillage
- Lack of proper harvesting tools for both maize and sunflower

2. Storage causes
- Grain contamination - ground drying
- Improper threshing - damage
- Poor storage facilities - rodent attack and leakage thus grain spoilage
- Storage pest damage - loss in quality and rushed sales
3. **Causes of Milling losses include**

- Spillage
- Poor pre-treatments resulting in grain contamination at this stage
- Lack of proper maintenance
## Level of losses at critical points

<table>
<thead>
<tr>
<th>Crop</th>
<th>Critical point</th>
<th>% loss</th>
<th>Loss factor</th>
<th>Food loss Stage sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>Harvesting</td>
<td>3.3</td>
<td>Spillage,</td>
<td>Farmers</td>
</tr>
<tr>
<td></td>
<td>Storage</td>
<td>17</td>
<td>pest damage and aflatoxin</td>
<td>Farmers</td>
</tr>
<tr>
<td></td>
<td>Milling</td>
<td>5</td>
<td>spillage</td>
<td>Millers</td>
</tr>
<tr>
<td>Sunflower</td>
<td>Harvesting</td>
<td>2</td>
<td>spillage</td>
<td>farmers</td>
</tr>
<tr>
<td></td>
<td>Drying</td>
<td>5</td>
<td>Contamination and spillage</td>
<td>farmers</td>
</tr>
<tr>
<td></td>
<td>Storage at Millers points</td>
<td>35%</td>
<td>Mould and aflatoxin and spillage</td>
<td>Millers’ stores</td>
</tr>
</tbody>
</table>
## Quality of farmers’ maize after 3 month storage

<table>
<thead>
<tr>
<th>Maize samples evaluated</th>
<th>district</th>
<th>*% Insect damage grain</th>
<th>Moisture content</th>
<th>% mechanical damage</th>
<th>% discoloration</th>
<th>% debri</th>
<th>Proportion of samples with aflatoxin (above 10ppb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Lira</td>
<td>11.2</td>
<td>12.4</td>
<td>0.6</td>
<td>3.1</td>
<td>0.7</td>
<td>1/3</td>
</tr>
<tr>
<td>10</td>
<td>Apac</td>
<td>20</td>
<td>12.2</td>
<td>1.6</td>
<td>2.1</td>
<td>0.7</td>
<td>1/2</td>
</tr>
<tr>
<td>≤</td>
<td>UGC</td>
<td>1.0</td>
<td>14</td>
<td>*5.5</td>
<td>*5.5</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>15.6</td>
<td>12.3</td>
<td>1.1</td>
<td>2.6</td>
<td>0.7</td>
<td></td>
</tr>
</tbody>
</table>
**Costs of sunflower recommended options**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Unit cost</th>
<th>Life span (yrs)</th>
<th>Qty</th>
<th>Yearly cost of investment</th>
<th>Yearly cost of operation</th>
<th>Yearly total cost (USD)</th>
<th>Value of stored grain (USD)</th>
<th>Cost Recovery time (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Metal silo (750 l)</em></td>
<td>350</td>
<td>10</td>
<td>5</td>
<td>1750</td>
<td>0</td>
<td>1750</td>
<td>1294</td>
<td>2</td>
</tr>
<tr>
<td>Plastic silo (500l)</td>
<td>37.5</td>
<td>10</td>
<td>7</td>
<td>262.5</td>
<td>0</td>
<td>262.5</td>
<td>1294</td>
<td>1</td>
</tr>
<tr>
<td>Cemented drying yard (for 10 HH)</td>
<td>2440</td>
<td>30</td>
<td>1</td>
<td>2440</td>
<td>0</td>
<td>2440</td>
<td>12940</td>
<td>1</td>
</tr>
<tr>
<td>Tarpauline</td>
<td>9.4</td>
<td>1</td>
<td>3</td>
<td>28.2</td>
<td>0</td>
<td>28.2</td>
<td>1294</td>
<td>1</td>
</tr>
<tr>
<td>Community store (for 10 households)</td>
<td>12,500</td>
<td>30</td>
<td>1</td>
<td>12,500</td>
<td>416.6</td>
<td>12,916.6</td>
<td>12,940</td>
<td>1</td>
</tr>
</tbody>
</table>

*750 ml metal silos are preferred by farmers for sunflower*
Recommended solutions

Sunflower
• Capacity building of farmers and millers on improved harvesting, drying and storage
• Use of tarpaulines to reduce grain contamination
• Use of 500, 750 and 3 t silos
• Group storage in 2 t cacoons
## Cost of recommended Maize technologies

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Unit cost</th>
<th>Life span</th>
<th>Qty</th>
<th>Yearly cost of investment</th>
<th>Yearly cost of operation</th>
<th>Yearly total cost (USD)</th>
<th>Value of stored grain (USD)</th>
<th>Cost Recovery time (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize crib</td>
<td>780</td>
<td>10</td>
<td>1</td>
<td>780</td>
<td></td>
<td>780</td>
<td>620</td>
<td>6</td>
</tr>
<tr>
<td>Tarpauline</td>
<td>9.5</td>
<td>2</td>
<td>2</td>
<td>19</td>
<td>0</td>
<td>19</td>
<td>620</td>
<td></td>
</tr>
<tr>
<td>Metallic silo (500 l)</td>
<td>160</td>
<td>10</td>
<td>1</td>
<td>160</td>
<td>0</td>
<td>160</td>
<td>620</td>
<td>1</td>
</tr>
<tr>
<td>Plastic silo (300l)</td>
<td>37.5</td>
<td>10</td>
<td>10</td>
<td>75</td>
<td>0</td>
<td>75</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3t- Metal silo</td>
<td>350</td>
<td>20</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>350</td>
<td>930</td>
<td>2</td>
</tr>
<tr>
<td>30 t ware house</td>
<td>12,500</td>
<td>30</td>
<td>1</td>
<td>828.3</td>
<td>10</td>
<td>13262.3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Hermetic bag</td>
<td>2.12</td>
<td>2</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>16.96</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Motorised shellers (for whole subcounty)</td>
<td>2000</td>
<td>15</td>
<td>10</td>
<td>2000</td>
<td>0.63 per bag</td>
<td>2000</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Maize technologies

- 3t silos can be fabricated at EATREC, metal silos can be easily purchased from Lira.
- Also motorised shellers can be operated as a business and result in reduced losses at farmer group level.
- Can be built locally by private workshops in Lira town and at the Agricultural Engineering and Appropriate Technology Research Institute (AEATRI).
- Reduce shelling cost from USD 0.94 per 120 kg-bag when using a stick to USD 0.63 when using a motorized sheller.
WFP has engaged some local NGOs and these are involved in the promotion of the metal silos and plastic bin given out at 50% subsidy.

- Additionally the project already is piloting the use of the 750kg metal silo, drying yard and grain safe cacoon for sunflower loss reduction.

- Maize pilots are being done promoting use of hermetic bag, maize crib, 750 kg metal silo and 500kg plastic silo and storage in warehouse for maize.

- All the technologies are being piloted using the 50% subsidy model where the funds generated are retained by the groups to enable another farmer get the technology in the next round.
The technologies for loss reduction piloted

- **Maize crib**
- **Super bag**
- **750 l- metal silo**
- **2 t- cacoon**
- **500l -plastic silo**
Additional strategic interventions needed

- Capacity building of farmers, traders and millers on improved grain handling and storage
- Promote grain marketing by promoting communal storage and marketing enterprises to improve grain market access
- Encourage household grain storage in units including storage in superbags, metal silos, plastic silos to enhance hh food security
- Set up bi-laws that encourage proper drying of grain and critical observation of safety levels especially with respect to aflatoxin
Other strategies

▪ Need to organise more private sector engagement to address the issue of loss reduction
▪ Multi-stakeholder approach will be the best approach to combat post harvest loss issues
▪ Support is needed to finance the strategy especially from our UN partners and other donor agencies
We would like to acknowledge the farmers form the 2 target sub-counties of Lira and Apac

- District and sub-county extension officers
- NARO,
- FAO, IFAD and WFP Partners
- Swiss Agency for International Development for funding
- Organisers and participants in this conference
THANK YOU

Hunger can be eliminated in our lifetimes.