Community of Practice (CoP) on Food Loss Reduction

Forum Report #1 (January 2015) - English

First online discussion on losses occurring along the maize supply chains: levels, causes and solutions promoted / (October 2014 - January 2015)

What are your experiences related to the levels of grain losses, particularly in the maize chain? How were they measured? What solutions can be/were implemented to reduce these losses? What success stories can you share with the Community?

Useful reference: SAVE FOOD series of field studies in Kenya (pages 31-50, available at: http://www.fao.org/save-food/resources/casestudies/en/).

The first CoP online discussion launched on 13th October 2014 has collected inputs from the SAVE FOOD Initiative members including FAO technical staff and field experts from different organizations and countries (7 threads of discussion). Albeit, the discussion initiated on the basis of the Kenya case study produced by the SAVE FOOD Initiative, several contributions have presented their experiences from Rwanda, Tanzania, Uganda, and in general from maize value chain related issues. In addition, the CoP Moderator has also proposed information on relevant publications and studies produced by different stakeholders in order to further stimulate the CoP members' feedback. Although calls for exchanging in French were circulated, also through targeted email messages to francophone experts and colleagues, no replies have been submitted in other languages than in English.

BACKGROUND

The ***Kenya case studies of the SAVE FOOD Initiative*** assessed and evaluated the magnitude of food losses, the main causes, and the cost- effectiveness of food loss prevention measures specific to four food supply chains: bananas, dairy, fish, and maize. The **findings on maize** highlighted that 3% of grain losses occur at the drying stage on farm, and 8 to 10% are caused by weevil damage during storage. Other causes of losses have been identified and assessed along the supply chain. Higher losses in the maize supply chains take place among the less skilled chain actors, who lack awareness of the importance of the losses and what can (easily) be done about them. In many cases adequate supervision of unskilled labour would reduce losses. However, the cost of supervision is an obstacle for small-scale farmers and rural traders.

Several **measures to reduce losses** included the following 1) mobile grain driers and improved storage at community level, 2) small metal silos for grain storage, 3) mechanized harvesting, 4) producer sensitization and training, 5) equipment calibration, 6) grain drying centres, and 7) grain consolidation centres. Furthermore, the identified **loss reduction strategies** are 1) awareness raising combined with training and organization of smallholders to build supply chain actors to recognize the effect of food losses on food security and on their economic benefits, and the need for upgrading and developing the supply chain for better performance and higher margins, 2) value chain development and organization, and, 3) centralisation and contract services.

DISCUSSION AND RESULTS

In the different threads of discussion (see complete list afterwards), it emerged that CoP members were considering and exchanging on few major themes: solutions and practices; government and multi-stakeholders' interventions; technologies and innovation; vulnerabilities; communication; education; and research.

In detail, the main threads of discussion developed as follows:

- *Cephas Taruvinga* (FAO) mentioned the need to differentiate between **long term** (actions at multiple levels, including policy and standards) **and short-medium term solutions** (technologies and training to farmers at community level).
- *Camelia Bucatariu* (FAO) proposed some useful links referring to maize losses in Rwanda, which illustrate that the huge **investments by the government** in the sector (13% of the national budget) would come to nought if there is no mechanism to contain the production losses. The produce worsens extremely when there is poor cleaning, drying and storing of the yields. Realizing this, the Ministry of Agriculture established a post-harvest handling and storage task force with the mission to reduce losses, ensure proper storage, and improve market linkages for farmers (2011 MinAgri strategy). Despite this commitment a survey conducted last year indicated a loss of 18.9% of maize production compare to 30% in 2009. The target is to reduce the loss of maize production to maximum 5% (read the article).
- The *CoP Moderator* highlighted that there is a clear need to focus more in **post-harvest losses technologies** in order to reduce losses in the maize production and demonstrated through a recent survey cited in the above mentioned article. And linked to this post the new report published by the SDC Ethiopian office, which refers to past experiences in this country and shows how reducing postharvest losses to a significantly low level is technically feasible. However, uses of appropriate management practices have costs, and in economic terms, it makes sense to promote/adopt these practices if the benefit justifies the associated costs, as reported. This is why ex-ante cost benefit analysis (CBA) may be useful, like for this Ethiopian case. Examples have also been presented from the P4P intervention of WFP (Uganda and Burkina Faso) and Helvetas' projects in Mozambique, Tanzania and Benin by *Georgina Bingham* PhD, Senior Technical Specialist & Global Partnerships of Vestergaard Food Security.
- *Joseph Mpagalile* (FAO) reported from his 10-year experience in Tanzania the need to strengthen and facilitate **communication and exchange** between the different stakeholders involved in the maize chain, information and knowledge sharing on regular basis would contribute in effectively address post-harvest issues.
- In relation to Tanzania, the *CoP Moderator* has shared a new project for testing **innovative storage technologies** launched in Tanzania by AGRA in November (link).
- Re. the strategies to reduce losses, *Stéphane LAKO* from Cameroon, wanted to emphasize that when training and sensitising, instead of focusing too much on capacity building, it is good to look at impacts of communication on the farmers' thinking, habits and practices. Furthermore, mid- to long-term **sensitization and education programmes** should be considered despite their costs (e.g. demonstration sites play an important role in transferring the knowledge).
- The above mentioned issue is also touched by *Danilo Mejia* (FAO), who refers to **traditional operations** undertaken by farmers when harvesting and storing maize. There are **practices** crucial to limit losses and reference is made to a very useful FAO compendium, which illustrates post-harvest operations for maize. Additional information on farmers' practices was shared by *Harriet Muyinza*, Senior Researcher at the National Agricultural Research Organization (NARO) and National Focal Point of the UN Rome-based Agencies (RBAs) joint project 'Mainstreaming food

loss reduction initiatives for smallholders in food deficit areas' in Uganda, on the basis of experience in Uganda.

- In addition, the *CoP Moderator* has informed about a newly published FAO publication touching another critical point which affects small-holder farmers, it is their being prone to natural hazards (e.g. cyclones, droughts and floods). In such circumstances they are facing an **increased vulnerability** if suboptimal storage of agricultural products is adopted. This theme is dealt in the series "A Field Guide for Disaster Risk Reduction/management for Southern Africa" issued by FAO Sub-regional Office for Disaster Risk Reduction/Management for Southern Africa.
- **Research** related to PHL is on-going at several levels. The most recent analysis published in World Development Vol. 66, pp.49-68, 2015 titled "Unpacking Postharvest Losses in Sub-Saharan Africa: A Meta-Analysis" has been shared by the *CoP Moderator* in direct exchange with one of the author Pascal Sanginga from the International Development Research Centre, Nairobi, Kenya. The study due to the limited knowledge on PHL magnitudes consists in a meta-analysis conducted on available resources covering six African countries and 7 commodities. Findings reveal inadequacies of loss assessment methodologies that result in inaccurate PHL estimates. The authors suggest need for change in the way PHL research is conducted. Sharing this kind of publications within the CoP on food loss reduction is meant to enhance collaboration and common understanding of the main topics and issues related to PHL practice.

COMPLETE LIST OF CONTRIBUTIONS

1. Critical Control Points on Post-harvest Losses of Maize (10-10-2014)	Maize losses occur in some extent in each operation from the field until consumption. However, some inappropriate traditional operations used by farmers have a significant negative impact on maize losses. For instances, when the maize cob get the total development on the plant is very common among farmers they fold the plant and let it drying on the field for some time, before they harvest. This drying usually take long time (2 or 4 weeks or even more) and is precisely during this time when the maize is seriously affected qualitatively and quantitatively since it is exposed to contamination by diverse fungus, bacteria, insects, birds, rodents and others animals, moisture absorption etc. so that when the grain is stored the grain has the conditions to continuing losing quality. Once the maize is harvested they store it in inadequate structure which allows the loss continues since the storage structures are not hermetic. Thus, is very important that farmers put attention on these operations during the harvest and postharvest of maize. Each postharvest operation for maize is important, but avoiding long drying time on the field and using adequate hermetic storage structure is crucial. A good and recommendable reference to read is the document at: http://www.fao.org/fileadmin/user_upload/inpho/docs/Post_Harvest_Compendium_-_MAIZE.pdf *Danilo Mejia* / AGRO-INDUSTRY OFFICER, AGS-FAO Replies: • Dear CoP members, I would like to raise your attention to another critical point affecting small-holder farmers, it is their being prone to natural hazards (e.g. cyclones, droughts and floods). In such circumstances they are facing an increased vulnerability if suboptimal storage of agricultural products is adopted. This is the theme of a new publication of the series "A Field Guide for Disaster Risk Reduction/management for Southern Africa" issued by FAO Sub-regional Office for Disaster Risk Reduction/Management for Southern Africa. As "*the combined effect of natural disaster and poor storage practices may lead to tremendous losses for small farmers, with devastating effects both from economic and food security points of view*" you may be interested in reading the "Instructions for the Implementation of Small-Scale Storage Practices" documented in the publication available at: "http://www.fao.org/3/a-i3769e.pdf". Available also in French at: "http://www.fao.org/3/a-i3769f.pdf" As the CoP moderator I will be happy to receive from you any other input which may enrich practitioners' knowledge and document the state of the art related to feasible interventions and operations.

	Please, feel free to leave your contribution in French and Spanish, we will make sure to have it translated. With kind regards, Francesca Gianfelici, CoP Moderator, FAO/AGS Division (10 November 2014) • In Uganda postharvest losses are still considerably high especially at small scale farmer level. Statistics however, of their extent are diverse and are estimated to range between 5-50%. This itself demonstrates how varied the extent of loss can be at different locations in the country. These factors include farmers' practice, level of knowledge on postharvest handling, their ability to use appropriate technologies and duration of storage among others. I would say that losses along the maize chain are started right from the time of harvesting when farmers delay to harvest due to lack of knowledge on the damger in field to store infestation. This is further followed extensive losses due to spillage and loss of quality drying. Small scale farmers usually dry maize on the ground. Now since the crop is rellt bulky, they will find it very hard to keep moving it out into the sun to dry and then put it in the house or shed at night. They usually resort to heaping it in the compound or if they take it into the house, they will leave it for some days in the house as they wait to get the time or clear weather to place it back in the compound to dry. Now this will mean that the grain will mold, get discolored, and could even be attacked by termites on the usually mud floors where it is heaped during this drying period. So when it is finally dry, it is of poor qualiy and won't be fit for food, and of poor grade thus leading to food and income insecurity. Drying is thus a very critical point in maize posthrvest handling. Threshing is another critical stage usually done by hitting maize cobs using sticks. As a reult of this processs the grain gets cracked, and some is scattered and not usually recoved after words. In this way losses are increased. Then the cracked grain is then stored usually in polyethylene bags in the house. Cracked grains are usually more infested with insect pests and mold. Without any protection losses can easily go up to> 50% within 3 months of storage. Thus poor practices at harvest, poor drying, and threshing compounded by poor storage structures are the lead cause of losses at small scale farmer level. It may require a complete package including farmer education, subsidising simple equipment and tools for threshing and technologies such as simpe dryers, shellers, and hermetic storage structures to reduce losses. Harriet Muyinza (26 January 2015)
2. Stakeholder collaboration and communication is important (15-10-2014)	I wish to share my experience on maize postharvest handling which I gained while working as a researcher in Tanzania between 2000 and 2010. During this time, I observed that success in the reduction of postharvest losses (PHL) in maize supply chain depends, among other factors, also on how stakeholders in the maize supply chain collaborate and communicate to share and exchange information and good practices toward PHL reduction. It is difficult to effectively reduce postharvest losses if stakeholders work in isolation. Farmers, seed suppliers, agrochemical dealers, transporters, processors, researchers, extension officers, consumers, development partners etc. who are the main stakeholders need to share information and knowledge on regular basis in order to effectively address the postharvest losses problems. However, it was evident at that time that communication on postharvest aspects within the domains e.g. researchers from universities and those from the National Agricultural Research System (NARS) etc. and between different domains e.g. farmers and agro-dealers or researchers and extension officers was very low. For example, it was common to find that stockists of packaging materials or agro-dealers were not communicating with farmers or processors to identify the types and amount of packaging materials or storage pesticides needed in the following season. One of the key lessons learnt was that it is important for stakeholders to maintain continuous collaboration and communication to share information in order to efficiently reduce maize postharvest losses. I believe this observation is still valid today. *Joseph Mpagalile* AGRO-INDUSTRIES OFFICER, AGS-FAO

3. Maize losses (9-10-2014)	Contribution for maize losses in Rwanda: • from MINAGRI National Post Harvest Staple Crop Strategy , Oct 2011 http://www.minagri.gov.rw/fileadmin/user_upload/documents/Publications/National%20Post%20Harvest%20Strategy%20-%20Nov%2022.pdf • from the media http://focus.rw/wp/2013/02/minagri-registers-reduction-in-post-harvest-losses/ *Camelia Bucatariu* CST for Food Waste Issues and Policy Development, AGS-FAO Replies: • These are good references. The material shows the strides Rwanda has made in reducing post-harvest losses. Cephas Taruvinga Food Losses Technical Officer / AGS-FAO • Dear CoP members, the case of Rwanda and governmental investments in the sector, as it is possible to see from the 2011 strategy of the Ministry of agriculture shared by Camelia Bucatariu is very interesting, especially linking with what has been reported in the related article. It seems there is a clear need to focus more in post-harvest losses technologies in order to reduce losses in the maize production and demonstrated through a recent survey cited in the article. The SDC Ethiopian office has published a new report, which refers to past experiences in that country and shows how reducing postharvest losses to a significantly low level is technically feasible. However, uses of appropriate management practices have costs, and in economic terms, it makes sense to promote/adopt these practices if the benefit justifies the associated costs, as reported. This is why ex-ante cost benefit analysis (CBA) may be useful, like for this Ethiopian case. You may find interesting to read the Report available at "http://www.sdc-foodsecurity.ch/en/Home/Focus_areas/Post_harvest/Documents_Videos" and propose other examples to complement and enrich the discussion in this Forum. Looking forward to reading from you, and feel free to contribute in French or Spanish also. With kind regards, Francesca Gianfelici CoP Moderator, FAO / AGS division (14 November 2014)
4. My experience in Rwanda (6-10-2014)	Maize harvested at high moisture levels and sold to traders without being sufficiently dried to safe moisture levels lost its quality later in storage. Whole consignments in storage were downgraded to ''unsuitable for human consumption'' This downgraded maize was later sold to the public for household use through informal markets. Because the grain went through two different market channels it was difficult to quantify the loss directly. The cause of this loss was not only due to poor storage management by the warehouse operator, but also due to lack of awareness by farmers, lack of quality testing facilities by traders and the lack of a national policy on grain quality standards. Since in the long term the solutions were required at multiple levels of the supply chain, to address this in the short to medium term, drying facilities were provided at community levels and farmers were trained to use them. *Cephas Taruvinga* Food Losses Technical Officer / AGS-FAO
5. **Some key points to consider for reduction of losses at small or household farms (24-10-2014)**	I'm a Cameroonian Agricultural Engineer. I have been working with small farmers groups and household farms for 5 years, and this is what I noticed. It's true that it is among unskilled actors that the losses are higher. This is because they are not aware of the extent to which various factors can affect the quality and quantity of grains and the rate at which these could decrease. Also, whenever those are trained on simple techniques to improve handling and conservation of maize grains, sometimes they think that's too much extra work. So thinking at sensitization as a measure joint with raising awareness is a good strategy. But the challenge is to find good ways of giving the information such that it has impact on their understanding of the problem and their practices. For example saying to a farmer that "40 cobs of maize leave on-farm, lost during transportation, or

	lost during storage will cost five litres grains" will surely have a better impact than to explain to him the various factors that could influence the loss of grain quantity and quality. So, when training and sensitising, instead of focusing too much on capacity building, it is good to look at impacts of communication on the farmer thinking, habits and practices. Training and sensitisation should then consider all the factors influencing grain quality and quantity over time: harvesting technology and method, transportation facilities, storage facilities, etc. In order to reach great impact on farmers, trainers and engineer would need a mid- to long-term sensitization and education program. Despite the heavy cost of this, advantages and potential positive impacts can be valued in most of other agricultural products. Generally demonstration sites are good bases to convince farmers on practical issues. *Stéphane LAKO* (Cameroon)
6. **Testing innovative storage technologies in Tanzania (15-12-2014)**	Dear CoP members, I take the opportunity of this post to share about an interesting new project for testing innovative storage technologies launched early this month in Tanzania by AGRA. Read article here. These new technologies - hermetic cocoons, metal silos and PICs (Purdue Improved Cowpeas) bags - are meant to serve 4200 smallholder farmers for increasing their storage capacities. Do you have other examples of similar testing/piloting interventions in the countries where do you work? With kind regards, *Francesca Gianfelici* CoP moderator / FAO AGS division Replies: Members, if I may, I would like to draw attention to a few trials were several new technologies, including our own ZeroFly(r) Storage Bags, are being evaluated. The following link provides details of the successful and ongoing "P4P" Action trials by WFP in Uganda and Burkina Faso: http://www.wfp.org/purchase-progress/news/blog/wfp-scaling-successful-post-harvest-programme-smallholder-farmers By clicking on "action research evaluation trial" shown in blue on the page it directs you to the full report from the team. Additionally, Helvetas has PHL projects in Tanzania, Benin and Mozambique: more information available online: http://www.helvetas.org/projects___countries/countries/tanzania.cfm Many thanks for the opportunity to share this with the community. Kind regards Georgina Bingham PhD Senior Technical Specialist & Global Partnerships Vestergaard Food Security (22 January 2015)
7. **Postharvest losses studies and analysis (29-12-2014)**	Dear CoP members, I'm opening a thread on PHL studies and analysis aimed at getting your insights. A new article published in World Development Vol. 66, pp.49-68, 2015 titled "Unpacking Postharvest Losses in Sub-Saharan Africa: A Meta-Analysis" has been circulated. The study due to the limited knowledge on PHL magnitudes consists in a meta-analysis conducted on available resources covering six African countries and 7 commodities. Findings reveal inadequacies of loss assessment methodologies that result in inaccurate PHL estimates. The authors suggest need for change in the way PHL research is conducted. Your valuable expertise and knowledge may contribute in exchanging within this Community on the possible changes and tangible results already undertaken and occurred. Looking forward to reading from you on this topics. With kind regards, *Francesca Gianfelici* CoP Moderator / FAO AGS division

THE WAY FORWARD

The on-line discussion on Maize value chain was closed on 31 January 2015. This report, made available in the Forum achieve, represents a live document which can be further developed if interested colleagues, experts, practitioners are willing to share further information. This can be done contacting the Moderator of the CoP at < food-loss-reduction@fao.org >.

RELEVANT AND USEFUL RESOURCES ON THE TOPIC

- SAVE FOOD series of field studies in Kenya
- FAO compendium on post-harvest operations for maize
- FAO Rural Infrastructure and Agro-industries Division - Household metal silos
- WFP Manual - Improving grain post-harvest handling and storage
- Description of the Business Model for Post-Production Solutions (SDC programme POSTCOSECHA)
- Food losses in cassava and maize value chains in Nigeria (GIZ)
- The Ecological Footprint of Cassava and Maize_Post-Harvest-Losses in Nigeria (GIZ)