

# Tackling post-harvest cereal losses in sub-Saharan Africa

Post-harvest loss reduction raises food availability without increasing the use of land, water and agricultural inputs. This article refers to the case of grain to show the hurdles that farmers have to clear in taking measures to reduce losses and suggests ways that post-harvest practitioners can target mitigating actions in sub-Saharan Africa.

Cereal grains are the main food staples of sub-Saharan Africa (SSA). Losses after harvest of both quantity (weight losses) and quality deprive farmers of the full benefits of their labours. Weight losses typically range from 5 per cent to 40 per cent of production (see Figure), averaging about 13.5 per cent. It has been suggested that for eastern and southern Africa the value of this weight loss amounts to about 1.6 billion US dollars (USD) per annum, or possibly about four billion USD for all of sub-Saharan Africa. This exceeds the value of total food aid received by SSA in the decade 1998–2008, equates to the value of cereal import to SSA in the

period 2000–2007, and is equivalent to the annual calorific requirement of at least 48 million people (World Bank, 2011).

Post-harvest grain losses result from both the scattering of grain due to poor post-harvest handling (harvesting, threshing, transport) and from biodeterioration brought about by pest organisms that include insects, moulds and fungi, rodents and, sometimes, birds.

The effects of biodeterioration are made worse by mechanical damage during handling as broken grain is



Photo: R. Hodges

much more susceptible to other types of quality decline such as pest attack. Furthermore, inadequate storage protection allows the entry of water and facilitates easy access by insects and rodents, while in large-scale bag storage chemical browning reactions may lead to grain discoloration called 'stack-burn'.

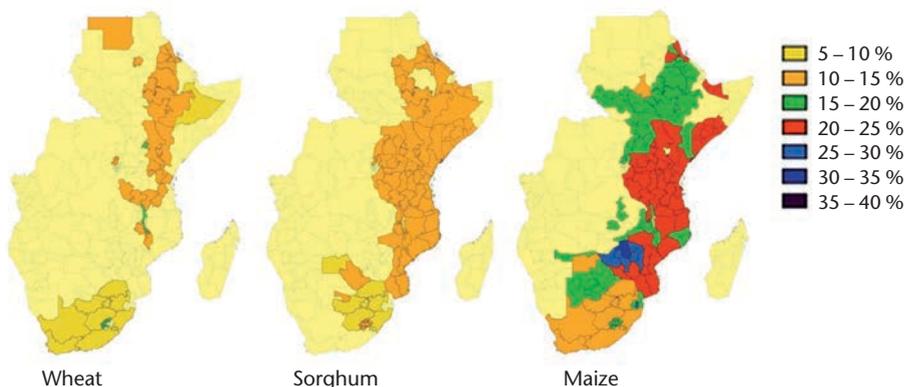
Grain weight loss is easily understood as a loss of food; on the other

**Rick Hodges and Ben Bennett**  
 Food and Markets Department  
 Natural Resources Institute  
 University of Greenwich, United Kingdom  
 R.J.Hodges@gre.ac.uk

**Marc Bernard**  
 Federal Office for Agriculture and Food  
 Bonn, Germany  
 mbe@zadi.de

**Felix Rembold**  
 Joint Research Centre of the  
 European Commission  
 Ispra, Italy  
 felix.rembold@jrc.ec.europa.eu

**Estimated cumulative per cent post-harvest weight loss from production of various grains in eastern and southern Africa for 2007**



Source: African Post-harvest Losses Information System

hand, quality loss is a more complex phenomenon and is usually expressed in financial terms. Reduction in quality confines grain to lower value markets, which are usually informal, so that farmers lose the opportunity of better incomes. When both types of loss are expressed in cash terms, quality losses may often be greater than weight losses. Furthermore, quality loss may also include a decline in nutritional value, and when grain drying during handling is inadequate, then subsequent mould growth can lead to the production of toxins, e.g. aflatoxins. These may seriously damage the health of consumers (see also pages 30–31).

### ■ It won't work without incentives

Central to any effort to reduce losses is the adoption of better post-harvest practice. This includes improving the application of existing approaches to post-harvest handling (e.g. ensuring basic hygiene), introducing new technologies (better grain driers, shellers, stores, etc.), and adopting new marketing arrangements such as collective marketing, or new financial institutions. The latter include inventory credit or warehouse receipts systems that can give access to the credit needed to enable farmers to adopt better practices and technology.

When thinking about loss reduction, it is useful to distinguish between farmers who are net-deficit grain producers and those who are surplus producers. Most deficit producers lack commercial opportunities and may need direct subsidy before they can adopt improved post-harvest methods to reduce losses and improve their food security. In contrast, surplus producers have the potential to invest in better post-harvest technology if they can gain sufficient income from their grain production, consequently such farmers can benefit from improved marketing

arrangements and access to credit. For surplus producers, the process leading to adoption of better technology requires preconditions such as a market that offers sufficient reward for better quality grain, transport infrastructure giving reliable linkage to a market, and the knowledge and skills to produce good quality grain in a commercial context. Farmers often find that it is not worthwhile investing in the production of good-quality grain because the financial rewards are insufficient. Such an investment is not necessarily confined to the costs of better technology but also requires a change in farmers' priorities and in the risks that they are prepared to take, and may be set in a relatively complex scenario (see Box). Critically, a suitable incentive is needed to encourage post-harvest loss reduction.

### ■ Why a value-chain approach is necessary

It is not only these surplus-producing farmers who would benefit from the production of good-quality grain. Others working in the grain trade, the traders, transporters etc., also benefit because a successful, quality-conscious grain trade offers much increased grain flows in national and regional markets, leading to better business and better nutrition for all. It is common for traders to purchase poor quality grain from farmers at a discount and then to recondition this grain so that it conforms to grade requirements. But this process of reconditioning involves substantial grain losses and costs. The result is less grain on the market and higher priced grain. Alternatively, farmers could produce good-quality grain

### Complex arrangements behind loss reduction

A real-life example demonstrating the complexity of circumstances is the case of the Iganga Farmers' Group in Uganda. Previously, they could not shell their maize cobs soon after harvest as they had more important tasks, including land preparation for the next harvest. When there was time, they shelled their maize by beating the cobs with sticks, a long and tedious process resulting in plenty of broken grain. They then lacked time to sort the grain to meet the quality requirements of a local warehouse receipts system. But a new opportunity appeared when a motorised thresher was offered for hire. Using this machine, they could shell their maize quickly and directly after harvest, giving a number of important advantages. As the machine was more efficient than hand-shelling, there were fewer broken grains; with less delay, quality decline was minimised, and now they had time to sort their grain to ensure good quality. In this new scenario, they moved their maize very quickly to the warehouse and received a warehouse receipt. With the receipt, they borrowed money from the bank to finance the inputs required for planting the next crop. At the warehouse, the Manager noted that the grain from this Group was now of much better quality, so he didn't have to reject any and buyers of this warehouse receipt paid a premium price.

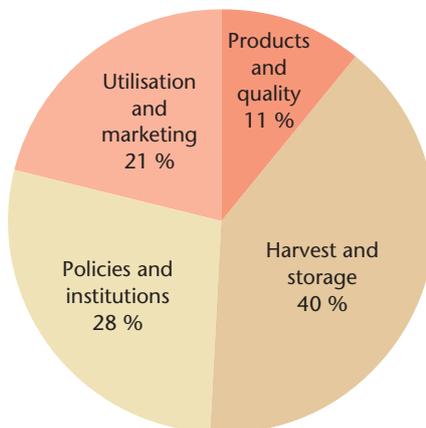


that does not need reconditioning. In that case, consumers benefit as they do not have to pay the costs of the losses inherent in this process and as the losses are lower there will be more grain on the market, resulting in prices rising less steeply. This highlights the need for a value-chain approach to help farmers sell better quality grain for higher prices. There is a need for more focus on market intermediaries, i.e. forward-looking local merchants, large-scale traders and farmer organisations (FOs), as channels to convey post-harvest extension messages and price premiums to farmers. The increasing importance of the value-chain approach was supported by a recent questionnaire survey of post-harvest experts, who were asked to recommend which future post-harvest developments are required to improve the quantity and quality of grain supply from smallholders. They targeted storage and harvesting issues but indicated the need for the support of better policies and institutions and improved marketing opportunities, including value addition (see Figure).

### ■ The need for a co-ordinated response to the problem

The international community currently has no clear means of co-ordinating development efforts in this area. Prior to the year 2000, the relevant body was GASGA (Group for Assistance on Systems Relating to Grain After

### Recommendations for future interventions to improve the quality and quantity of grain supply in SSA, expressed in percent of suggested projects



Source: World Bank, 2011

Harvest), that subsequently became PhAction (The Global Post-harvest Forum), but this fell into abeyance as real agricultural commodity prices hit all-time lows and aid donors shifted their focus away from agriculture. In view of this void, the World Bank has recently called for the development of a new Community of Practice (CoP) on post-harvest loss reduction (World Bank, 2011). The opportunity is for a bottom-up, largely virtual forum where information and experiences can be shared, and good practice disseminated. The FAO (UN Food and Agriculture Organisation) are currently questioning stakeholders about their views on a CoP, and are suggesting that their INPhO (Information System

on Post-harvest Operations) may be a potential cornerstone.

Another body that may also be able to contribute to the CoP is APHLIS (African Postharvest Losses Information System – see Box). This is the initiative of the European Commission’s Joint Research Centre and is a network of local experts in SSA who submit relevant data into the APHLIS database. The website displays estimated cumulative post-harvest weight losses of seven different cereal grains by country and by province; the results may be viewed as tables or as maps (see Figure on page 16). The intention is to provide data in support of agricultural policy formulation, identify opportunities to improve the efficiency of value chains and to enhance food security, especially through more accurate cereal supply calculations, and to provide a means to monitor and evaluate project performance. In the near future, APHLIS will facilitate its network members to develop their own country-specific web pages that provide narratives that elaborate on their post-harvest losses and offer web pages that give advice on aspects of post-harvest loss reduction.

Equally important is that the CoP provides access to project outputs, especially where these offer a guide through the complex technical, economic and social dimensions of loss reduction. A good example of this is the UN World Food Programme’s ‘Purchase for Progress’ project that provides a quality conscious market for the cereals produced by farmers’ groups in many developing countries. The groups are treated according to their state of development and provided with business and technical training; the latter has recently been supported by the development of a training manual that elaborates on all the major steps in the production of better quality grain.

➤ [www.wfp.org/content/p4p-training-manual-improving-grain-post-harvest-handling-and-storage](http://www.wfp.org/content/p4p-training-manual-improving-grain-post-harvest-handling-and-storage)

### African Postharvest Losses Information System (APHLIS): the features

- APHLIS losses tables can be ‘clicked’ to reveal a complete breakdown of the loss calculation, the sources of data, and an appraisal of data quality.
- APHLIS offers a downloadable version of the loss calculator as an Excel spreadsheet. Users can thus change default values within the calculator to those relevant to their situation and generate loss estimates for any geographical scale.
- APHLIS is easily upgraded as more reliable loss figures become available. Users contributing loss figures that are as good as, or better than, existing loss data will be added to the database.
- APHLIS may be updated annually, so that users can see trends across years. Website: <http://www.aphlis.net>