

Tackling food losses: New approaches needed

In the 1980s and '90s post-harvest protection featured prominently in international cooperation, but subsequently the emphasis placed on it diminished. The debate on rising food prices and the use of limited resources has placed it high on the political agenda again. But have the priorities remained unchanged in the intervening years? Can the lessons learnt still be used, or do we need to start again from scratch? Our contributors report on the practical experience of German development cooperation.

Food shortages, food price rises and the impacts of climate change on agricultural production are once again topical issues. In consequence, policy-makers, researchers and the private sector are turning their attention to the promotion of agriculture in developing countries. In 2009 the G8 countries launched the L'Aquila Food Security Initiative (AFSI), under which they pledged to provide 22 billion US dollars between 2010 and 2012 for measures that would help to permanently resolve the food crisis. The German chancellor, Angela Merkel, promised that during this period Germany would contribute three billion dollars for rural development and food security. The German Federal Ministry for Economic Cooperation and Development (BMZ) has set out its targets for the promotion of rural development and food security in a ten-point programme. Among other issues, the programme explicitly refers to "improving post-harvest protection".

The UN Food and Agriculture Organization (FAO) estimates that

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around 30 per cent of the food harvested worldwide is lost or wasted. This is equivalent to a staggering 1.3 billion tons (FAO, 2012). Similar figures were being quoted two decades ago and the present data basis is weak. What is clear, however, is that food losses are making a significant contribution to the global food crisis.

Food losses occur along the entire food supply chain (FSC), including production, storage, processing and distribution, from the field to the plate. They are unacceptable from both economic and environmental points of view since they vitiate investment that has already been made in agricultural inputs, labour and natural resources such as soil and water.

■ Two sides of the coin

Food waste involves products that are ready to eat but that are not in fact used for human consumption. It is particularly significant in the industrialised countries and is becoming an increasing problem in newly industrialising ones. **Food losses**, on the other hand, occur between harvest and sale, often in developing countries. The wastage close to home and the losses in the developing country both have a similar effect: they exacerbate food security problems and add unnecessarily to the

pressure on the natural factors of production. However, the causes of wastage and loss are very varied and a wide range of stakeholders and institutions are involved: an assortment of political and technical measures is therefore required to tackle the problem. This article looks specifically at plant-based food losses in the developing countries; it should not be forgotten that animal products – meat, fish, milk, eggs – are also affected by losses throughout the value chain, but these have been of less importance in development cooperation projects (see also Table on page 8).



■ Post-harvest protection in development cooperation: the experience of the '80s and '90s

As an issue triggered by the severe droughts and famine in the Sahel, post-harvest protection played an important part in German and international development cooperation in the 1980s and '90s. During this time BMZ supported several national food security projects involving state storage of food supplies (Burkina Faso, Mali, Mauritania, Niger) and a number of other projects in Africa (Benin, Egypt, Ghana, Kenya, Madagascar, Malawi, Tanzania, Togo and Zambia) that included post-harvest protection components. Working with national partner organisations, farmers and field staff, new schemes were devised and disseminated. Various research institutes and universities in the participating countries and in Germany also contributed (among them the Julius Kühn-Institut in Berlin – which was then the Federal Biological Research Centre; see also the article on pages 26–29). This work typically involved introducing new techniques and adapting traditional processes in order to improve stor-



A farm worker storing harvested maize in a silo in Nhamuka village, Mozambique.

Photo: FAO/P. Thekiso

age hygiene and prevent infestation. Chemical treatment and fumigation of stored produce were also used if other approaches looked unlikely to succeed.

As well as supporting national crop protection projects, German development cooperation between 1983 and 1998 also supported an integrated Africa-wide campaign against a widespread storage pest, the larger grain borer (*Prostephanus truncatus*); this was achieved via promotion of a trans-regional project with priority areas in Benin, Ghana, Malawi, Tanzania and Togo. *Prostephanus truncatus* – an auger beetle of the *Bostrichidae* family – was brought to Africa from Central America in the late 1970s. Having no natural enemies, it multiplied rapidly and inflicted considerable damage on stored maize and dried manioc. In collaboration with the International

Institute of Tropical Agriculture (IITA) and other international research centres (NRI – Natural Resources Institute, UK; KARI – Kenya Agricultural Research Institute; IIBC – International Institute of Biological Control, UK) the predator *Teretriusoma nigrescens* was introduced to West Africa from its original home in Central America. It was released first in Togo in 1991 and subsequently in other African countries.

The projects of that period had two main aims. Firstly, they were designed to help the state grain agencies of the Sahel countries provide food in areas in which there were shortages by promoting storage structures, storage management and market information systems. Secondly, they set out to substantially improve the protection of grain, maize, cassava, yams, sweet potatoes and beans stored by village

Food losses – an important topic in GIZ projects

Even if specific post-harvest-management projects, as in the past, do not exist any more, the topic food losses is addressed in many GIZ projects dealing with rural development, agricultural promotion and especially promotion of agricultural value chains and strengthening resilience of farmers under changing climatic conditions.

For the **Baghlan Agriculture Project in Afghanistan** the development of value chains of wheat, potatoes, fruit and vegetables is a major concern and the project aims that at least 900 enterprises have recorded a significant increase in operating income due to improved storage/processing of market products in Baghlan.

The **African Cashew Initiative** is a jointly funded programme of BMZ (German Federal Ministry for Economic Cooperation and Development), Bill & Melinda Gates Foundation and private-sector partners, and implemented, amongst others, by GIZ. It addresses food losses in cashew and other value chains and aims for improvements in production and best practices for harvesting and post-harvest handling in all participating countries (Benin, Burkina Faso, Ivory Coast, Ghana, Mozambique).

The objective of the **“Market Oriented Agriculture Programme”** (MOAP) in **Ghana** is to improve the competitiveness of agricultural producers and other agricultural actors in processing, trade and services on national, regional and international markets. Through better market infrastructure at the important wholesale market in Techiman, the quality of maize and the reduction in grain moisture is improved. Furthermore, the exportable share of pineapple is risen nation-wide through improved quality, reduced losses and fruit rejects and improved market access.

In **Bolivia**, the **“Programa de Desarrollo Agropecuario Sustentable”** (Sustainable Agricultural Development Programme) aims at improving resilience of smallholder farmers with regard to changing climate conditions. The reduction of post-harvest-losses is one of several options to achieve this goal. The value chains concerned are fruit, vegetable and corn.

Other projects dealing with post-harvest management are in Ethiopia, Laos, Nepal, Nicaragua, Pakistan, Philippines, Usbekistan and Vietnam.

communities and farming families. The specific roles of men and women, especially in connection with the production and post-harvest handling of roots and tubers, were analysed in detail and taken into account in the intervention strategies.

The specific activities included testing different materials and structures for the storage of grain and maize. Exchange visits enabled farmers to learn about different types of storage and hence to identify the type that they would be best advised to build for their own purposes. In some West African countries hundreds of storehouses of different sizes and types were built to provide better medium- and long-term protection for harvested produce that could then serve as a food reserve. In addition, through a range of dialogue and training measures information about better storage and post-harvest management was disseminated and research findings were passed on to multipliers and farmers.

■ The path to the systemic approach

In the 1990s it was already clear that the ideas put forward were not being accepted everywhere and that the expected success was not materialising (Bell, Mazaud, Mück, 1999). Consideration was therefore extended to socio-economic and socio-cultural conditions; this led to the development of valuable post-harvest protection schemes utilising measures that were widely accepted, feasible and adapted to local conditions. The focus was on the economic viability of the measures and their impact on the producer households' standard of living. From a nuanced analysis of types of loss it was evident even then that the loss figures quoted in the literature were frequently too high. „The widespread practice of continuous withdrawal of maize from storage for consumption or sale throughout the storage period leads to

Losses of certain product groups at different stages of the food supply chain (FSC)

Product group	Loss (%)	Stages (FSC)	Region	Source
Cereals	10–15	Transport, processing, storage	worldwide	1
Rice	2–40	Post-harvest	Asia	1
Maize	7–100	Post-harvest	Africa	1
Maize	9–40	Post-harvest	Latin America	1
Sorghum	0–40	Post-harvest	Africa	1
Roots and tubers	10–60	Post-harvest	Africa	1
Roots and tubers	22–33 (26–40)	Post-harvest, storage, processing (incl. distribution)	Africa, Asia, Latin America	2
Fruits and vegetables	33	Whole chain, without consumer	Worldwide	1
Fruits and vegetables	10–50	Post-harvest	Africa and Asia each	1
Fruits and vegetables	30–34 (42–51)	Post-harvest, storage, processing (incl. distribution)	Africa, Asia, Latin America	2
Milk	8–11 (16–21)	Post-harvest, storage, processing (incl. distribution)	Africa, Asia, Latin America	2
Meat products	5–6 (10–13)	Slaughter, storage, processing (incl. distribution)	Africa, Asia, Latin America	2
Fish and seafood	14–15 (24–30)	Post catch, storage, processing (incl. distribution)	Africa, Asia, Latin America	2
Fish	1–5, 3–17, 20–40	Post-harvest small-scale	Selected fish species in African countries	3
Fish, captured and cultivated	10	Post-harvest (weight)	Global	4

Sources:

1. Priefer, C., Jörissen, J., 2012: ITA-Monitoring „Frisch auf den Müll“. Verringerung der Lebensmittelverluste als Ansatz zur Verbesserung der Welternährungssituation. Karlsruhe: ITAS des KIT Pre-Print: 22.11.2012
2. Gustavsson, J., van Otterdijk, R., et al., 2011: Global food losses and food waste. Extent, causes and prevention. FAO
3. Akande, G., Diei-Ouadi, Y., 2010: Post-harvest losses in small-scale fisheries. Case studies in five sub-Saharan African countries. FAO Fisheries and aquaculture technical paper, 550
4. FAO, 2013: Fisheries and Aquaculture Department, Reducing post-harvest losses

the actual storage losses being overestimated,” wrote Bell et al. (1999) based on the fact that the 30 per cent loss in farm maize stores found in Togo after six months therefore corresponded to some 17 per cent of the quantity put into the store (Pantenius 1988).

Building on the concept of integrating protection of stored produce and storage management on the one hand and socio-economic conditions on the other, the system approach to

This maize is infested with the larger grain borer.



Photo: R. Hodges

*A grain silo in Mutwaathi,
eastern Kenya.*

post-harvest activities was developed by the FAO, GTZ and partners in the mid-1990s (on the basis of experience in Ghana, Kenya and Zambia and influenced by the Agenda 21). This was a multi-disciplinary and participative approach that involved all stakeholders at all stages of the “post-harvest chain”. The focus was no longer on pests and technical problems but instead on the people affected by the issues (see “From biological control to a systems approach in the post harvest sector”, IITA / GTZ meeting 1997; Borgemeister et al., 1999). However, the decreasing project activities at that time did not offer much opportunity to implement this concept.

■ What is now the way forward?

Today the perspective has widened to include the causes of food losses and to consider losses not only at producer level but also along the entire value chain, whether during storage, transport, processing or the various stages of marketing. Measures to reduce loss must therefore take account of the entire value chain and focus on the particular hot spots at which the largest losses occur and the most effective measures can be put in place. This is highly depending on the produce and the regional post-harvest conditions. Planning and implementing loss reduction measures needs to involve many different players in both the public and private sectors. The desired result will not be achieved if storage facilities are built without an adequate transport infrastructure, without market information or without further processing opportunities, and technical innovation without prior cost/benefit analysis, without capacity building and without a sound gender approach is unsustainable. In this regard GIZ will closely cooperate with the “Save Food



Photo: FAO/Thomas Hug

Initiative” (www.save-food.org), initiated by Messe Düsseldorf and FAO in 2011 (see also pages 10–11). Complex links and interrelationships need to be identified and incorporated into the measures that are devised. For example, this is the case with the analysis of losses, which now needs to include the environmental footprint of production (see also the article on page 15).

In order not to reinvent the wheel, GIZ has started to connect to main stakeholders in the field of post-harvest protection: in June 2012 it held a seminar entitled “Food losses concern us all” at which key German institutions from research, politics and the private sector exchanged views and planned further collaboration. In July 2012 GIZ

and the Global Donor Platform for Rural Development held a “virtual briefing” on post-harvest losses at which the most important international organisations such as the FAO, the World Bank and the African Development Bank and various national institutions such as the Natural Resources Institute (NRI) and the Swiss Agency for Development and Cooperation (SDC) discussed their measures and strategies for post-harvest losses (www.donorplatform.org/postharvest-losses/virtual-briefings). Other “virtual briefings” are planned. Nowadays GIZ is implementing several projects on rural development and sustainable agriculture together with national partner organisations which integrate post-harvest activities (see Box on page 7).

Comprehensive information

In 1996, to facilitate international discussion of and access to the most important documents on post-harvest protection, the FAO, working with GTZ and the Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), set up the internet platform INPhO (the Information Network on Post-harvest Operations), which is still accessible (www.fao.org/inpho). In view of the renewed interest in the issue, GIZ will shortly be making its most important publications, booklets and reports available to professionals worldwide in digital form at the website of the Global Donor Platform for Rural Development (www.donorplatform.org/postharvest-losses).

Further information and details of the references mentioned in this article can be found at www.rural21.com.