

Simple technology, big impact

More than 30 years ago, the Swiss Agency for Development and Cooperation (SDC) started a post-harvest programme in Central America named “Postcosecha”. The significant impact that was still evident long after the project end also continues to exist after the cessation of external support. The current priority in SDC’s contribution to post-harvest management (PHM) is to use existing knowledge and experience to create conditions for scaling up the most appropriate PHM technologies in sub-Saharan Africa.

The “Postcosecha” project, launched by the Swiss Agency for Development and Cooperation (SDC) in 1983, was designed to protect small farmers from post-harvest losses and lead to greater food security for the families. “Postcosecha” is Spanish for post-harvest. At the heart of the project is a “menu” of four different technologies for reducing post-harvest losses. The most popular technology turned out to be a simple, hermetic metal grain silo, fabricated by local artisans, that protects dried corn and beans from insects, mice and rats, as well as against decomposition – in a cost-effective way by means of fumigation or oxygen depletion without chemical by-products. The silos and three other technologies were selected for market entry after several years of evaluating smallholder demand in rural Honduras. In particular, the silos spread like mushrooms in Honduras, then Guatemala (the region’s most populated country) and finally Nicaragua and El Salvador, totalling a number of 670,000 in 2009. Assuming a service life of at least 15 years, one can expect to find a minimum of 600,000 silos still in operation, serving 415,000 farm families, on the basis of an average of 1.4 silos per family. Each farm is thus able to safely store about a tonne of maize or beans, Central America’s most important staples.

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In Central America, farmers using metal silos avoided post-harvest losses valued at more than 75 million US dollars from 1984 to 2009, and the impact has continued after cessation of external support.

Such decentralised technology above all improves food security for the farmer and his family. A study conducted in 2011 showed that 70 per cent of the grain stored in a silo was for the family’s own consumption, with just 27 per cent being sold on the market and the remaining 3 per cent carefully set aside to be used as seeds. Surveys have demonstrated that the average annual consumption of a family is 600 to 800 kilograms of maize and 100 to 300 kilos of beans. The available silo storage space is thus enough to meet a farm family’s annual requirement. Farmers who produce only for their own requirements usually have just the necessary storage space, while those who also produce for the market need additional silo capacity.

■ Value added for small farmers ...

The study revealed two most welcome developments for the households of farming families in Central America:

■ Postharvest losses can be extensively avoided. A survey of farmers showed that for 44 per cent of respondents the avoidance of grain losses has been the most positive change brought about by the introduction of silos. The use of silos has helped to increase food security by 30–35 days per year.



Photo: SDC

■ The owner of a silo can save more or earn more. Immediately after the harvest, when supply is greatest in local markets as well as in the cities, the price for maize is at its lowest. However, anyone who can safely store the maize for a few months prior to selling can count on a higher price, or conversely on making a saving by not having to buy when the market price is high. At the time of the harvest, between November and February, about 80 per cent of farmers sell their maize rather than storing it in a silo. In the critical period before the next harvest, between March and July, the situation is almost reversed, with 73 per cent selling only maize stored in the silo.

■ ... and local artisans

Farmers are not alone in being able to add value thanks to a silo. Artisans who fabricate them also increase their earnings. In fact, local fabrica-

tion of the silos from galvanized sheet metal is an important aspect of the Postcosecha strategy. In most cases, the metalworkers who make the silos are themselves farmers who are thus able to acquire a profitable sideline income.

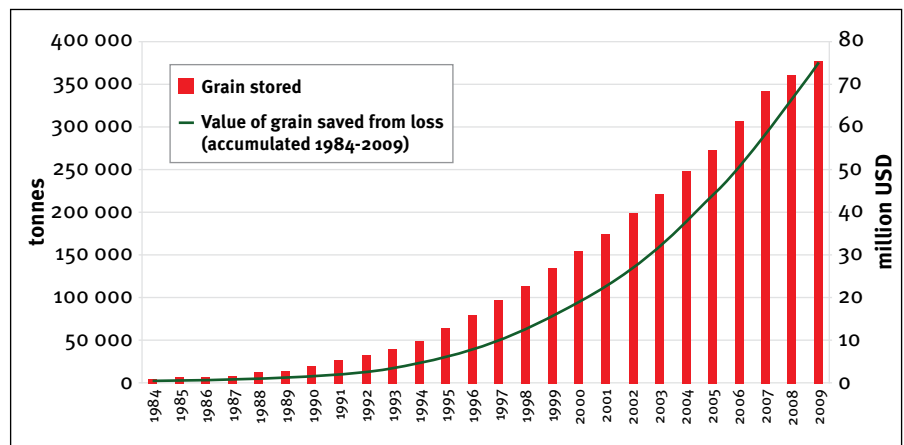
Since the beginning of the programme, 2,000 individuals have been trained in the fabrication of silos. Not all of them have stayed with it, however: some have moved away, others have found new business opportunities, while some have not been able to find anyone to take over the job. It is estimated that 800 to 900 individuals are still making silos. There are considerable differences in the size of their operations. A good third of the metalworkers produced 20 silos of different sizes in 2009. Somewhat less than two thirds sold between 100 to 300 silos, while five per cent were large-scale manufacturers producing an average of 670 silos per workshop. The fabrication of silos is a job for the men, whereas selling the maize is mainly a task for the women.

Many artisans, above all in Guatemala and El Salvador, are on record as saying that their general situation has improved in the past five years thanks to the fabrication of silos. They have more food and more cash income, while the children's education benefits and conditions in the home have improved. Two thirds of the respondents also noted an improvement in their standing in the community since they had begun fabricating silos.

■ Positive cost-benefit ratio

One of the main questions in the ex-post impact study of the programme concerned the macro-economic benefits of the 600,000 silos currently in operation in the four countries of Central America. The storage capacity of the silos has grown steadily each year to reach the present 380,000 tonnes. This corresponds to 13 per cent of the region's annual production of maize, or in the case of Honduras, to 30 per cent. A "critical mass" may have already been reached in the maize

Reduction of post-harvest losses with metal silos in Central America



market of Central America. The study revealed that post-harvest storage in grain silos on a massive scale has had a stabilising effect on the market price of maize, particularly at the local level.

In 2009 alone, metal silos prevented the loss of 38,000 tonnes of maize and beans, equal to the consumption of 50,000 families, for a savings of some 12 million US dollars (USD). If one takes into account the extra earnings farmers make from selling premium maize stored in their silos at a later date the result is even more encouraging. Extrapolating to cover the entire region, it amounts to an additional USD 21 million. According to the authors' estimate, the result for the entire Postcosecha programme between 1984 and 2009 amounts to USD 75 million worth of crop saved from spoiling, with additional revenue for farmers of USD 90–100 million, plus USD 12 million for metalworkers. In comparison, the USD 20 million invested by the SDC and the additional contribution of USD 13 million by non-governmental organisations and the governments of Central America have been an excellent investment, especially when considered as a start-up investment.

Today metal grain silos virtually sell themselves in the region. Even years after the end of Swiss support in 2009 and the departure of foreign advisers the number of silos in use continues to grow. Already, 20 per cent of all beans and maize produced in Central America is now stored in hermeti-

cally sealed metal silos of a type previously unknown here. This is above all due to the fact that in the first five years following termination of the programme, measures taken by the various governments, in particular at national level, ensured the continuing dissemination of the grain silos. Moreover, Postcosecha has become a model for farmers and development organisations in other parts of the world, first of all in other countries in Latin America such as Cuba, the Dominican Republic and Paraguay which followed in the footsteps of their Central American neighbours.

■ South aids South: knowledge transfer to Africa

Given the significant achievements in Central America, SDC decided to make available its accumulated knowledge and experience with regard to implementation of PHM programmes for smallholders experiencing post-harvest losses in other parts of the world, particularly in sub-Saharan Africa. In consequence, more SDC-supported PHM programmes have started recently, in Tanzania and in ten other countries in sub-Saharan Africa. African technicians have initially familiarised themselves with the new method with the help of ex-Postcosecha partners in El Salvador. The first test runs were conducted in Kenya and Malawi between 2008 and 2011, in partnership with the International Maize and Wheat Improvement Centre (CIMMYT). An evaluation has

shown that several new technologies, including metal silos, hermetic bags, metal or plastic drums, improved traditional structures, are appropriate to African conditions and, in certain circumstances, are readily welcomed by farming families. The outlook for the widespread distribution of silo technology is particularly good in Malawi, where the government has recognised the importance to the economy of small farmers and is seriously concerned about food security. However, the price of the metal silos developed in Central America continues to be a significant obstacle for the poorest African farmers. That's why SDC-supported programmes not only make efforts helping smallholders to overcome this initial price barrier (working on policies regarding access to financial services, tariffs, etc.) but also support an array of other storage options (mentioned above). For instance, in a new kind of storage unit that has been successfully tested in Africa, dried produce will be placed in different types of bags which can be sealed hermetically. This approach will be especially useful for female farmers, who make up 45 to 60 per cent of working women in the countries targeted. Hermetic bags are considerably cheaper than a metal silo, but they have a much shorter service life and hardly resist rodents. Silos are a better investment in the long run, but they require a greater initial capital outlay.

The new grain storage methods are due to be introduced in regions where there is traditionally enough maize for self-sufficiency and a surplus that can be sold on the market, but which face difficult problems with pests and disease. Their introduction will be supported by the training of agricultural consultants, and artisans for fabrication of the silos. Staff from government and non-governmental organisations as well as the private sector will be entrusted with the marketing of both the silos and plastic bags. To ensure an environment favourable to this economic policy and farmer-friendly measures, the authorities and entrepreneurs must be convinced of the requirement for them, and a suitable agricultural policy has to be promoted.

■ Need for action

The introduction of new technology in sub-Saharan Africa is all the more pressing in view of the size of post-harvest grain losses, estimated at 10 to 20 per cent (FAO, World Bank: "Missing Food", 2011). The numerical distribution of the losses shows that some farmers lose almost their entire harvest. In African countries where the pest known as the Larger Grain Borer is prevalent, post-harvest losses are substantially higher than elsewhere. In the maize producing countries of the southern and eastern regions, damage amounts to USD 100 million each year. Farmers of both sexes are so afraid of the expected storage losses that they often try to sell their produce immediately after it has been harvested. In order to ensure their own sustenance they frequently have to buy the maize back at much higher prices just months later. The availability of this food a few months after the harvest would help to combat hunger and poverty. And farmers' incomes would increase as well, stimulating economic growth in rural areas. Furthermore, it is not merely a question of reducing quantitative losses, for poor storage also results in the loss of essential nutritional

elements, which in turn impacts the health of population groups affected by HIV/AIDS.



Traditional grain storage structure in Benin.

Photo: M. Streit/SDC



In the short term, hermetic bags are cheaper than a metal silo – an important advantage, especially for female farmers.

Photo: SDC

SDC's work on food security

The "SDC Global Programme Food Security" builds on the lessons learned in Central America as well as in Eastern and Southern Africa. The programme involves the cooperation of the United Nations Food and Agriculture Organization (FAO)/ International Fund for Agricultural Development (IFAD), World Food Programme (WFP), the non-governmental organisation Helvetas Swiss Intercooperation and various African centres of expertise. The focus is on the processing and storage of cereals and pulses by individual farmers, groups of farmers and co-operatives. The experiences to date and the results of related tests are to be exchanged and made available throughout Africa.

SDC's "Agriculture and Food Security Network", and in particular its subgroup on post-harvest losses, will liaise and encourage world-wide knowledge-sharing for all the different post-harvest relevant projects supported by SDC.

For more information on SDC's programme on food security and project descriptions, see: > www.postharvest.ch