



FOOD SECURITY IN CENTRAL AMERICA: SMALL SILOS THAT MAKE A BIG DIFFERENCE



What happens in one region of the Third World when a development project holds tenaciously to the same objective for 20 years? Can changes be observed? Was the path chosen the right one? A wide-ranging impact stu-

dy has shown that the widespread distribution of simple metal grain silos in Central America has changed the lives of hundreds of thousands of small farmers. This proven technology is now being introduced in Africa. If success-

ful the transfer of knowledge will open new dimensions for a promising initiative of the Swiss Agency for Development and Cooperation (SDC).

Five years after the key to the POST-COSECHA (postharvest) development programme was handed over to local partners, independent experts under the leadership of Martin Fischler of HELVETAS Swiss Intercooperation returned to Central America to see for themselves what had been accomplished. The purpose of their study: to create an agricultural programme that will protect small farmers from postharvest losses and lead to greater food security for the families. At the heart of the SDC POSTCOSECHA development project is a simple metal grain silo, fabricated by local artisans, that protects dried corn and beans from insects, mice and rats, as well as against decomposition.

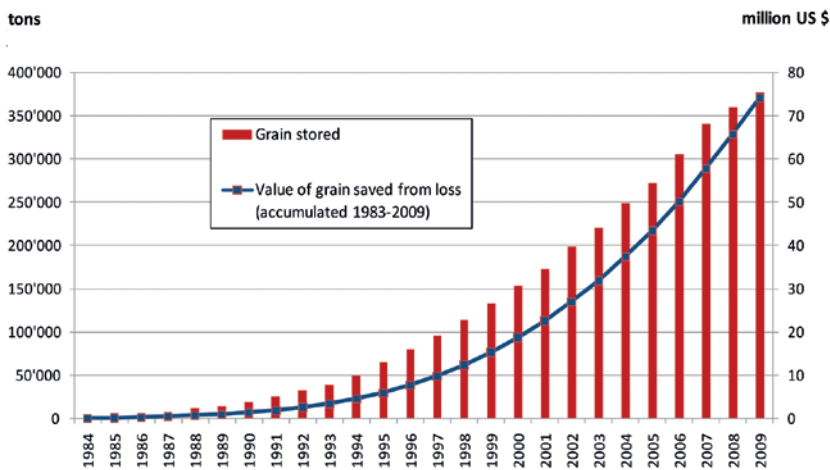
Initial findings: efforts to ensure the widespread distribution of grain silo technology have succeeded. Already 20% of all beans and maize produced in Central America is stored in hermetically sealed metal silos of a type previously unknown here. These grain silos make it possible to eliminate the presence of any insects in the stored produce in a cost-effective way by means of fumigation or oxygen depletion without chemical by-products. Today it is impossible to imagine these farms without the characteristic silver-grey cylinder-shaped silo. The silo has brought a practical and lasting solution to a problem that posed a serious threat to small farmers living in at best modest circumstances. Over a period of years grain silos have spread like mushrooms, beginning in Honduras, then Guatemala (the region's most populated country)



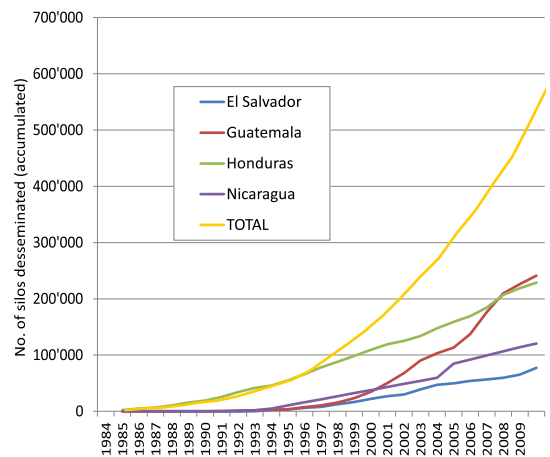
and finally Nicaragua and El Salvador. Such decentralised technology above all improves food security for the farmer and his family. The study shows that 70% of the grain stored in a silo is for the family's own consumption, with just 27% being sold on the market and the remaining 3% carefully set aside to be used as seeds.

A gratifying result: today metal grain silos virtually sell themselves. Even years after the end of Swiss support and the departure of foreign advisers the number of silos in use continues to grow. The programme thus passes the test of sustainability with flying colours. This is above all due to the fact that in the first five years following termination of the programme, measures taken by the various govern-

ments, in particular at the 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 such as Cuba, the Dominican Republic and Paraguay which followed in the footsteps of their Central American neighbours. Further afield in Kenya and Malawi a test run of several years has given positive results. As of 2012 the SDC has supported the introduction and dissemination of silo technology in seven countries in Eastern and Southern Africa, as well as two countries in West Africa, making a contribution to South-South technology transfer.



SDC metal silos reduced postharvest losses valued at more than 80 million dollars



In Central America the metal silos have wide success among small farmers

NEED FOR A LONG TERM APPROACH

A joint study of the POSTCOSECHA programme by the World Bank and the Food and Agriculture Organisation (FAO)* indicates that farmers usually require a considerable amount of time to evaluate and eventually adopt this new storage technology. Continuous support is needed to ensure success. The silos must be fabricated and operated properly, failing which the reputation of the whole scheme can suffer. In the view of development experts it will take 20 years for the SDC to achieve its objective. To date efforts to reduce postharvest losses in Africa have suffered from the lack of a long term, systematic approach.

*Missing Food: The Case of Postharvest Grain Losses in Sub-Saharan Africa. World Bank/FAO, April 2011



VALUE ADDED FOR SMALL FARMERS

In Central America the campaign to end postharvest losses is closely linked with the POSTCOSECHA programme. POSTCOSECHA is Spanish for postharvest. The name has become almost a trademark and like the model itself is inseparable from dissemination of the silos. The SDC became established as the main promoter of the POSTCOSECHA programme in the 1983-2003 period. What began as a small project in Honduras has since grown into a campaign throughout the region. From the launch date in 1983 to the year 2009 the number of silos has gradually increased to 670,000. 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 store in safety about a tonne of maize or beans, Central America's most important staples. Surveys have shown that the average annual consumption of a family is 600-800 kilograms of maize and 100-300 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.

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

- Postharvest losses can be extensively avoided. A survey of farmers shows that for 44% of respondents the avoidance of grain losses has been the most positive change brought about by the introduction of silos. The introduction of silos helped to increase food security by 30-35 days per year.
- 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% 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% selling only maize stored in the silo.

BOOM PERIOD FOR ARTISANS

Farmers are not alone in being able to add value thanks to a silo. Artisans who fabricate them also increase their earnings. An important aspect of the POSTCOSECHA silo strategy is in fact local fabrication of the silos from galvanized sheet metal. In most cases the metalworkers who make the silos are themselves farmers, who thus are able to acquire a profitable sideline.

Since the beginning of the programme no less than 2,000 individuals have been trained in the fabrication of silos. Not all 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 there are 800-900 individuals still making silos. There are considerable differences between 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 100-300 silos, while 5% 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, the children's education also 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 began fabricating silos.



GUATEMALA SUBSIDISES METAL SILOS

Agriculture in Guatemala is fragile, being constantly subjected to either droughts, flooding or hurricanes. In the context of the government's food security strategy for the poorest segments of the population postharvest losses have become a priority. The year 2000 marked the beginning of the widespread distribution of metal silos in accordance with the POSTCOSECHA model. The European Union provided additional funding for the subsidisation programme in the 2010-12 period.

To ensure that even the poorest families have access to the proven technology of metal silos the state subsidises the raw material essential for their fabrication, zinc sheet. This metal, which accounts for about two thirds of the cost of fabrication, is provided in a controlled manner at no cost to local metalworkers and is delivered to farmers in the various provinces free of charge. Artisans participating in the programme may set a price for the purchase of a silo that covers the cost of the labour plus a modest profit. Thanks to this system farmers can acquire their own family silo for USD 22. Even though artisans in the programme earn less per unit they can count on a guaranteed increase in turnover. Furthermore as the direct supplier they are able to advise the purchaser on how to operate and maintain a silo. And they no longer have to worry about price fluctuations for the raw material. The state procures the required zinc sheet by public tender, and this is reflected in the lower overall cost of the silo programme. The middleman is eliminated.

POSITIVE COST-BENEFIT RATIO

One of the main questions in the 5 Year Ex-Post Impact Study POSTCOSECHA Program (March 2011) concerns the macroeconomic 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% of the region's annual production of maize, or in the case of Honduras to 30%. The authors feel that a "critical mass" may have already been reached in the maize market of Central America. They have shown that postharvest 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 USD 12 million. 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.

"The POSTCOSECHA programme brings major social and economic advantages for the rural population at a low cost. Many farming families learn through it how to avoid postharvest losses. Their food security increases and with healthy foodstuffs. The programme also provides employment in rural areas, in particular for metalworkers. A modest subsidy that ensures the widespread distribution of metal silos is fully justified, and there are no paternalistic overtones since the advantages are considerable."

Carlos Anzueto, former director of international cooperation projects for the Guatemalan government.

SOUTH AIDS SOUTH: TECHNOLOGY TRANSFER TO AFRICA

In the years ahead the SDC will support similar projects in Zambia, Zimbabwe, Malawi and Kenya in an effort to help reduce postharvest losses, of maize in particular. There will be also be a similar programme in Tanzania. Equally worth mentioning is the new "SDC Global Program Food Security" (see box) focusing on metal silos fabricated for farms by local artisans, a technology which has proven its worth in Central America. African technicians have familiarised themselves with the new method with the help of 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 metal silos, together with other technologies that offer advantages in certain circumstances, are also appropriate to African conditions and 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.

The aim is provide silo technology to at least 16,000 small farmers in Eastern and Southern Africa by 2016. However the price of the metal silos developed in Central America remains prohibitive for the poorest African farmers. The project will therefore also support a new kind of storage unit that has been successfully tested in Africa and will be suitable for use by an additional 24,000 farmers. Instead of silos the harvested and dried produce will be placed in plastic bags and sealed hermetically. This approach will be especially useful for female farmers, who make up 45-60% of working women in the countries targeted. Plastic bags are considerably cheaper of course, but they have a much shorter service life. Silos are a better investment in the long run, but they require a greater initial capital outlay.

The new methods of storing grain 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. Personnel from state and non-state 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 need to be convinced of this need, and a suitable agricultural policy has to be promoted.

The introduction of silo technology in Eastern and Southern Africa is all the more pressing in view of the size of post-harvest losses, currently estimated at 16-23% compared to just 10-15% in Central America. 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, postharvest losses are substantially higher. In the maize producing countries of the southern and eastern regions the damage each year amounts to USD 100 million. Farmers of both sexes are so afraid of the expected storage losses that they often try to sell their produce immediately after it is harvested. In order to ensure their own sustenance they often 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 also increase. This would stimulate 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 AIDS/HIV.

FOOD SECURITY – A GLOBAL CHALLENGE

The "SDC Global Program Food Security" will build on the lessons learned in Central America as well as Eastern and Southern Africa. Postharvest programmes will also be introduced elsewhere in Africa (Ethiopia, Mozambique, Benin, Burkina Faso) to disseminate this proven, adaptable technology and methods for reducing postharvest losses. The objective is to improve the economic situation of small farmers and their families, and their food security. The programme involves the cooperation of the FAO/IFAD, WFP, 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 cooperatives. 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 postharvest losses (see www.postharvest.ch), will liaise and encourage worldwide knowledge sharing for all the different postharvest relevant projects supported by SDC.



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Swiss Agency for Development and Cooperation (SDC)
Freiburgstrasse 130, CH-3003 Bern
Latin America Division
Tel. +41 31 322 34 41
cosude.amlat@deza.admin.ch

For further information:

www.sdc.admin.ch, www.postharvest.ch

Photos

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