



Introducing a New Grain Storage Technology in Tanzania - The Case of Metal Silos at Household Level

Lessons from the Grain Post-Harvest Loss Prevention (GPLP) Project in Tanzania (2013 – 2020)

Key Messages

- *Small size metal silos for on-farm storage of grain were successfully introduced by the GPLP project by transferring the technology and ensuring local production.*
- *Several dozen artisans in their metal workshops nowadays fabricate metal silos on order.*
- *The economic context with rising costs for metal sheets and the arrival of hermetic bags as low-cost alternative to store grain are affecting the further dissemination and widespread adoption of metal silos for on-farm grain storage.*

1. Background

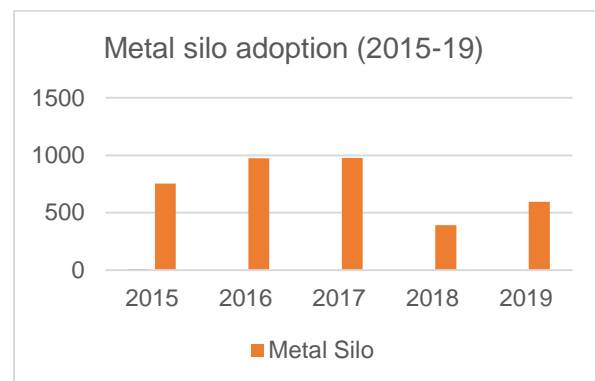
The introduction of metal silos for grain storage at farm household level was one of the major interventions of the Grain Post-Harvest Loss Prevention (GPLP). The project was conceived based on the success metal silos had in Central America under the *Postcosecha* project (1983 – 2003) of the Swiss Agency for Development and Cooperation (SDC). The GPLP project aimed at facilitating the extensive knowledge transfer and the wide-spread adoption of metal silos for the storage of grain at household level in Tanzania.

At its start, the project conducted a survey of the availability of material for the local production of metal silos and estimated the price at TZS 135,000 (USD 61) for a silo to store 500 kg of grain and TZS 175,000 (USD 79) for a 1000 kg metal silo. A good demand for silos was anticipated because the baseline showed that 80% of farmers used normal poly-propylene bags and/or traditional baskets (*Vihenge*) for grain storage which resulted in high post-harvest losses.

A first group of three master trainers received training on the fabrication of metal silos in 2015; and a metal silo training manual was reviewed and translated. The project followed a decentralised silo production approach whereby potential artisans were identified in each project target ward and trained by the master trainers. At the end of their training, the artisans were given a toolbox and material (metal sheet, soldering sticks and acid) to produce 10 silos as in-kind starting capital. The project invested and facilitated on-site coaching by the master trainers. The produced 10 silos were given to VICOBA groups as seed money to start a revolving fund so that group members could acquire metal silos. The artisans were also trained on producing tinsmith products from the leftovers of the metal sheets, and they were given training on entrepreneurship skills. In the end, some artisans imparted their skills to workers in their workshops.

The supply of material to produce the metal silos was mainly through agro-dealers, while some artisans with enough capital bought the metal sheets directly from Arusha or Dar es Salaam. The agro-dealers created business relations with artisans and collaborated in promoting the metal silos. Upon receipt of orders for silos from farmers,

agro-dealers provided material to the artisans for the production of the silos and paid them for the work. Some artisans however received orders directly from the farmers and got the metal sheets from the agro-dealers as advance. Metal silos were promoted via awareness training events, mass media campaigns, Nane Nane / Farmers' Day exhibitions and during post-harvest management training of. Demonstrations on the use of the metal silo was organised in each target village at a farm household.



Key achievements of the GPLP project

- 3 master trainers trained
- 95 artisans trained
- 3,690 metal silos produced
- 75 active artisans at the end of the project

2. Key Lessons

- 1) **Make a new product known and locally available.** This was one of the key success factors for GPLP in introducing and promoting the availability of the metal silo in the Tanzanian market. Unless many final products which are normally imported, GPLP opted to fabricate the silos locally and use the available human resources. By making the product locally known and available, the project did not only focus on the supply side but also on the demand side as farmers were facilitated to access the product using the seed money capital which was set aside by the GPLP project in kind, i.e. in form of material (metal sheets) supplied to artisans.



Faraji Mwahu, artisan from Bolisa ward Kondoa district preparing the base of a metal silo before fixing the cover

- 2) **Demand activation and awareness raising activities are crucial to introduce metal silo as a new product.** The initial activities which related to product promotion and penetration were deemed necessary to introduce the metal silos at the village and household levels, as these activities played an important role to boost adoption. In partnership with local artisans and agro-dealers, various awareness raising activities and demand-led events were undertaken, which included demonstrations at household level, training, and campaigns on TV, radio and in the print media. There were also exhibition activities such as Nane Nane and World Food Day. In most of these activities, government representatives were involved, including extension officers and local government authorities, to support the introduction and dissemination of the silos.
- 3) **Timely guidance, coaching and mentoring are relevant.** The GPLP project team acknowledged the importance of post-training coaching, guidance and mentoring for knowledge transfer among artisans. Realising the significance of

“Metal silo is the best; it’s durable, takes little space and there is no rodent attack; I am using metal silo!” Yohana Chidiza, a farmer from Matongolo

these efforts, many small-scale artisans succeeded in anchoring their business success. Follow-on visits were linked to awareness and promotion activities and resulted in increased demand and more orders from the smallholder farmers. The project strengthened collaboration between local actors involved in the metal silo business, i.e. the artisans, extension officers, lead farmers, agro-dealers and the government PHM

focal person assigned to an area, which resulted in the promotion and quality control of the metal silos. These interactions strengthened the capacity of the artisans and allowed them promoting their metal silo business with more confidence. Timing for the training cannot be over emphasized. The training and coaching must take place prior to the harvesting season so that artisans can fabricate silos during the season and receive orders from farmers. If the training is done after harvesting, artisans will be idle to produce silos until next season starts.

- 4) **Build financial capacity of metal silo suppliers.** Financial literacy among the target producers and suppliers of metal silos (artisans and agro-dealers) was relatively low. Although the project trained the artisans on silo fabrication and created linkages along the supply chain, the linkages to formal and informal financial systems were weak at the beginning. Majority of artisans could not access the required working capital due to lack of convincing business plans and collaterals. Tailor-made business development services would have enabled artisans to strengthen even more their financial literacy and business skills; knowhow which is needed to successfully navigate through their business challenges.
- 5) **Limited access to raw materials and cost increase of metal sheets contributed to higher costs of metal silos.** With the changing business environment in Tanzania, numbers of businesses importing metal sheets from abroad reduced. The agro-dealers and artisans in Manyara and Shinyanga regions faced difficulty to access metal sheets on time and of good quality. With the inflation and the devaluation of the local currency, the cost of metal sheets significantly increased in the last 5 years. In 2015, a metal sheet costed TZS 25,000 (USD 11.5), while in 2019 the cost increased to TZS 55,000 (USD 25) per sheet, which significantly increased the cost of silos from 135,000TZS (USD 61) to 250,000TZS (USD 114)
- 6) **Metal silos could not compete with hermetic bags.** Thanks to a dense supply network, hermetic bags to store maize are increasingly available in the market. So, farmers can easily buy them in the villages, while metal silos are mostly produced on order. Although there are advantages of storing maize in silos, hermetic bags are cheaper and hence preferred.

7) Quality of metal silos manufactured at local level must be assured. Local production of silos creates employment and income to small artisans and ensures farmers' access to silos. However, decentralized metal silo production was challenging concerning quality assurance. GPLP developed a quality assurance framework, which in the end involved several actors. Quality check of raw materials was left to artisans, suppliers and the Tanzania Bureau of Standards, while checking of finished silos was left with extension officers and farmers.

3. Key recommendations

Focus on local ownership to ensure sustainability of technology transfer. Based on GPLP's experience it is concluded that for copying and transferring a technology from abroad, it must be adapted to the local context.

"I see the future for metal silo; it is a local product, it provides employment to local people, and farmers are now adopting it. It is a new product and it will take time, but eventually it will pick up." Isihaka Juma – artisan from Kondoa

Only adaptation leads to adoption by the local consumers and suppliers and guarantees market growth and sustainability. The project did not set the price of the product but facilitated the artisans to do the calculation of the production cost together with a small profit margin. This worked well for the introduction, promotion and adoption of metal silos in the Central Corridor of Tanzania. However, due to its relatively high price, which went up even further with the cost increase for metal sheets, affordability of the silo remained limited among the very small, resource-constrained grain producing households.

Engage in onsite coaching and mentoring to ensure large scale product acceptance. Artisans acknowledged the value extracted from the follow-on visits to their workplaces by the master trainers. One aim for these coaching and mentoring visits was to ensure the quality for the metal silos. This was realised because during follow-on visits there was more time for exchange and focussed discussions with the artisans; this contrary to the classroom training where the master trainer had a lot more students to supervise. To a large extent, the success of the quality metal silo fabrication is attributed to proper follow-up visits aiming to mentor, coach and guide the artisans.

Adapt to the change of business environment and context. During the project design and early implementation, hermetic bags were scarce and had to be imported. In this context, metal silos were seen as good solution. However, the context changed, and the production of hermetic bags started locally with lower costs. At the same time, the cost for metal sheets which had to be imported doubled. Currently, Tanzania has three companies which produce hermetic bags with a good supply system to all regions and districts along with other imported brands. The GPLP project therefore facilitated the linkage and supply of these hermetic bags through agro-dealers and their agents leaving metal silo appreciated by many and adopted by few because of the relatively high initial investment.



Yohana Chidiza and his wife, farmers in Matongolo ward, Kongwa district, Tanzania showing their quality maize after storing it in a metal silo for one year

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