

Community of Practice (CoP) on food loss reduction

Business models for PHL technologies Forum online discussion - Digest

(November 2017)

The discussion launched in January 2017 aimed at being useful for sharing information on approaches applied for introducing and promoting relevant technologies such as metal silos, plastic silos and hermetic bags, and others; to discuss what works and what does not work in different contexts, the pros and cons of different models, with the aim to better understand the processes (including in countries where projects are only at a phase of piloting these technologies, therefore at a rather demonstration phase vs. large scale projects). A presentation outline was made available to interested CoP members in order to get a comparable analysis. Few additional material and comments have been shared for enriching the discussion. The Online discussion is open and accepts any additional contribution to get a broader overview of what is available worldwide. Below you can access the presentation published and the comments received.

1. GPLP Project in Tanzania

Presentation from the Helvetas Grain Postharvest Loss Prevention project. ([English](#); [French](#); [Spanish](#)) / January 2017.

- An article recently posted by All Africa online news, titled "[Tanzania: Farmers Say Goodbye to Post-Harvest Grain Losses](#)" by Hansjürg Jäger and published on The Citizen, it describes the GPLP Project.
- Their key approach in the GPLP business model is Market System Development or MSD approach where private sector or PHT supply chain actors are in the forefront (by Rakesh Munankami / February 2017).

2. Purdue University - PICS bags

Presentation from Purdue University and refers to the PICS bags. ([English](#); [French](#); [Spanish](#)) / February 2017

- Presentation on advancing postharvest technologies & management from IRRI and refers to some improved technologies, options and business models here. [Super bag business case here](#) and a business case decision-making tool [here](#) meant to help end-users determine whether a sound business case exists for adoption of IRRI Super bags based on their own participatory trials compared with current storage practices (by Rashad Hegazy / February 2017).

3. Vestergaard SA - ZeroFly®

Presentation prepared by Vestergaard. ([English](#) ; [French](#) ; [Spanish](#)) / March 2017

- This ZeroFly business plan does not discuss how plastic bags are currently limited by stationary warehouses? Historically, warehouses are limiting (Armah, 2006) as for example, it is cumbersome to monitor if insects have contacted the insecticidal fibers and fungi are impacting liability. This plan would be convincing if ZeroFly could "scale" at dispersed and dynamic PHL control points to store the surplus needed to for grower benefit and sustain significant Foreign exchange reserves.

Would other CoP members agree, that some stationary hurdles to convincing are:

1. During Field handling to storage environments significant PHL occurs (Lipinski, 2013).

[Bag (non-hermetic, insecticide fibers sewn into bag) field handling to household to storage requires a field/farm/warehouse to exclude rodents, ground water, birds, rain, flooding, wild fire and theft. Bags (non-hermetic) breath to mitigate condensation caused by temperature fluctuations (day vs night). IPM is excellent during field handling to storage. However, manual labor is used to stack and unstack the bags which cause wear and tear to the fibers, increases risk of re-infestation, replacement costs and recycling plastic sewn with insecticide fiber. Bag storage can scale to harvest if field/farm/warehouses are well located. However, field/farm/warehouses locations are fixed relative to where wildfire or large and small harvests or may occur. Growers are less likely to invest inputs or capital if IPM is not a risk management option at dispersed PHL control points.

2. During Storage significant PHL occurs (Lipinski, 2013) and the net value of stored surplus yield to a market-oriented grower is a function of price seasonality, value loss prevention, and their opportunity cost of capital (Jones, 2011).

Bag (non-hermetic, insecticide fibers sewn into bag) need warehouses and effective IPM to be grower cooperative storage. However, even though initial control of insects that contact the insecticidal fiber is possible, it is likely not sustainable / tonne stored because the insecticide fibers lose effectiveness after 150 days or they are covered by dust. Manual dust removal or any type of handling is cumbersome and increases replacement costs. If chewing rodents or boring insects carrying fungi do enter the bags, the effectiveness of management like fumigation will be limited. Without IPM, insect resistant increases and the higher control costs reduce net value. Life cycle assessments must include the grower benefit of strategically stockpiling quality, and the cost of monitoring stacked sacks for pest control, bag replacement, recycling, residual insecticides and increasing insect resistance.

3. "A yield gap may also exist because the high costs of inputs or the low returns from increased production of surplus make it economically suboptimal to raise production to the maximum technically attainable" (Godfray, 2010).

Bag (non-hermetic, insecticide fibers sewn into bag) need warehouses. Warehouse marketing limits returns, because idle or not protocol fees and services, maintenance costs continue. Warehouses are suited to cooperative processing. However, official locations and warehouse stack management and receipts typically limit cooperatives from tactically scaling to harvest or processing and/or strategic market access. For example, "none of the defunct GFDC's warehouses was functioning", "all were idle or have become rusting monuments to inappropriate technology transfer. None of the other institutional storage facilities owned by MoFA, FASCOM, CMB, Action AID or others were being used" (Armah, 2006). These "institutions will likely fail when support is withdrawn and are typically multimillion projects that do not work, as the marketing environment is not sufficiently developed to support them. Even if they did work, they would not help smallholders, whom they are often claimed to do" (World Bank, 2013).

Finally, Hell (1999) reports growers who noticed PHL, took measures to reduce these problems if effective choices were available.

De Groote's (2013) initial findings highlight that either prices or seasonal price differences or PHL need to be sufficiently high for stationary Grain Distribution Logistical Infrastructure (GDLI) to pay off and that technologies such as stationary GDLI, which also pay off when prices/losses are low, require higher upfront investments for credit constrained, tenure insecure growers in SSA.

So it is curious to this CoP member and maybe others, that without explanation

- Kumar (2016) ADMI reviews omit mobile GDLI technology
- FtF Postharvest Fact Finders and Postharvest Lab leads ignore mobility in Ejura, Ghana
- Vestergarrd does not honor offers of ZeroFly kit (Zivanovic and Ayobami, Tue, Dec 20, 2016 at 10:08 AM)

When for example, mobility likely reduces PHL and upfront investment, and ADMI funded presentations and published abstracts like [#ADMI102 Lanier](#) so surplus could sustain SSA Foreign exchange reserves.

Thank for the chance to comment and to receive any insight, William Lanier / May 2017.

4. Grain store technology clustered round institutional solutions i.e. Gsoko by Will Lanier / 25 April 2017

Has anyone else noticed how clustered around institutional solutions the Grain store technologies are? Diversity is best as watching [EAGC's Gsoko animation](#) (with the time references (0:00) for the comments and the Stop/Go button in mind). It provides context for a discussion about how grain institution/companies could support smallholders, especially the disadvantaged tenure-insecure.

(0:23) - Is comparing coffee and flowers (no nutrition) too surplus staple commodities that are high volume, have low value and often aflatoxin, a logical reason for institutions based on sophisticated virtual trading systems? (0:37) is it really trading or institutional "infancy" that "has left many smallholder growers exposed to poor agricultural practices", "leading to big losses and poor quality" and sensitive to "pressure to sell." And how can opportunistic traders who help maintain the "small" in "smallholder farmer", be compared equal to farmers who assume the significant risk of production? (0:58) - Why is improved information gloss over how choices by distant institutions like "warehouse receipt systems do not help smallholder farmers" (World Bank/Ferris, 2013)? When historically, it is the dynamic "location of seasonal variations and Postharvest loss combined with unpredictable government policies" that lead to wild changes in the price?

(1:30) - Long before virtual trading, "structured grain trading in the developed world" and "fast changing markets" were held accountable by farmers who had rights to access technology on-farm, that stored the Net benefits of quality and wild price fluctuations.

(1:45) - If an institution's heart truly "embraces technology and processes that unlock value, increase profitability, foster inclusion and reduce risk" then an institution would stop Postharvest loss like aflatoxin at the harvest field where control is cost-effective for farmers. Cost-effective storage at control points would guarantee quality surplus and let farmers define procedures, protocols and regulations needed to access a fast changing market and bulk National foreign exchange reserves.

(2:36) - Structured grain trading in the developed world includes technology that is super easy to maintain, self-cleaning, on-farm storage that moves to reduce Postharvest loss of many surplus commodities and the impact of unpredictable policies so farmers can benefit from and/or reduce wild price changes.

(2:50) - Institutional hearts that welcome storage technology for physical inspection to guarantee uniform quality "irrespective of where the grain is located"? So African farmers control the First Step 1 to the Net benefit of "economies of scale, creating market signal, and competition for their grain between institutions, banks or sophisticated trading platforms".

(4:00) - If institutions would facilitate as many options as possible to immediate sale, African farmers could use information to choose optimal inputs, and as Hell (1999) reports, "it seems Benin farmers who noticed their maize was damaged by pests or fungi, took measures to reduce these problems" and deliver the low cost and high quality commodities that are now imported via accountable grain trading in the developed world.

Complete references on request. Thank you for comments and insight regarding a catalog of 'Diverse grain store technology'.

Conclusions as of November 2017

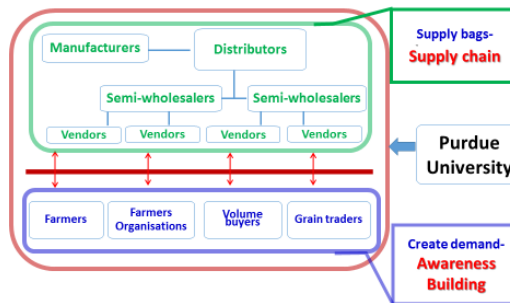
Hereunder is made available a brief comparison of the different business models showcased in the online discussion.

Approach	Context / Actors	Comments
<p>GPLP Approach and Outputs</p> <p>The diagram illustrates the GPLP approach through a circular flow of three functions: Services Function (top), Core Function (middle), and Rules Function (bottom). Five clusters are identified: Cluster 1 (Coordination and Advocacy through multi-stakeholder platforms), Cluster 2 (Awareness raising, communication and farmers training), Cluster 3 (Manufacturing of quality silo and other PHTs), Cluster 4 (Access to financial services to buy / produce PHTs), and Cluster 5 (Action research and M&E). The HELVETAS logo is included.</p>	<p>GPLP Business Model</p> <p>The diagram shows the business model context and actors. Key actors include Extension Officers, Local Agents of Agro dealers, Agro dealers, Producers of PHTs, Sources of Finance, Suppliers of Metal Sheets, Artisans, and Farmers. Key interactions include: MALT trains extension workers; Demand for PHTs; Supply of PHTs; Agreement between AD and local agent; Agreement between AD and artisan; Training and coaching of Artisans; Partners train VICOBAs Facilitators; and Coordination and Evidence based Policy Making. The HELVETAS logo is included.</p>	<ol style="list-style-type: none"> 1. Identification of proper market actors is key to sustainable market system. 2. Metal silo is a new technology which takes time for adoption; increasing demand of PICS bags. 3. Competitive approaches by different organisations promoting PHM – Market based Vs free give away 4. Need for sustainable metal silo quality control mechanism (who provides, who pays in what modality). 5. All three private sector actors: local agent, agro dealers and artisans are in direct contact with the farmers. 6. VICOBAs groups are lending mostly for IGAs











PICS3 Project Activities

- **Market development:** Awareness building through demonstrations and media activities.
- **Supply chain development:** Focus on manufacturing and distribution to facilitate farmers' access to PICS bags.
- **Monitoring and Evaluation:** Embedded into the extension and supply chain activities to ensure that they are yielding expected outcomes.
- **Capacity building:** Cross-cutting over all activities to build local capacity for sustainability.

Sustaining Availability of Crop Storage Technology



1. PICS bag storage technology is well accepted as has proved successful wherever it has been tried.
2. PICS bags are cost effective and easy to adopt for smallholder farmers compared to other hermetic technologies/ more demand for PICS bags.
3. The use of PICS bags provides farmers the flexibility to sell their grains when they choose while supplying healthy, clean and insecticide-free food to their families throughout the year.
4. The bags help provide income to farmers throughout the year - and at better prices than if they had sold their crops immediately after harvest. PICS bags are more profitable when the farmer can store crops longer and be able to reuse the bag for 2 or more seasons
5. Extension workers, partners and distributors are key in awareness creation.
6. VICOBA groups have been active in

		<p>disseminating the technology</p> <ol style="list-style-type: none"> Village demonstrations are very effective in PICS bag technology adoption. "SEEING is BELIEVING" The PICS bag forms an ideal solution to tackle the regional problems of post-harvest losses and allows chemical-free storage. PICS3 utilization of Information and Communication Technology (ICT) tools such as radio, cell phones, and other platforms like Short Message Service (SMS) have been vital to increase awareness and improve availability of PICS bags 										
<p>Vestergaard – ZeroFly</p> <ol style="list-style-type: none"> Understanding the problem – designing a solution/ prototype tool that fits the target audience need/ project scope/ Target product profile; Pilot scale testing - data generation; Optimise solution/ tool for the user and the supply chain – including production activities to reduce aspects such as waste and processing to reduce costs; Demonstrations & pilot scale testing; 	<p>Market Entry points:</p> <ul style="list-style-type: none"> • Bag importers or manufacturers • Input distributors • NGOs • Government agencies • Traders, Dealers, Processors, Exporters, • Shipping lines • Banks  <table border="1" data-bbox="1155 1088 1585 1307"> <caption>Target Segments, retail prices, and distribution measure by product & segment:</caption> <thead> <tr> <th>Product/Segments</th> <th>Distribution method</th> </tr> </thead> <tbody> <tr> <td>  Seed Strategic Grain Reserves USD 0.80 / pcs </td> <td>Direct sales via Agents and/or sales via country distributor</td> </tr> <tr> <td>  Small Holder Farmers USD 1 / pcs </td> <td>Sales via distributor who sells to NGOs who runs subsidy scheme or who sells to farm institutions/outlets directly</td> </tr> <tr> <td>  Medium Holder Farmers USD 60 / pcs </td> <td>Sales via distributor who sells to NGOs who runs subsidy scheme or who sells to farm institutions/outlets directly</td> </tr> <tr> <td>  Processors where one yearly harvest require storage USD 25/pcs </td> <td>Direct sale via Agents or sale via distributor to processors who needs to store in order to produce all year around</td> </tr> </tbody> </table>	Product/Segments	Distribution method	 Seed Strategic Grain Reserves USD 0.80 / pcs	Direct sales via Agents and/or sales via country distributor	 Small Holder Farmers USD 1 / pcs	Sales via distributor who sells to NGOs who runs subsidy scheme or who sells to farm institutions/outlets directly	 Medium Holder Farmers USD 60 / pcs	Sales via distributor who sells to NGOs who runs subsidy scheme or who sells to farm institutions/outlets directly	 Processors where one yearly harvest require storage USD 25/pcs	Direct sale via Agents or sale via distributor to processors who needs to store in order to produce all year around	<ol style="list-style-type: none"> Taxes and Duties in country for imported products increases the prices significantly Subsidy schemes may have differential success in different countries, regions, markets and segments, and there will need to be a close tailoring process with each expansion of the project.
Product/Segments	Distribution method											
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<ol style="list-style-type: none"> 5. Stakeholder advocacy and awareness building – FAO Category 6. Registration and market entry priming activities; 7. Sales related activities - large scale impact vs. <i>pilot scale</i>; 8. Product Launch and Scaling activities – affordability, availability, accessibility and adequacy of food. 		<ol style="list-style-type: none"> 3. Further market knowledge of the segments will be required to prioritize product registration and initial sales efforts, to allow the required focus for success since the Food Security sales force is a relatively small team. 4. The storage bag market has a lack of regulation, for example for OTR there is no regulation on the product for current suppliers receiving donor funding. In the future it will important that there is a standard and it is enforced – even more so for products receiving public funding. 5. Product optimisation as the price on the current bags is too high for some segments compared to ordinary bags 6. Exploration of which “finished good” should be sold to the customers at different stages in the supply chain - providing rolls rather than finished bags or full in-country production to reduce
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		lead times from getting orders to delivery of the product in time for sales before harvest.
<p>IRRI Super bag</p> <p>The IRRI Super Bag makes the principle of hermetic storage available to farmers and processors at low cost. The IRRI Super Bag is a farmer-friendly storage bag that allows cereal grains and other crops (e.g., maize or coffee) to be safely stored for extended periods. The Super Bag fits as a liner inside existing storage bags (e.g., woven polypropylene or jute bags).</p> <p>More at : http://www.knowledgebank.irri.org/step-by-step-production/postharvest/storage/grain-storage-systems/hermetic-storage-systems/irri-super-bag</p>	<p>http://www.knowledgebank.irri.org/images/docs/super-bag-business-case.pdf</p>	<ol style="list-style-type: none"> 1. IRRI hermetic Super bags provide clear and demonstrable benefits for a variety of end-users. 2. For sustainable adoption and scaling out to occur, end-users must recognize a profitable business case for continuing use of any technology. 3. Technical benefits alone may be insufficient to convince end-users to purchase and continue using a technology. 4. This business case decision-making tool is meant to help end-users determine whether a sound business case exists for adoption of IRRI Super bags based on their own participatory trials compared with current storage practices.