

## **Jobs for Youth to Reverse Cereal Grain Postharvest Loss** By *Willian Lanier, NeverIdle Farms and Consulting (Ghana)*

Development testifies about increasing grain yields, but youth continue to migrate away from grain growing towards cities. However, by reversing grain "Postharvest and related input loss" (PHL) youth could multiply the benefits of micro-finance, mechanization, seed, fertilizer, pest management and grow profitably.

Youth will be interested to know that some PHL is of wet, densely nutritious (fruits and vegetables) and some is dry, high calorie grains. Dry, high calorie grains feed most of the human labor and animal power needed to grow and harvest and market food like fruits, vegetables and livestock.

"Encouragingly, though, tackling [dry grain] post-harvest loss is not rocket science. It does not require technological breakthroughs or years of high level scientific research as do some of the other challenges we face" (Cousins, 2014).

Entrepreneurial youth who reverse grain PHL during harvesting and drying have: a rural job producing food for growers; then business plans that defragment aggregation, storage, processing and marketing services; regional expertise to "share the risk among other actors and allow borrowers to benefit from higher lending on better terms" (Albert, 2016); and finally the acumen needed to develop policies that manage ecosystem services which bear the cost of production, optimally.

Around the world, testing moisture content provides a robust way to assess PHL and the suitability of grains for safe storage. An Australian farmer recently commented: "Moisture levels are what determine when we harvest! They have a major bearing on the sell price of the grain. Accurate calibrated moisture measurements are made on a regular, almost hourly routine with the results governing the harvest and storage decisions for that moment" (Parker, 2015).

Moisture content is related to insect infestations and aflatoxin producing fungi.

Entrepreneurs who are familiar with mobile phones will be interested to learn about hand held moisture meters. Moisture meters have apps that determine the moisture content for many cereal, oilseed and pulse crops and resemble a "cup with screw lid" (Image 1) or probe "PHL meter" (McNeill, 2015). Meters can help growers determine when to harvest, forecast pests, store and market optimally.

It is important to test moisture content with an accurate meter. Accurate meters have a certificate. A Ghana Standards Authority certificate states that the meter consistently met or exceeded standards for recognizing moisture content and then indicates what calibration settings match Scientific Oven tests. Although pioneering development (FAO, 2015) groups list them, Bite and Salt moisture tests are not certifiable. Neither of these tests requires expensive equipment but neither is certified because they are very subjective and error prone.

Table 1. Comparing the Practicality of Moisture Meters in Sub-Saharan Africa

	Primitive	Protocol prone	Certified accurate	App Quick	Sack	Bulk
Bare hand	Yes	Very	No	Yes	No	No
Bite	Yes	Very	No	Yes	No	No
Salt	Yes	Yes	No	Tedious	No	No
PHL meter	No	No	Yes	Medium	Yes	No
Screw top	No	No	Yes	Yes	No	No
Open top	No	Yes	Not in Ghana	Yes	No	No
2 Prong	No	Yes	Not in Ghana	Yes	Yes	No

Moisture testing reverses PHL best when it is done early in the postharvest handling process – during harvesting, drying and aggregation when representative sampling is easy. Retesting moisture after grain is in sacks, stacked in storage, or stored in bulk, means additional costs to unload, sample, test and then reload.

In the outside environment, moving air of low relative humidity, coupled with for example, the heating effects of sunshine will dry grain. This approach is very economical when used for standing crops in the field. When moisture testing governs the harvest of cereals dried standing, they can go directly into storage. However, most Sub-Saharan African (SSA) grains are harvested regardless of moisture content onto a drying platform. Even though drying cereals on a platform outside means additional handling, sun drying is still economical when compared to burning fuel for heat.

To store grains, airtight storage needs a roof and raised platform to mitigate loss associated with the condensation that is caused by day and night temperatures, fungi, insects and rats. Breathable storage addresses those problems practically so grains are safe food or animal feed and surplus attracts optimal prices.

How serious is the reversing PHL business opportunity?

- Dr Cardwell (2014) presents "Farmers whose scale of operation is too small to be able to produce SAFE FOOD, are too small to farm maize (or any aflatoxin sensitive staples)."
- Reversing PHL is good for SSA Governments who want to multiply the benefits of subsidized inputs because otherwise, separating increased yields from "stunting in children" (Cardwell, 2015) is difficult.
- Lenders want to reduce the risk of PHL so SSA borrowers benefit from better terms and "empirical studies show that commodity [safe food] trading presents enormous benefits to economies" (Narh - Bank of Ghana, 2015).

- NGO's are interested in "reliable PHL figures essential for better targeting of loss reduction programmes, monitoring the success of these programmes and estimating food availability in countries threatened by food insecurity" (APHLIS, 2015).
- Just like hand washing will prevent ebola, moisture testing will reverse PHL and efficiently "increase food availability without further use of land, water and other agricultural inputs" (APHLIS, 2015).

Tremendous benefits wait for youth who decide to: dry grain accurately; store grain for a sell date by trading moisture for time (See image 2 Safe storage chart); and advertise their expertise using sms based "ear to the market, applications and field services" (Esoko, 2015).

One approach to reverse PHL started in August 2013 when "Diana's Moisture testing and Solarization" (MT&S Image 3) began providing the Ashanti region of Ghana with calibrated moisture meter testing. Testing grains being harvested, drying on platforms, moving into and out of storage so growers control their business plan is Diana's job. Moisture testing extends beyond safe food. Diana will visit seed outlets, because purchasing seed with vital levels of moisture reduces poor germination later. Diana's MT&S began gathering grower contacts at local market and National Farmer day celebrations.

Youth that reverse PHL can hold chiefs, traders, NGO cultural advisers, Industry and ultimately SSA governments accountable so: "natural resources benefit the people in the countries that possess them in an inclusive manner, and create value addition in sustainably managing natural resources including ensuring protection of ecosystems and minimizing environmental degradation" (Africa's Adaptation Gap, 2015).

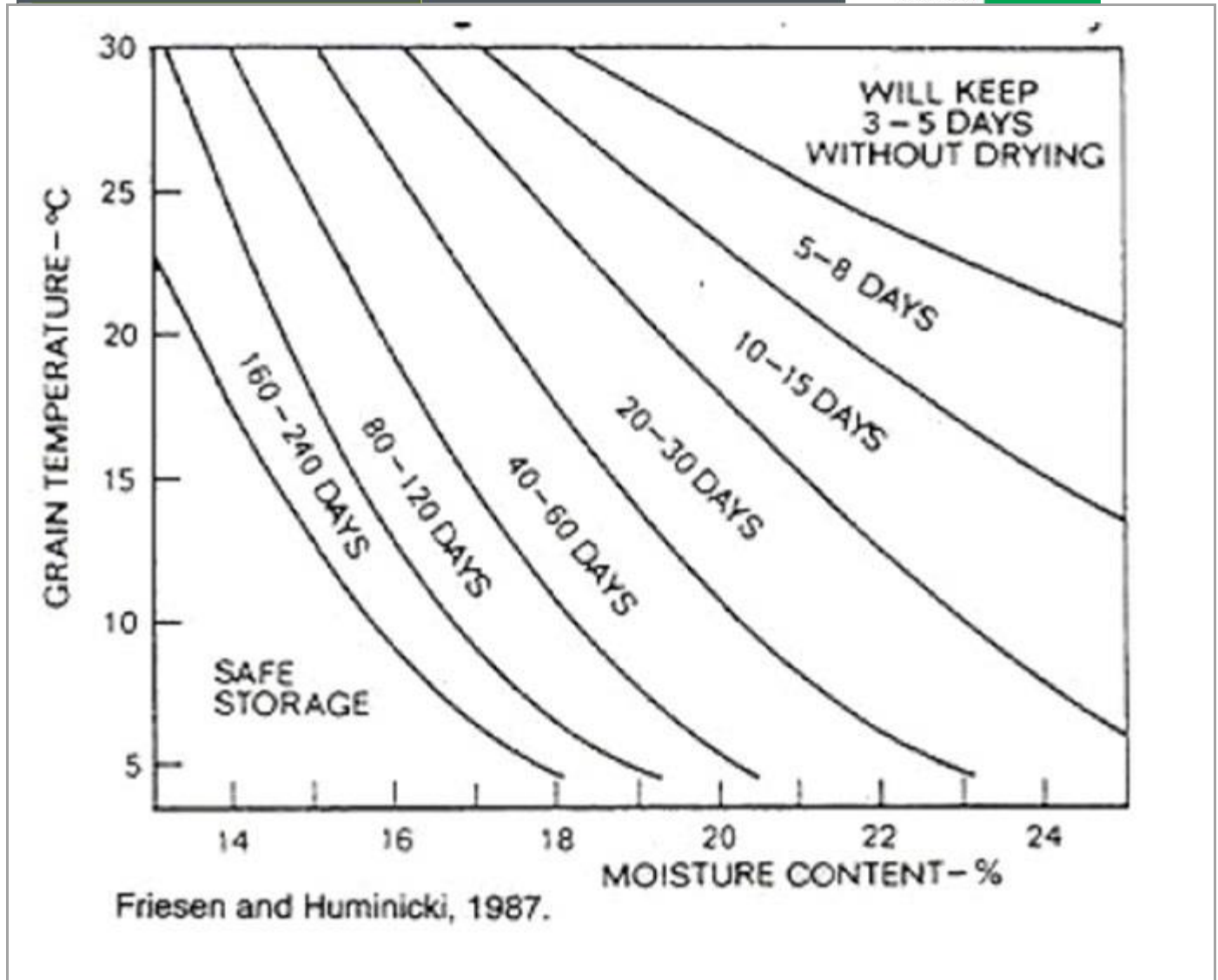
Image 1. Hand held moisture testers



**Test Maize/Rice/Beans moisture for safe storage.**

Source: Lanier, 2014

Image 2. Safe storage chart



Source: Friesen and Huminicki, 1987. Retrieved: AlbertaAgricultureForestry.com

Image 3. Diana MT&S at NFDC 2014, Aframsso Ghana.





Source: Lanier, 2014

References:

Africa's Adaptation Gap, 2015. "Africa's Adaptation Gap 2: Bridging the gap – mobilizing sources" Michiel Schaeffer, Climate Analytics, Germany, et al, 2015. Retrieved: <[www.unep.org/roa/](http://www.unep.org/roa/)>

Alpert, E., 2016. How to inspire a generation of farming entrepreneurs [Guardian Farming and Food Security Hub report]. Retrieved: <<http://www.theguardian.com/global-development-professionals-network/2014/jul/18/agriculture-africa-youth-unemployment-montpellier-report>>

APHLIS, 2015. African Postharvest Losses Information System [map]. Retrieved: <<http://www.aphlis.net/>>

Cardwell, K. (2015). Aflatoxin Identifying the Way Forward Kitty [The TOPS Program's Conversations about Aflatoxin]. Retrieved: [www.fsnnetwork.org/sites/default/files/Kitty%20Cardwell%20Presentation.pdf](http://www.fsnnetwork.org/sites/default/files/Kitty%20Cardwell%20Presentation.pdf)

FAO, 2015. Technical manual: for the construction and use of family-sized metal silos to store cereals and grain legumes [Manual]. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. Rome, 2015 Retrieved: <http://www.fao.org/3/a-i3632e.pdf>

Lanier (2015). Delivering Moisture Testing to Growers [ADM Institute Post] retrieved at: <http://publish.illinois.edu/phlinstitute/2015/11/25/delivering-moisture-to-growers/>

McNeill, Armstrong, Osekre (2015). Assessment of Moisture Measurement and Maize Dryers in Ghana [ADM Congress Presentation]. Retrieved <http://phlcongress.illinois.edu>





**AAK Net**  
Knowledge for Adaptation

GUEST ARTICLE

**Adaptation** **AFRICA**  
Newsletter

Narh Deputy Governor of Bank of Ghana, 2015. Millison Narh Deputy Governor of Bank of Ghana. Dailey Graphic Saturday July 18. 2015. BoG introduces warehouse system of financing Reported by Jessica Acheampong

Parker, Daniel. December 2015. Flat Pack Silos Australia. Personal email to author.