Until the 1970’s, Tanzania had no policy on storage for agricultural products. However, following the appearance of the Large Grain Borer (LGB) in the 1980’s, resulting in high PHL of cereals, which endangered food security in the country, the government began to support farmers to reduce PHL.

There is general consensus that policy reforms in the agricultural sector, especially in relation to the reduction of post-harvest losses (PHL) of main cereal crops, is a matter of priority. Results from different research studies demonstrate that farmers lose up to 40% of the harvest through PHL (depending on the crop and geographical area). This has a negative impact on their income, livelihood and production incentives. However, there is NO comprehensive data on PHL in grain for Tanzania. The most recent data goes back to the 1950-1960’s. For cereal grains, the value of PHL in Sub-Saharan Africa is estimated at around 4 billion US$ annually or almost 15% of the total production value. A recent study conducted by the Department of Agricultural Economics and Agribusiness, Sokoine University of Agriculture, resulted in the following data (table 1):

### Table 1: Tanzania average PHL from 2003 to 2007 for three major cereal crops (in tonnes).

<table>
<thead>
<tr>
<th>Production</th>
<th>Total Productions (tonnes)</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td></td>
<td>3,343,758</td>
<td>3,218,541</td>
<td>3,472,885</td>
<td>3,302,057</td>
<td>3,593,659</td>
</tr>
<tr>
<td>PHL 15.5%</td>
<td></td>
<td>518,282</td>
<td>498,874</td>
<td>538,297</td>
<td>511,819</td>
<td>557,017</td>
</tr>
<tr>
<td>Paddy</td>
<td></td>
<td>704287</td>
<td>759,386</td>
<td>805065</td>
<td>909990</td>
<td>896,696</td>
</tr>
<tr>
<td>PHL 10.7%</td>
<td></td>
<td>75,359</td>
<td>81,254</td>
<td>86,142</td>
<td>97,369</td>
<td>95,946</td>
</tr>
<tr>
<td>Sorghum</td>
<td></td>
<td>820,100</td>
<td>714,339</td>
<td>711,631</td>
<td>971,198</td>
<td>861,386</td>
</tr>
<tr>
<td>PHL 12.5%</td>
<td></td>
<td>102,513</td>
<td>89,292</td>
<td>88,954</td>
<td>121,400</td>
<td>107,673</td>
</tr>
</tbody>
</table>

1. Consultancy study Daima,
2. Source: PMC, SUA, interview, July 2012
4. “Experience of Tanzania in enabling small holder farmers to access post-harvest technologies”, SUA (Department of Agricultural Economics and Agribusiness), October 2012.
Achieving food security is a high priority for the Government of Tanzania. In this regard, the government has formulated and currently implementing relevant strategies and programmes under the Agricultural Sector Development Strategy (ASDS). The ASDS provides a policy and strategic forum for investment by both private and public sector. If such investment is made at different levels of the value chain, namely at storage, processing, appropriate packaging, transportation and marketing, it will result in significant reductions of PHL currently happening along the food chain. Yet, there are no records of a specific post-harvest policy existing.

The Government’s efforts to tackle the issues of PHL are mainly focussing on the construction of storage facilities. Since the 1970’s several initiatives have been set up, assisted by FAO/UNDP and other development partners. Alternatively, Sasakawa Global 2000 uses an integrated approach by addressing all post-harvest stages including training farmers and grain stockists on efficient PH handling, and constructing improved storage structures. Currently, Tanzania has a total of 1,260 warehouses, merely a needle in a hay stack compared to the actual demand from the approximately 11,000 villages. On top of that, many of these warehouses are not accessible for farmers to use due to their poor condition (pulled down, dilapidated beyond repair), or mis-use (leased or sold to private businessmen for other purposes).

In general, farmers have a relative good understanding of the problems causing PHL, see Table 1. It would hence be inappropriate to reduce PHL as an issue of storage. PHL are occurring from the field to the fork and even pre-harvest decisions and practices are affecting the degree of PHL at a later stage. More emphasis should be given to this holistic approach of dealing with PHL.

Moreover, it was indicated that a large amount of PHL associated with storing cereal crops were caused by improper drying processes and infestations by insects and rats. For that matter, there must be deliberate efforts along the entire value chain to ensure that cereal crops are harvested, processed and stored properly to minimize these losses.

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Findings

What are the figures on PHL telling us?
Data shows that despite the increase of cereal crops production at national level estimated at 3,897,500 tons on average per year technologies used for harvesting and processing are poor and this has led the PHL to be 1,559,000 tons on average per year. This means that a total of 40% of the annual national production of cereals is lost due to PHL.

Table 1: overview of causes of PHL

<table>
<thead>
<tr>
<th>Reasons causing PHL</th>
<th>Perception by farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damage caused by insects and rats</td>
<td>Recognised by 35 %</td>
</tr>
<tr>
<td>Losses during transport from field to storage</td>
<td>Recognised by 16 %</td>
</tr>
<tr>
<td>Improper weighing and packaging as reason for PHL</td>
<td>Recognised by 12 %</td>
</tr>
<tr>
<td>Improper drying</td>
<td>Recognised by 9 %</td>
</tr>
<tr>
<td>Unpredictable markets (delay in selling the produce)</td>
<td>Recognised by less then 5 %</td>
</tr>
<tr>
<td>Loss during processing</td>
<td>Recognised by less then 5 %</td>
</tr>
<tr>
<td>Grain breaking into pieces (especially for rice)</td>
<td>Recognised by less then 5 %</td>
</tr>
</tbody>
</table>
Reasons for low usage of existing warehouses
Many farmers experience storage charges to be too high, greatly contributing to lowering the farmers’ income, especially when the farmer doesn’t have any guarantee about the reduction of PHL during storage\(^5\). Apart from that, most identified factors augmenting for low usage of warehouses can be categorised under either (1) lack of information to farmers, (2) lack of proper management of the existing facilities or (3) other practical/logistical factors. Several of the PHL risks involved in storage of cereals are caused by pests (insects and rats)(46%); theft (20%); damage to cereals caused by high moisture content (18%); poor quality of bags/sacks (13.9%); lack of risk insurance (13.9%); scarcity of pesticides for preservation of grains (13.9%).

Given the poor state of roads, the scarcity and high costs of transport facilities, and an average distance from farm to warehouse of 15 km, the time that farmers have to travel in order to store their produce is an awesome hurdle in the use of available warehouses. All these factors contribute to the reluctance by farmers to use warehouses (large scale) and continue the ancient practice of storing the grains at home, with limited appropriate storage facilities.

Disincentives impeding growing investment in PH Infrastructure
Although no clear reasons for the lack of investment initiatives in PH infrastructure were identified, a number of disincentives to invest in warehousing were shown. These are related to two groups of stakeholders, primarily farmers who have some excess production and want to store, whether or not in collaboration with the neighbours (farmer groups), secondly investors (can be traders, owners, businessmen, institutions, other middle persons) who are looking for an opportunity to invest their money and gain revenue. Both are facing challenges, being disincentives towards investing in the construction of warehouses and the establishment of other PH technologies.

1. Farmers are facing insufficient awareness concerning advantages of the use of warehouses and storage facilities; absence of good transportation infrastructure to the farm areas; low amounts of grains to store and financial constraints to investments, including lack of appropriate loans, insurance schemes, Government led finance, etc.

2. Investors from their side are facing high (initial) construction cost; lack of adequate appropriate land for warehouse construction; low return on investment; inadequate skilled people for construction of modern warehouses.

The 5-year development plan and PHL
NDP 2011/12 - 2015/16 targets the following areas which are relevant to the reduction of PHL:

- Integrated planning and implementation to promote synergies among economic sectors,
- Increased public-private partnership in investing in economic and social service delivery,
- Building the capacities of institutions including local governments to deliver services,
- Increased agricultural sector growth from current 4.2% to 6.2%,
- Improved access to market information for agricultural crops,
- Promote agro-processing and value addition,
- Ease availability of modern agricultural implements and promotion of mechanization,
- Strengthening agricultural training and extension,
- Link farmers to research information and promote its practical use.

There is a need for continuous monitoring that actions are set in place to actively reach these NDP-targets set forth. The goals are achievable but need to be prioritised in the agenda of the government as well as give enough attention to the focus on reducing PHL for farmers and end-consumers. This will stabilise the grain markets through an assured input of cereal produce.
Incentives to promote Private Sector Investment in warehousing

The three most important factors, out of six incentives evaluated in terms of influencing private sector to participate better in warehousing investment, are:

1. Availability/accessibility to reliable markets
2. Transportation infrastructure needs to be in place and of acceptable quality
3. Warehousing credits/subsidy schemes should be available to spread the risk of high investment costs at initial stage of construction

A favourable business environment, as well as policy and preferential tariffs were also pointed out to be important. Thus, the government should look at ways to improve the environment for private investment by incorporating incentives into its agricultural development strategic plan.

Value addition processes that help reduce PHL

One of the most important ways to create value addition to cereals is by encouraging proper and correct handling during PH stages, as well as primary and secondary agro-processing. In the area of agro-processing, small-scale industries are observed to be a potential way for farmers to start processing local products for the local market, alternatively to export raw materials (unprocessed agro-products) at cheap prices, when not meeting the national demand.

Through processing of food products, and particularly value addition practices, farmers will benefit from the following positive impact:

- Substantial reduction of PHL-levels;
- Increased farmer awareness and use of grading and standards system;
- Agro-processors’ and producers’ access and utilization of new and proven processing technologies for value addition and technologies for reducing PHL.

Government can facilitate in establishing an enabling environment for these small-scale industries to become profitable. The following requirements for setting up value addition processing units at village level were identified:

- Increased availability of appropriate and affordable equipment for reducing PHL;
- Increased entrepreneurial and management skills of farmer groups and processors;
- Increased awareness and utilization of quality control, certification and standardization procedures.

Proposed strategies to reduce the problem of PHL

Possible solutions to reduce PHL as proposed by small holder farmers and other key stakeholders are grouped under 5 main categories.

1. Issues related to storage (warehouse construction and management as well as local storage at household level and grain bags) and processing (availability of modern tools, lowering costs of equipment, quality control).
2. Knowledge and information to farmers on harvesting practices and post-harvest management including use of insecticides, losses not related to storage.
3. Markets and market linkage including price setting mechanisms, government regulations and interventions.
4. Logistical issues including improved road infrastructure and transportation means, issues concerning weights, measures and standards.
5. Capacity building of farmer groups and cooperative unions on PHL, financial schemes as well as rights and responsibilities when entering into business agreements (either for sale or storage).
SOKO KUU
MANISPAA YA IRINGA

DAIMA SAIDIA KUIWEKA MANISPAA YAKO SAFI
KAMINI KUMBUKA UKWAI UNAUI KIONA KASI
Policy strategies
1. Incentives for increased private sector participation in investment in storage infrastructure, examples are tax breaks for warehouse construction material, guarantee for lease finance to small holder farmers.

2. Facilitating an enabling environment for Public-Private Partnerships (PPP), with emphasis on the social accountability of private partners in a project that should benefit the recipient community.

3. Increased government investment in the agricultural sector to create public goods such as rural access roads, modern warehouses, and others.

4. Extension services to increase farmers awareness about available technologies for reducing PHL and capacity building on financial schemes (village savings and loans, SACCOS, etc.), and entrepreneurial skills.

Recommendations

Government enforcing the role of the private sector
The private sector can play a key-role in different areas of agricultural production related to reducing PHL, among others handling, grading, packaging, transportation, storage, processing and marketing. The government has a major role to play in creating the enabling environment for the private sector to do so. That enabling environment requires good infrastructure and enforcement of regulations for effective PPP.

The following measures are recommended to address the losses caused by post-harvest damages:

- Develop a comprehensive PHL policy strategy to address PHL as an independent topic giving it the attention it deserves. This will give the opportunity to discuss PHM in all its aspects (including economic, social and cultural) rather than one aspect of food security, or insecurity.

- Facilitate Public-Private Partnerships through establishing an enabling environment for private sector to engage in the PH sector, in particularly by enforcing the regulations in this regard and hence holding all partners socially accountable for their commitments and take responsibility to achieve the common goals set-forth benefiting the rural community as well as the private sector who engaged with the community.

- Provide incentive packages for private sector investments by exempting taxes on building materials for warehouses and agro-processing industries as well as the respective technologies, allocating free lands for building warehouses and setting up agro-processing industries.

- Increase the budget for the agricultural sector as per CAADP-commitments to 10% and adequate allocation of that budget to activities supporting the expansion of training and extension services that cover contract farming, out-grower schemes, enhancing agro-processing, preservation, value addition and marketing, and contributing to increase farmer awareness on modern production methods, harvesting techniques and post-harvest handling, including grading and packaging;

- Create a conducive business environment for private sector participation in value addition of agricultural products, focussing on rules and regulations, improvement and construction of rural roads and allied infrastructures and increased support for warehouse construction.

- Pursue prudent fiscal and monetary policies by scaling up the current voucher system as well as looking at the possibility to introduce practices of grain banks and/or expand Warehouse Receipt System (WRS), once current challenges have been addressed;

- Establish an institution for appropriate cereal post-harvest product management (as there is the WHRC for horticultural products), addressing issues as research in low-cost post-harvest technologies, promotion of crop varieties with less susceptibility to PHL, storage and handling, and enforcement of standards, grading and packaging at farm level and collection centres and dissemination of findings to benefit farmers using appropriate communication channels; and

- Introduce village or community storage facilities to show-case good-examples, particularly regarding PHL-reducing technologies, health-related issues like fumigation (regulation and inspection) and to realize economies of scale;

- Set-up a system of licensed vehicles for transportation of food products.

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6 “Experience of Tanzania in enabling small holder farmers to access post harvest technologies”, SUA (Department of Agricultural Economics and Agricultural Business), October 2012.

7 According to CAADP, Africa governments committed to invest 10% of their GDP to agriculture. Tanzania, as many other African countries, is falling short on this, and the Tanzanian government should strive to achieve the goals.