

Food Loss in Developing Countries: Data Gaps and Data Collection Methods

Introduction

Global population is expected to rise to at least 9 billion by the year 2050 (Godfray 2010). Food insecurity, already an issue in many developing countries, will be an ever-growing problem as populations increase. Climate change is expected to have negative impacts on agricultural production and to disproportionately affect developing countries, thus magnifying their food security problem (Brown 2008). One way to confront the growing food insecurity in developing countries is to reduce post-harvest losses, food losses that occur in the food supply chain (FSC) between the farmer and the consumer. Processes in the FSC can account for crop losses of up to 40% in developing countries (Parfitt 2010). Reducing these post-harvest losses has the potential to significantly increase food security in developing regions. Unfortunately, the amount of data available about post-harvest losses is not sufficient, due to lack of data collection and standardized methods for this data collection, for complete loss analysis of each step in the FSC. Accurate and complete data is essential to assessing a problem and beginning to develop solutions. Developing standard methods for data collection and gathering post-harvest loss data needs to be the first step in reducing these losses and thus in addressing food insecurity.

Post-Harvest Loss Data Gaps

The data concerning post-harvest losses that is available neglects important food categories and does not adequately describe losses at each step in the FSC. Of the more than 200 loss estimates analyzed in a review of Sub-Saharan African food loss data, 80.4% were related to food storage and 43% concerned maize (Affognon 2015). Storage is the most frequently analyzed step in the FSC because it is the simplest to quantify. Similarly, post-harvest losses of cereal grains including maize are studied more than losses in other food

categories because grains are the logistically simplest food category to analyze. The availability of grain storage data and ease of grain storage loss assessment has prompted the introduction of potential solutions in this area. Metal silos, for example, have been proven to significantly reduce losses in Kenya, among other countries (Gitonga 2013). While storage is an important aspect of the FSC and grains are a major calorie source for people around the globe, it is important not to neglect other causes of loss in the FSC and losses in other crop categories. Fresh fruits and vegetables along with roots and tubers are significant sources of nutrition and income and thus their losses need to be quantified. The available data concerning post-harvest losses is not only sparse, but also contains a large amount of uncertainty.

Uncertainties in existing post-harvest loss data sets are significant. Losses of cereal grains and fruits in Sub-Saharan Africa from one review paper are estimated at $25.6\% \pm 27.4\%$ and $55.9\% \pm 25.4\%$, respectively (Affognon 2015). These large standard deviations are in part due to the number of estimates that the researchers analyzed, the many different methods used to collect post-harvest loss data, and different environmental conditions around the continent influencing food losses (Affognon 2015). The 2011 United Nations Food and Agriculture Organization report “Global Food Losses and Food Waste” is the most current, comprehensive record of food losses, detailing losses in each region of the world separated by crop type and cause of loss. Many of the statistics in the report have been estimated due to lack of sufficient data (Gustavsson 2011). The absence of reliable, comprehensive data from this field of research is a detriment to those attempting to develop solutions to specific causes of food loss. It is clear that data availability is the limiting factor in reducing post-harvest losses when even the most comprehensive reports call for further data collection. In addition to the dearth of

reliable data about post-harvest losses at each step in the food supply chain, there is a lack of standard methods for collecting food loss data.

Post-Harvest Loss Data Collection Methods

Standard methods for collecting post-harvest food loss data are absent from this field of research. The only standard procedure for assessing food losses was developed in 1978 by Harris and Lindblad; this procedure is for determining losses of cereal grains during storage (Bourne 2014). The absence of common methods to assess losses makes it difficult to confidently compare studies across research teams and across countries. Existence of a standard method to assess grain storage losses has led to the development of a multitude of solutions to address these losses. There are few solutions for limiting losses during other steps in the FSC and for other food categories because there are no data collection standards. It is important to develop these standardized methods for analyzing losses because reliable data is necessary for the development of successful solutions.

Conclusion

With a rising global population and climate change expected to increase food insecurity in developing countries in the coming decades, it is essential that more research be conducted in the field of post-harvest crop losses; reducing these losses could have a large positive impact on food security. The first step in this research process is performing a detailed analysis of the FSC in many developing countries from different regions of the world. These processes can then be compared with one another in order to determine similarities that will allow for the development of standardized food loss data collection methods. Next, methods must be developed to address losses at each step in the FSC and over a broad range of food categories. These standardized methods can

then be used to collect data from around the world and the data can be compared to determine the FSC steps and food categories with the greatest potential for improvement. This research is necessary to be able to develop the most efficient solutions to post-harvest food losses and ultimately increase food security in developing countries.

References

- Affognon, H. et al, "Unpacking Postharvest Losses in Sub-Saharan Africa: A Meta-Analysis," *World Development*, Vol. 66, pp. 49-68, 2015.
- Bourne, M. C., "Food Security: Postharvest Losses," *Encyclopedia of Agriculture and Food Systems*, Vol. 3, pp. 338-351, 2014.
- Brown, M. E. and C. C. Funk, "Food Security Under Climate Change," *Science*, Vol. 319, pp. 580-581, Feb. 2008.
- Gitonga, Z. M. et al, "Impact of Metal Silos on Households' Maize Storage, Storage Losses and Food Security: An application of a propensity score matching," *Food Policy*, Vol. 43, Aug. 2013.
- Godfray, H. C. J. et al, "Food Security: The Challenge of Feeding 9 Billion People," *Science*, Vol. 327, pp. 812-818, Feb. 2010.
- Gustavsson, J. et al, "Global Food Losses and Food Waste. Extent, Losses, and Prevention," *Food and Agriculture Organization of the United Nations*, 2011.
- Parfitt, J. et al, "Food Waste within Food Supply Chains: Quantification and Potential for Change to 2050," *Philosophical Transactions of the Royal Society B*, Vol. 365, pp. 3065-3081, 2010.