

Understanding Post-harvest Losses and its Effect on Food Security & Climate

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Oluremi Olayinka Ajayi is a student in the Supply Chain Management - Global Logistics program. In this blog entry, she discusses the issue of post-harvest loss and its implications for food security and proposes actions to combat it.

The United Nations released the 17 Sustainable Development Goals (SDGs) in September 2015, as a call to action to all the United Nations member countries to create the world we want – by addressing the urgent global social, economic and environmental challenges and implementing sustainable solutions to tackle these problems. SDG 2 - Zero Hunger is specifically focused on eliminating world hunger by 2030. According to the United Nations, 9.2% of the world's population, or 735 million people, suffered from chronic hunger in 2022 (UN SDG Report, 2023)

Food Security – SDG 2 Target

Food security is defined as the condition in which every individual consistently possesses the physical and economic means to secure enough supply of safe and nourishing food that aligns with their dietary requirements and personal food choices, enabling them to lead an active and healthy life. Food security is a key mission, one that is aggravated by factors such as climate change conditions, pandemics, conflict, civil insecurity and so on. To add to this, wastage can be as high as 40–50% in some African, Caribbean, and Pacific ACP countries, where tropical weather and underdeveloped infrastructure add to the issue (SPORE, 2011).



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In line with SDG 2 targets, it has become fundamental to prevent post-harvest losses so as to ensure a global food supply and reduce hunger. However, the challenge is in answering the question of how this is to be achieved in the face of the staggering climate change shocks and depleting food production. The United Nations has further estimated that 2 billion more people will need to be fed by 2050 compared to our current population, the majority of whom will live in developing countries. To achieve this, food production will need to be boosted by 60%. (U.N, 2015)

Preventing post-harvest losses has become essential to achieving SDG 2's goals of reducing hunger and ensuring food security. How do we attain food security for the growing world population while ensuring long-term sustainable development? Evidently, decreasing these losses is one of the key methods to improve food security.

Problem of Post-Harvest Loss (PHL)

The problem of post-harvest loss is one of the biggest challenges affecting economic growth globally as it largely affects global food security and long-term sustainable growth (Brickstone, 2022). About one-third of food produced for human consumption is lost or wasted, according to the Food and Agriculture Organization of the United Nations (FAO).

This amounts to a yearly cost of US\$ 2.6 trillion, which includes social expenses of US\$ 900 billion and environmental costs of US\$ 700 billion. Post-harvest grain losses in sub-Saharan Africa are estimated to be about \$4 billion annually, which is more than the total amount of food aid the area has received in the preceding ten years. Huge quantities of food are lost due to spoilage, infestation, and decomposition, which reduces the amount of food available for consumption and wastes the resources initially put into food production. Let's dive deeper into how post-harvest losses occur. (FAO, 2019)



Image 2 by Julia Lavrinenko from <https://www.istockphoto.com/>

How does PHL occur?

Post-harvest losses may occur from a number of reasons, such as improper harvesting and harvesting methods, lack of access to effective storage facilities, lack of efficient transportation systems, lack of proper packaging and labelling technologies, lack of information and education, biodeterioration by microorganisms and so on, which are referred to as 'internal factors'. 'External factors' are environmental in nature such as humidity, temperature, and time. These losses can happen at any point in the agricultural value chain and even outside the value chain. (APHLIS, ND).

Post-Harvest Loss and the Climate

Aside from the pressure PHL puts on food security, the anticipated effects of climate change extend to value chains and agricultural production in substantial ways. These effects manifest both directly, through alterations in agro-ecological conditions such as drought, unpredictable precipitation patterns, and extreme weather events, as well as indirectly, by giving rise to novel diseases and pests, all of which collectively influence agricultural output. As the Earth's average surface temperature and atmospheric carbon dioxide levels continue to increase, we can expect further consequences, including the loss of productive land and a reduction in crop yields. (Brickstone, 2022)

Aflatoxins, known carcinogens, pose a threat to various crops in regions characterized by high temperatures and humidity, primarily in tropical and subtropical countries. These toxins, produced by molds, can contaminate crops either during their growth in the field or post-harvest when inadequate storage conditions prevail. Presently, approximately 4.5 billion people worldwide are at risk of aflatoxin exposure. Alarming statistics reveal that nearly 30% of global liver cancer cases can be directly attributed to the consumption of aflatoxin-contaminated foods. When combined with poor dietary practices, aflatoxins also contribute to growth impairment and compromise the immune systems of children. The Food and Agriculture Organization (FAO) estimates that mycotoxins, particularly aflatoxins, impact around 25% of the world's food crops, leading to significant economic losses running into billions of dollars. (FAO, 2013)

Water resources are gradually depleting and becoming insufficiently available to cater to human needs and the escalating demands of a growing economy. This issue extends to the irrigation sector and domestic usage, contributing to the depletion of groundwater tables in many countries. For instance, the production of a single cup of coffee consumes approximately 208 liters of water when considering all the elements involved in the

production process. Similarly, numerous other crops, such as rice and avocados, exhibit substantial water footprints. Inefficient irrigation practices and limited knowledge among farmers have exacerbated water wastage concerns. Additionally, the water footprint of each crop increases along the supply chain, and any damage or loss of harvested crops results in wasted water. This poses a significant problem in developed countries, where plate wastage is prevalent, leading to a high-water footprint associated with crops (Godha, 2020)



Image 3 by Joe_Potato from <https://www.istockphoto.com/>

Reducing PHL & Increasing Sustainability

Efforts to mitigate postharvest losses can be significantly enhanced by targeted investments in technology advancement and skill development. In sub-Saharan Africa, the World Bank has projected that a mere one percent reduction in postharvest losses could yield annual economic benefits of approximately \$40 million (Christiaensen Et al, 2018). Importantly, the majority of these gains would directly benefit smallholder farmers. Strategies aimed at curtailing food loss also contribute to bolstering climate resilience. For instance, enhancements in storage and refrigeration facilities can reduce the susceptibility of harvested produce to factors such as heat and pest damage. Additionally, these improvements play a vital role in preserving the nutritional value of highly perishable items such as fruits and vegetables. Moreover, refining processing techniques not only helps in reducing postharvest loss but also empowers farmers to enhance the quality of their produce, explore new market opportunities, and augment their incomes, improving their economic wellbeing. In order to increase environmental sustainability, measures need to be taken by the government to enact policies that will improve farming methodologies that will potentially reduce the stress on cultivated land, preserve natural biodiversity and reduce greenhouse gas emissions. A general effort at promoting awareness and proper knowledge drive amongst farmers on the short-, medium- and long-term implications of their actions on food security, food loss and the environment is also important to drive home these points.

Effectively reducing postharvest losses would have a great impact on food security and environmental sustainability. To achieve the objective of completely eliminating hunger by 2030, it is of utmost importance that we promptly undertake well-coordinated actions and

put into effect efficient policy initiatives. These endeavours should be directed towards addressing long-standing inequalities, transforming our food systems, allocating resources to support sustainable agricultural practices, and mitigating the negative impacts of conflicts and pandemics on global nutrition and food security.

Oluremi Olayinka Ajayi

Supply Chain Management - Global Logistics



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