

Postharvest Food Losses: The Missing Link in Poverty Reduction

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Abstract

This paper discusses the significance of reducing postharvest losses as a vehicle for making more food available and thus reduce hunger and poverty. Food losses have become a big challenge and a serious threat to attaining food security. Increasing the availability of food consists of two parts namely increasing production levels and reducing the losses after production. Postharvest losses (PHL) of crops are conservatively estimated to be between 10 to 50% with the perishables incurring the highest losses. For instance, according to evidence generated in the Postharvest Loss Global Scale Solutions, and Relevance to Ghana, Carlotta et al (2018) 14% of maize, 13.5% of rice, 31.4% of yam and up to 45% of mangoes are lost after harvesting. On the average 20 – 25% of the estimated 20 million metric tonnes of foodstuffs produced is lost through postharvest losses. The introduction and implementation of sound policies to drive the reduction of postharvest losses and the adoption of new and innovative technologies to reduce losses is the panacea to reduce food losses and thus help in the attainment of food security. The paper also looks at some Government policies and their possible impact on addressing postharvest losses.

Key words: Postharvest losses, food security, technology and policies

Date of Submission: 07-08-2020

Date of Acceptance: 21-08-2020

I. Introduction

Food losses have become a big challenge and threat to attaining food security. Ajilore (2013) reported that about 1.2 billion people are hungry in the world and about a third of this number live in Africa. About 1.3 B tonnes of food waste has also been reported to be produced annually around the world at a direct economic cost of \$750 B (FAO 2011, 2013a) cited by Obayelu(2014) A report by the Food and Agriculture Organization (FAO 2013a) shows that about 54% of the world's food waste occurs during production, postharvest handling and storage, and 46% happens at the processing, distribution and consumption stages. Food losses and waste are, therefore, not only causing major economic losses but also wreaking significant harm on the natural resources that humanity relies upon to feed. (Obayelu 2014)

Increasing food availability is therefore not only increasing the productivity in agriculture, there is also a need to lower the losses (Kader, 2005). Food losses after harvest until the food reaches the consumer are significant (FAO and World Bank, 2010, FAO 2014). Food losses represent a waste of resources used in production such as land, water, energy and inputs.

Agriculture is the backbone of the Ghanaian economy employing more than 44.7% of the population. It contributes more than 18.9% to the national Gross domestic product (GDP) indicating the nation's reliance on the sector for its economic growth and development.

In view of this, numerous attempts have been made through policies, programs and strategies initiated by government and other stakeholders to facilitate agricultural growth through increased productivity. However, the alarming rates of Postharvest losses recorded among major food crops in the country poses a major threat to food security and erodes the gains made in food production.

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A large amount of food and products are not reaching the consumer particularly due to postharvest losses during harvesting, handling, transporting, storage, processing, packaging and distribution. Handling and processing of food are of high importance in order to ensure food-safety (FAO, 2009; FAO and World Bank, 2010). Post-harvest loss leads to an inadequate food intake and it could be in the areas of seed loss, monetary loss, and food loss.

Seed loss leads to unavailability of quality planting material and food loss may lead to malnutrition.

To attain food security, it is important to get nutritious food at the right place, at the right time and at the right price to the population. This involves numerous processes along the value chain such as transportation, handling and storage. Investment in technologies to reduce post-harvest losses will go a long way to ensure stable food supply throughout the year and thus help stabilise food prices.

Concepts and Definitions

A lot of literature is available on the concepts and definitions of what constitutes postharvest losses. Tyler and Gilman (1979) defined losses as a measurable reduction in food crops that may affect either quantity, quality or both. These losses can occur at any stage after harvest.

Postharvest is the period after separation from the medium and site of immediate growth or production of the food (Harris and Lindblad, 1977). Three periods are associated with food losses. These are:

1. Preharvest where losses occur before the onset of harvesting and may be caused by insects, microbes, birds or termites
2. Harvest losses which occurs during harvesting, damage and bruises and shattering are examples
3. Postharvest losses occur after the crop has been harvested.

Causes of Postharvest Losses

Postharvest losses can be caused by mechanical damage and injury, physiological processes, poor handling, lack of processing, inadequate packaging, poor logistics and poor storage conditions (Chakraverty et al, 2003). Postharvest losses may vary greatly among commodities, production, areas, seasons, handling, management practices and level of education of farmer.

The problem of postharvest loss is especially acute for horticultural crops, for which as much as 40-50% is wasted in the production, postharvest handling and storage, and packaging stages year Carlotta et al (2018). Their postharvest life depends on the rate at which they use up their stored food reserves and their rate of water loss.

Sites of Losses

Losses may occur anywhere from the point where the food has been harvested up to the point of consumption.

The following can be identified as possible areas where losses occur:

1. Harvest: The separation of the commodity from the plant that produced it. In the case of roots, tubers and bulbs the commodity is lifted out of the soil.
2. Preparation: The separation or extraction of the edible from the non-edible portion of the produce e.g., the peeling of fruits and vegetables and threshing of grains
3. Preservation: The prevention of loss and spoilage of foods by drying of fruits, the use of refrigeration.
4. Processing: The conversion of edible food into other forms more convenient to the consumer.
5. Transportation: All forms of transportation that are used to convey foods from the point of production to the ultimate point of consumption
6. Storage: The holding of foods under suitable conditions until consumption.

Losses also differ depending on the season as found out by Egyir et al (2008) and reported below:

The percent mean loss estimated for the selected commodities (overlooking commodity classes) range between approximately 1 percent for oil palm and 61 percent for mangoes. Within commodity classes, there is some variation (albeit, not statistically tested) among seasons; for instance, in the major season where the wetness of the season is high, storability of these perishables are greatly influenced more by microbes, for fruits, the mean minimum loss of 2.0 percent is estimated for oil palm and the maximum of 61 percent for mangoes. In the minor season the minimum loss of 3.0 percent is estimated for citrus and a maximum of 57 percent estimated for mango.

For roots, tuber and plantain the major season mean minimum loss of 9.6 percent is estimated for plantain and the maximum of 25 percent for cassava. In the minor season the minimum loss of 7.5 percent is again estimated for plantain and a maximum of 39 percent estimated for cassava.

Among the cereals, the major season mean minimum loss of 5.5 percent is estimated for rice and the maximum of 18 percent for maize. In the minor season the minimum loss of 2 percent is estimated for sorghum and a maximum of 9.6 percent estimated for maize.

Postharvest Losses Reduction Methods

Harvesting: The priority at harvesting is to avoid bruising and any other forms of mechanical damage. This requires that labour employed must have the required knowledge and skills to perform the task.

Harvesting can only be done when the crop is matured. There are many maturity indicators and these varies with the type of crop. In mangoes for example, number of days after full bloom, flesh color, fruit shape and size are used. In some cases, chemical analysis is done to determine acidity, total soluble solids and starch content. Harvesting by hand if properly done will result in less damage to produce than mechanical means. Historically, manual harvesting has been the preferred method for achieving high-quality control and minimizing tree damage (Benkeblia et al., 2011). It is however expensive in terms of labour costs and may pose a greater challenge in the face of declining labour availability.

Roots and tuber crops are likely to suffer damage during lifting from the ground. This can be mitigated if they are grown on raised beds or mounds. Field containers must be chosen carefully as to not damage the produce in any form. Containers used must have smooth surfaces.

Farm roads must be constructed before crops are planted to ensure smooth movement of produce from various sections of the farm and out of the farm in appropriate vehicles. Investment in refrigerated transport, packhouses and other cold chain logistics will help reduce losses.

Processing: including losses due to spillage and degradation during industrial or domestic processing, e.g. juice production. Losses may occur when crops are sorted out if not suitable to process or during washing, peeling, slicing and boiling. The use of appropriate technology will reduce these losses.

Packaging: Fresh fruits and vegetables have limited shelf life ranging from a few hours to few weeks at ambient temperature. They are living and continue their physiological and biochemical activities even after harvest. Fresh produce contains 80-90% of moisture or even more and equilibrate humidity as high as 98 %. Therefore, they dry rapidly (transpiration) under normal atmospheric conditions. This causes wilting and shrivelling due to shrinkage of cells. The existing postharvest loss of fruits and vegetables could be considerably reduced by adopting improved packaging technologies (Aysel et al 2019).

Packaging of fresh fruit and vegetables reduce food losses through the design of better and smarter packaging to keep food fresher for longer. Therefore, appropriate packaging systems should be designed to reduce food losses. Modified atmosphere packaging, active packaging and smart packaging technologies are being encouraged to help reduce losses attributed to packaging.

Storage: Holding of the commodity in appropriate structures that provide suitable internal conditions to suppress physiological deterioration. Temperature and relative humidity must be monitored regularly to ensure little deviation from the required conditions.

Some Policy Interventions by Government of Ghana

Over the past few years, government, through the Ministry of Food and Agriculture has initiated programs and strategies to address postharvest losses. The Planting for Food and Jobs places emphasis on Extension and Marketing services to deal with postharvest management, while other interventions such as the “one district one warehouse”, which is very specific, addresses issues of storage. The National Agricultural Engineering Policy of the Agricultural Engineering Services Directorate (AESD), addresses availability and affordability and easy access to the use of technologies to address PHL by Smallholder farmers. The launch of the Ghana Commodity Exchange (GCX), is expected to bring relief to farmers and other private sector stakeholders for a well efficient warehousing receipt system.

Post-harvest activities such as storage, transportation, processing, packaging and distribution for selected food commodities, especially staples will be supported for the reduction of losses. Incentives to the private sector and district administrations to invest in post-harvest activities will be made with a view to support sustained raw material supply to markets, small and medium scale agro-enterprises.

National Food Buffer Stock Agency will be re-organized to be more efficient and market oriented to give incentives for private sector participation. At the decentralized levels, the government will provide storage infrastructure, with drying facilities and a warehouse receipt system.

A national programme to create awareness about postharvest losses and their impact on reducing poverty and hunger should be launched nationwide. A postharvest training programme should be incorporated in agricultural curriculum at all levels of the educational system. A core technical team of postharvest specialists should be assembled to offer technical support at all levels of the postharvest chain.

II. Conclusion

Reducing postharvest losses is a very effective way of fighting poverty, attaining food security and to guarantee the quality of produce. In many developing countries, major causes of food loss are inadequate facilities for harvesting, transportation, storage and processing and packaging. Use of the appropriate postharvest

technologies is necessary to reduce post-harvest losses. Farmer education will improve the adoption of technologies necessary to reduce postharvest losses.

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Joyce Ametor Kporvie. "Postharvest Food Losses: The Missing Link in Poverty Reduction." *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)*, 13(8), 2020, pp. 12-15.