
Editorial: High incidence of postharvest food losses is worsening global food and nutrition security

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Although human-made conflicts and intolerance continue to banish millions of people into daily misery of deprivation and poverty, there are three interrelated, complex but urgent grand challenges confronting humanity in the 21st century that must be addressed with new and innovative ways of thinking:

- a climate change and greenhouse gas emissions
- b sustainable resource supply (mainly energy and fresh water) for continued economic growth
- c food and nutrition security.

The impacts of these grand challenges on agriculture and our food system are far-reaching and already being felt around the world. It is projected that global human population will grow at about 80 million per annum, thus increasing by 35% to 7.7 billion by 2020, then by 75% before reaching 10 billion people on planet earth. This growth in population creates new demand for food, fibre and other industrial materials which depend on agriculture.

Despite groundbreaking technological advancements during the past century on crop and livestock production, handling, processing and marketing, food production has barely kept pace with population increase over the past three centuries, particularly in Sub-Saharan Africa and other least developed economies, resulting in serious food security problems. Consequently, food consumption has exceeded local production by up to 50% in the mid-1980s and more than 30% in the mid-1990s. Today, the majority of the poor in Africa spend up to 80% of their income on food. The recent global food crises which resulted in massive protests, instability of some nation states and death in many countries has once again brought the issue of food security to the front of the global economic development agenda. Coupled with worsening environmental and ecological problems, global food shortage associated with rapidly growing human population has once again rekindled world attention towards the problem (and opportunities) of postharvest food losses.

Postharvest losses not only reduce the income of farmers and overall agribusiness profitability, but they also affect food and feed supply and even threaten the economies of rural areas. Equally important are the impacts of food losses on sustainability of natural resources and the environment through landfills for wastes. The opportunity cost of utilising scarce production inputs such as fresh water, energy and labour, and unnecessary

use of agrichemicals to produce food and raw materials that end up as waste is far-reaching.

Our recent findings have shown that postharvest food loss is truly a global problem, affecting both developed and developing countries; however, the magnitude and prevalence of the problem is higher in developing countries. For instance, our review of the global literature has shown that on annual basis, up to 25% postharvest losses of total food products occur worldwide (about 1.23–2.30 billion tons of cereal products, roots and tuber crops and fruit and vegetables). Higher levels of global losses and waste have been quoted by some researchers, ranging from 40% to 50%. Although food losses occur during both production and postharvest handling operations, figures from the Food and Agriculture Organisation of the United Nations indicate that storage losses (40%) of world produce is higher than field losses (30%), with most of the losses occurring in developing countries. Data on the extent of food losses also varies across continents, ranging from about 30% in Europe and North America to 40% in Latin America and highest at about 50% in Africa and Asia.

More recent and comprehensive national food loss assessment studies carried out in developed countries have also shown that high incidence postharvest food losses continues to occur, resulting in unnecessary waste of resources as well as contributing to mounting environmental, ecological and energy burden. For instance, in the USA, it has been reported that each year about 30% of all food worth over US\$48.3 billion (£32.5 billion) is wasted. Similar studies in the UK found that food waste from farm to the consumer cost about £20 billion annually. In Japan, estimated 23 million tons of food waste which occurred in 2007 was valued at about ¥11 trillion, which is the monetary equivalent of Japan's annual agricultural output, excluding additional cost of ¥2 trillion to process that waste. The Japanese study also showed that food thrown away in Tokyo alone each day could feed 4.5 million people. All these monetary cost of postharvest food loss and waste do not include the environment costs and the opportunity cost of production inputs used and other resources used in processing, postharvest handling, marketing and distribution.

All indications so far suggest that the problem of postharvest losses remains a major obstacle in addressing sustainable food and nutritional security. Literature evidence also suggest that the incidence of postharvest food loss is highest in Africa, partly due to limited deployment of loss-saving postharvest handling and processing technologies and as well as limited market opportunities for the millions of small-scale producers. Consequently, reducing postharvest losses provides a reasonable and additional economically viable tool in the global fight against food and nutritional insecurity. The potential to increase food availability without additional investments in agricultural land development and production inputs is clearly attractive from both economic and environmental viewpoints, especially in many countries in Africa dominated by resource-poor farmers.

The complexity and urgency of the grand challenges facing humanity in the 21st century require a multidisciplinary and integrated approach. On the other hand, the huge impact of agriculture and the global food system on these grand challenges assures a future for postharvest food losses as the often neglected dimension in addressing these challenges. To guide both policy and promote the development of interventions to reduce postharvest food losses, there is a need for reliable and accurate data on the incidence and amount of losses under specific local conditions. Often the lack of research-led policy scenarios on the socio-economic impacts of postharvest technology interventions make it

difficult for politicians, governments, development agencies and the private sector to fully understand and appreciate the potential returns on investment to reduce postharvest food losses. Systematic reviews on the impacts of postharvest technology and interventions are badly needed to assist in meeting this continuing challenge to engage postharvest research with the economic development agenda of government and civil society.

The recent world food price crises has once again brought the issue of food and nutrition security to the forefront of global agenda on sustainable integrated economic development, particularly in many least developed countries which depend on agriculture as the backbone of their economies. While this attention is most welcome, it is hoped that the expected increases in investment in agriculture would promote a broad-based approach, focusing on the value chain, from farm-to-fork, which calls for the monitoring and reduction of losses along the chain. The value-chain approach to agricultural development also promotes linking farmers to local, regional and global markets through assistance with sustainable production of good quality and safe food products and the handling and transformation of these products into high-value goods and services which create further employment and income opportunities.

Reducing postharvest food losses therefore does not only make economic sense – it also provides additional artillery in our arsenal to combat, mitigate and adapt to the grand environmental and economic challenges of our time. *IJPTI* will continue to promote and disseminate research outcomes which feed into the storehouse of technological innovations for reducing postharvest losses and adding value to the supply chain of agricultural food and industrial raw materials. The papers included in this first issue of *IJPTI* (Vol. 2, No. 1) reflect this undertaken – from modelling the success of fresh produce marketing (Fehr), to technologies for reducing losses such as chemical dips and coatings (De Moraes), cold-chain (Agüero), and value-addition using yeasts and lactic bacteria (Massawe), pepper and onion additives (Chukwu) and milling (Ross). We welcome original research articles, reviews and industry case studies dealing with all aspects of postharvest agriculture, horticulture and fisheries. Multi-disciplinary articles such as those reporting the adoption of postharvest technologies and impacts of postharvest technologies and interventions are also invited.