

## Chapter 14

# Building a Sustainable Food Supply Chain and Managing Food Losses

**A D Nuwan Gunarathne**

 <https://orcid.org/0000-0003-3024-9416>

*University of Sri Jayewardenepura, Sri Lanka*

**D. G. Navaratne**

*University of Sri Jayewardenepura, Sri Lanka*

**M. L. S. Gunaratne**

*University of Sri Jayewardenepura, Sri Lanka*

**Amanda Erasha Pakianathan**

*University of Sri Jayewardenepura, Sri Lanka*

**Yasasi Tharindra Perera**

*University of Sri Jayewardenepura, Sri Lanka*

### ABSTRACT

*With the unprecedented growth in the world's population, the supply of food has already become a major global challenge. The world food crisis highlights a large quantity of food going waste or lost due to many unsustainable practices in the food supply chain. This chapter provides a conceptual model to build a sustainable food supply chain while minimizing the food waste that occurs at different stages. By incorporating stakeholder management and other behavioral aspects while at the same time following a continuous improvement cycle, the model deviates from other techno-oriented or fragmented guidelines available on the subject. For the purpose of better understanding or providing practical applications, real-life case studies are also presented. Hence, the model provides useful guidelines for business organizations and other actors in the food supply chain to incorporate sustainability while minimizing environmental, social, and economic impacts of food losses/waste.*

DOI: 10.4018/978-1-7998-5354-1.ch014

## **INTRODUCTION**

As per the United Nations – UN - (2015), the world population will increase by more than one billion people within the next one and half decades to reach 8.5 billion in 2030. This projected population growth, which is concentrated mainly in the developing countries (UN, 2015), raises many challenges for the future of humanity since all the major global problems such as climate change, energy crisis, severe poverty, food scarcity, and economic and political instability relate to population growth in some way (Population Institute, 2017). Uncontrollable population growth has placed millions of people around the world at the risk of hunger leading to a massive and destructive food crisis (Holt-Giménez, 2008; Govindan, 2017). In order to address this global issue, the United Nations Development Program (UNDP) identifies zero hunger as one of its seventeen Sustainable Development Goals (SDGs) to be realized by 2030 (UNDP, 2017).

The world food crisis has many facets and it is pertinent to focus on food supply chain management by emphasizing two extreme consequences: a) food scarcity and b) food waste. According to the Food and Agricultural Organization (FAO) (2011), food waste in rich countries is almost the same as the entire net food production of sub-Saharan Africa. The food crisis in certain parts of Africa is so severe that it can end in famine. Refer Illustration 1 for more details of the food crisis in East Africa. Globally, 28% of the world's agricultural area is used annually to produce food that is lost or wasted. Further, it is estimated that 26% of children in the world are stunted due to malnutrition and two billion people suffer from one or more micronutrient deficiencies. FAO (2011) further states that one third of the edible food produced for human consumption gets lost or wasted along the global food supply chain. The amount of resource inputs to generate this waste and its contribution to greenhouse gas emission intensify the impact of food waste and warns global communities to pay more attention to ensure sustainability of the food supply chains and to minimize food waste by proper management and control. It is evident that the loss of resources in terms of edible food mass, time, energy and cost spent on converting crop into edible food that is being wasted results in direct losses arising from unsustainable food supply chains. Concurrently its environmental impact intensifies the adverse implications of unsustainable food supply chain practices (Nellemann, Macdevetta, Manders, Eickhout, Svihus, Prins, & Kalternborn, 2009). Thus, ensuring sustainability throughout the food supply chain has become a major challenge for global communities at present. However, the issue of food waste/loss has not been addressed from a supply chain perspective so far.

### **Illustration 1: Food Crisis in Africa**

*In February 2017, a famine was officially declared by the United Nations (UN) in some parts of South Sudan. The present civil war situation, poor economic condition and dry weather are the major contributors of this worst form of food crisis, famine. Due to the war, millions of people are fleeing to the neighbouring countries such as Uganda, abandoning their farms and livestock. In addition to loss of production, this situation also leads to loss of income for millions of families. Poor income coupled with rising cost living is posing a major threat for many families to find food even for survival. In addition, there has not been a rain for years in some parts of the country. As per the UN, not only South Sudan but some other countries in the Africa and Middle East such as Yemen, Somalia and Nigeria are also at risk of famine.*

19 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/building-a-sustainable-food-supply-chain-and-managing-food-losses/268144](http://www.igi-global.com/chapter/building-a-sustainable-food-supply-chain-and-managing-food-losses/268144)

## Related Content

---

### Elucidating the Phytochemical and Pharmacological Potential of Myristica fragrans (Nutmeg)

Ena Gupta (2020). *Ethnopharmacological Investigation of Indian Spices* (pp. 52-61).

[www.irma-international.org/chapter/elucidating-the-phytochemical-and-pharmacological-potential-of-myristica-fragrans-nutmeg/252446](http://www.irma-international.org/chapter/elucidating-the-phytochemical-and-pharmacological-potential-of-myristica-fragrans-nutmeg/252446)

### Local Production-Based Dietary Supplement Distribution in Emerging Countries: Bienestarina Distribution in Colombia

Jesus Gonzalez-Feliu, Carlos Osorio-Ramírez, Laura Palacios-Arguello and Carlos Alberto Talamantes (2021). *Research Anthology on Food Waste Reduction and Alternative Diets for Food and Nutrition Security* (pp. 865-883).

[www.irma-international.org/chapter/local-production-based-dietary-supplement-distribution-in-emerging-countries/268176](http://www.irma-international.org/chapter/local-production-based-dietary-supplement-distribution-in-emerging-countries/268176)

### Resource-Saving Technology of Dehydration of Fruit and Vegetable Raw Materials: Scientific Rationale and Cost Efficiency

Inna Simakova, Victoria Strizhevskaya, Igor Vorotnikov and Fedor Pertsevyi (2021). *Research Anthology on Food Waste Reduction and Alternative Diets for Food and Nutrition Security* (pp. 216-237).

[www.irma-international.org/chapter/resource-saving-technology-of-dehydration-of-fruit-and-vegetable-raw-materials/268140](http://www.irma-international.org/chapter/resource-saving-technology-of-dehydration-of-fruit-and-vegetable-raw-materials/268140)

### Nutritional and Pharmacological Properties of Bay Leaves (*Laurus nobilis* L.)

Rashmi Srivastava (2020). *Ethnopharmacological Investigation of Indian Spices* (pp. 114-123).

[www.irma-international.org/chapter/nutritional-and-pharmacological-properties-of-bay-leaves-laurus-nobilis-l/252452](http://www.irma-international.org/chapter/nutritional-and-pharmacological-properties-of-bay-leaves-laurus-nobilis-l/252452)

### Economic and Environmental Costs of Meat Waste in the US

Nicholas Hardersen and Jadwiga R. Ziolkowska (2021). *Research Anthology on Food Waste Reduction and Alternative Diets for Food and Nutrition Security* (pp. 685-702).

[www.irma-international.org/chapter/economic-and-environmental-costs-of-meat-waste-in-the-us/268167](http://www.irma-international.org/chapter/economic-and-environmental-costs-of-meat-waste-in-the-us/268167)