“The food and drink supply chain is a complex place, and the inherent risks are many. Samir Dani has provided an insightful overview supported by relevant case studies, making this an essential text for anyone involved in food and drink production and distribution.”

Steve Osborn, Principal Consultant, Aurora Ceres Partnership

“A must-read for everybody who wants to address one of the cardinal challenges of humanity: the supply of food. Comprehensive, well researched and rich in up-to-date cases.”

Constantin Blome, Professor of Operations Management, University of Sussex

Food Supply Chain Management and Logistics is both indispensable and accessible.

The growth of the food industry brings unique logistical challenges: new supply routes and demand dynamics are reshaping the future of food logistics. It is therefore essential for the industry to innovate, not only in demand management but also in order to ensure that food sources for a growing population are sustainable. Food Supply Chain Management and Logistics examines and assesses the support mechanisms that help overcome the challenges to food supply chains and make sure that food reaches our plates safely.

Showing readers how to stay ahead of the game, Food Supply Chain Management and Logistics covers the design and governance of the food supply chain and looks in detail at:

- food supply chain: production and manufacturing
- food logistics and regulation
- safety and quality
- sourcing and retailing food
- risk management
- food innovation
- technology trends
- food sector and economic regeneration
- international food supply chains

The book contains a wide range of international case studies including India, China, South East Asia and Brazil.

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Food is a very important part of human life. It pervades our waking time – breakfast, lunch, dinner, snacks, drinks, puddings. When I was growing up, snacks, or for that matter chocolates, were not often available. The shops were convenience stores, but they were unlike the retail ones we find now. There was less advertising of food and the reliance was on a staple diet that one received at home. The culture of snacking had not yet arrived. Fresh fruit and vegetables were available in a market where they were sourced locally, so that the produce was seasonal. We can still find these markets in India (although the retail sector has started changing the scope), but in the West these vegetable markets are more wholesale markets that are open very early in the morning for traders and individual shop owners to purchase their supplies. The retail environment has changed the way food is available to us and in turn has modified our eating styles and regimes.

Food is everywhere around us. As a species, today we are nearer to food than the hunter-gatherers were. However, the irony is that more than half of the world’s population lives below the poverty line and cannot afford to have one decent meal every day. The bigger irony is that small farmers who produce the food and contribute to the world’s food security and the complex food supply chain are also in a terrible state. It is sad to hear that in the developing world, farmers take their own lives because they are unable to sustain their livelihoods and hence unable to pay their debts.

The food sector has changed rapidly in the past decade. The movement of people for work and migration has led to a demand for food products from across the globe and retailers are keen to oblige. The style of retail environments, the technology advancements in tracking, operations management and packaging have made it possible to import a food item from any part of the world at the right quality specifications. Companies and countries around the world have been working very hard to get a share of the pie. This is not an easy task
and it needs a lot of effort to create capability within the system to manage international trade. Specifically within the food sector, the one factor that plays a very important role in the success or failure of a food supply chain is ‘food safety’. This one variable supersedes all other challenges within the chain. It is also the number-one risk that companies will be concerned about when dealing in food. Recent cases have demonstrated how it can go horribly wrong if food safety is not taken seriously. Food fraud and food crime are important topics being discussed in the West since the horsemeat scandal, leading to policy discussions and an investigation into methods to stop it.

Food supply chains criss-cross the world, with two aims:

1 satisfy the consumer as per the requirements; and
2 by carrying out (1) efficiently, become economically sustainable.

Food supply chains are becoming increasingly complex. For example, fish caught in the North Sea or off the western coast of the United States is frozen and shipped to China where it is defrosted, filleted, packed and refrozen before reaching retail shelves in Europe and the United States. The only reason for the supply chain being this complicated is to save on operating costs, but this also brings more risks into the chain.

A major discussion worldwide concerns food security and the capability of feeding nine billion people in 2050. Many initiatives have been formed to try to find a viable solution to the challenge. There are many local initiatives in play, both in developed and developing countries, to solve food security problems. As the developed world looks towards utilizing local produce and creating local supply chain capabilities for regional economic development, the initiatives in the developing world are directed towards building the capability of the farmer. The farmers, who are predominantly smallholders, need to get a fair price for their produce, infrastructure for their sector, individual financial instruments, skills and training regarding modern methods of agriculture and, in general, their rights as humans. A lot of good work on this is currently being conducted in South America, Africa and Asia. Along with food security, which is about securing the future supply of food, sustainability within the supply chain and
the sector is a topic that has garnered a lot of attention. Considering the triple bottom line concept, the food sector needs to work hard on the social front, which will provide incentives to producers and processors to maintain environmental bottom lines which will provide economic sustainability in the long term. Scarcity of arable land and water, and uncertain climatic patterns, put a lot of stress on the food system. However, there are many positive things happening within the food sector. One of the characteristics of the food sector is its ability to innovate. There is a consistent process in the industry with regard to innovations in food products, business models, packaging, technology and so on, which adds value in the supply chain.

When I thought about writing this book, I knew that it was going to be a daunting task and that when I had finished writing it I would feel that I had just scratched the surface. This is exactly how I feel now that I have finished it. Food as a topic is so multidisciplinary that it is very difficult to comprehend all the literature that covers it. Hence, it needs a focus, and the focus in this book was to understand the supply chain and the operations and factors that surround it. As you read the book, you will notice that it does not go into great detail but that it points you towards important processes and topics that can be looked at in detail. The additional reading list at the end of the book provides a lot of good information. As the focus of the book is to simplify the process and discuss new developments, it also refers to information from newspapers and magazines, including academia.

The book covers various aspects of food supply chains in detail. The basic premise is to cover the food supply chain from farm to fork, taking into consideration the various challenges and supporting mechanisms to make sure that the food reaching our plates is safe. It is important for the food industry to innovate with regard to both demand management and the sustainability of food sources for a growing population. This book covers various aspects of food supply chains from a management and social perspective.

Figure 0.1 shows how the book is structured. The book is divided into three sections. The first section sets the scene and discusses the different entities in the food supply chain. Section 2 is about operational challenges and hence discusses topics that are relevant for the
efficient operation of the chain. Section 3 is about sustainability and food security challenges. This section also looks at innovation in the food chain and how food supply chains can bring about economic regeneration.

**FIGURE 0.1** Outline of the book
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Introduction to food supply chains

Food supply chains are the lifeline for human existence on the planet. Whether these chains are local or international, the availability of food at the right time, right quality and right quantity is paramount. The recent United Nations report *World Population Prospects: the 2012 Revision* projects that the population of the world will be 9.6 billion by 2050, and one of the biggest challenges to mankind will be to feed this growing population. Another school of thought insists that although the challenge is great and food production needs to be ramped up, we are currently producing a sufficient amount of food to sustain the population. If this momentum continues, there will be sufficient production for the future. If this is the case, why does half of the world’s population go hungry every day, or have only one meal a day? Food poverty is rampant in the developing world and this has led not only to covert supply chains in food fraud and food crime, but also to a change in social environments where individuals move towards a life of crime to bank the necessary food rations for the day. International agencies such as the United Nations and the World Health Organization promote programmes to combat child poverty. These programmes focus not only on the availability of food but also on the quality and the nutritional aspects of food. Time and time again, history has shown that wars have been lost and won by controlling food supply chains. It is essential to study food supply chains from an operational perspective, as they not only influence everyday life but also affect businesses and livelihoods. This chapter considers the food supply chain and introduces the actors within...
food supply chains. It sets the scene for the remainder of the book. The detailed discussion on each actor will follow in the subsequent chapters.

The actors in a food supply chain

The series of processes, operations and entities that help to take the food from its raw material state to our plates is known as the food supply chain. It is not a singular chain of certain entities but a complicated web of interconnected entities working to make food available. The food supply chain starts with the producer (an agriculture-focused organization) and the food sourced at this stage moves through various methods of processing. The movement is facilitated by a host of logistics and transportation companies. These companies make sure that the food reaches us on time and at the right quality. The actors involved in a generic food supply chain are shown in Figure 1.1. The role of these actors is discussed briefly below.

Producers

As the world’s population continues to grow, there is increased pressure on the food system to double food production by 2050. To add to the population challenges, the rapid industrialization of developing countries has increased lifestyle and consumption patterns in these
countries. As populations in the developing world receive a higher wage through employment, their food consumption preferences move from grain to meat and other protein-based diets. This provides additional challenges to the meat supply chains. The food supply chain starts at the producer end, which supplies food in its raw form – grains, fruits, vegetables, meat, fish, poultry and so on. The producers are farmers who are a part of the agriculture industry. Farming businesses range from small firms to very large corporates. Some are new to the business while others may be family farms that have been producing food for generations. Every country requires a strong food production sector as it affects both food availability for the population and economic sustainability for the food sector. There are entities in the supply chain that supply raw material (seeds, farming machinery, pesticides, fertilizers and so on) to the producers. These ‘input suppliers’ are generally large global companies with a lot of power in the chain. The producers also have to deal with increasingly uncertain climatic weather patterns, scarcity of water, land grabbing by unscrupulous agents in developing countries and soil degradation caused by industrialization and urbanization. As margins for producers within the food supply chain are getting smaller and smaller, an increasing number of farmers are now growing what they can sell at a good price in order to have economic sustainability. Although this is fair, as long-term economic sustainability is needed for the sector, it has an impact on the availability of core food products.

Processors

Processors are the entities in the food supply chain that transform the food products supplied by the food producers into products that meet consumer requirements. This process is also known as food manufacturing. This stage in the food supply chain will either prepare fresh food from the producer in a ready-to-eat format for consumers, or use it as a raw material to create other food products demanded by consumers. Food-processing companies are diverse in nature and will process products at different stages: for example, meat slaughtering and processing; preservation of fresh fruits and vegetables either by freezing, puréeing or juicing; milling of grains; making confectionery
and bakery products; and other types of food manufacturing. Food-processing is an extremely important process, as it not only sustains the food sector economy by catering to the demands and requirements of consumers, but also helps to reduce waste and increase food availability by increasing the shelf life of raw food products that cannot be immediately consumed. Food processors need to work very closely with the downstream supply chain, which comprises the entities that take the processed food to the consumer. Food processors will need technology insertion, changes to distribution channels and innovation in order to keep pace with environmental changes and changing consumer demands. Another set of challenges that food processors are facing now and will face increasingly in the future is scarcity of resources such as water and energy and the availability of raw fresh food from the producers.

Retailers and distributors

This stage comprises two entities in the food supply chain: distributors and retailers. Distributors are companies that act as the link between producers, processors and markets. The distributors source either fresh produce or processed food from the processors and then distribute it through various channels to reach the final consumer. These channels are either retailing companies or other processing companies (for example, restaurants) which provide the product to the consumer. Distributors will generally buy in bulk and use an infrastructure of warehouses and distribution centres to deliver the products as and when required downstream in the food supply chain. Distribution companies are very important entities, especially when the supply chains are global and have to cross international boundaries, as distributors have to deal with local regulations.

Retailing is a process that showcases the product for the consumer. This can be in the form of local corner shops or large hypermarkets and supermarkets that deal with hundreds of thousands of stock-keeping units (SKUs). The retailer stage in the chain provides the consumer with the variety of core and innovative products that the food sector has to offer. It is a highly competitive industry where food processors compete for shelf space in the retailer environments and
the retailers compete among themselves to attract more consumers through their doors. Consumers have a wide choice of retailers, retail channels and formats. Retailers try to differentiate themselves from their competitors and are increasingly creating innovative business models that provide a good-value proposition to consumers based on price, quality and service. Retailers are experimenting with a variety of fulfillment channels and formats, ranging from physical infrastructure (shops) to e-retailing. As large global retailers prospect for markets in the developing world, the food supply chains in developing countries are undergoing a transformation. As the retail environment in developing countries moves from an unorganized sector (corner shops) to a more organized sector (supermarkets), the food supply chains and distribution channels have to innovate and change their processes to respond to retailer requirements. There is an ongoing debate within developing countries regarding the introduction of large-scale retailers and the impact on small shops.

**Hospitality sector**

The hospitality sector is a key entity within the food supply chain. Although it is not directly a retailer or distributor as such, it is an important link between the producer/processor and the consumer. Food service agencies, hotels, restaurants and takeaway places will source raw material from the producers or processors and transform the food to suit the requirements of the final consumer. These entities provide a ‘made to order’ service function and are an important entity within the food sector, as they comprise millions of small and medium enterprises, sometimes one-person organizations delivering a very high value within the food system.

**Consumers**

The consumer is the final entity in the food supply chain. The economic sustainability of the chain depends upon the consumers buying the products and providing the necessary cash to travel upstream through the supply chain. Food is a staple necessity for every person on this planet and hence competition within the food supply chain concentrates
on variety and value addition and not on core produce. Recently, in the UK, food supply chains have been subjected to a tussle between regular grocery supermarket chains and discount grocery retailers. This has led to squeezing of margins and prices upstream as the retailers try to outdo each other to offer the lowest-priced food products (for example, most large supermarket chains in the UK are offering four pints of milk for £1, which is greatly affecting the returns to dairy farmers and hence their sustainability). Although this is good for consumers, it leads to another debate about food sustainability and food wastage, as food is looked upon as a very cheap resource. Ironically, as the competition to sell more within the organized sector increases, the excessive variety of food products (with little or no demand) and cheap food available in large quantities creates more food wastage at the consumer end. Reducing food wastage at the consumer end has been a major focus among governments and food-sector organizations in Europe. Food safety is a major concern for consumers and all food supply chain entities have to take the necessary steps to avoid food contamination. This can range from an excess of pesticides in produced food to microbial contamination in processing to improper food handling within the distribution and retail environment.

Types of food chain

Food supply chains can be broadly discussed as those serving markets (as industrial products) and as those serving the final consumer. The first type works through the trading of agriculture produce in bulk or as a commodity. The second type works towards the fulfilment of the consumers’ needs.

Commodity- and producer-focused chains

The output from farms moves downstream in two formats, either directly as fresh produce to the consumer (fresh fruit and vegetables, milk, grain and so on) or in bulk as a raw material within food-processing plants. The bulk purchase of raw food material can be
done through strategic partnerships with the producers, through traders or by buying it as a commodity item. A commodity is an item that is subject to futures contracts. In a futures contract the two parties in the deal sign a contract to buy or sell an item (in this case food, for example cocoa) for a (future) price agreed today, with delivery and payment happening in the future. The buyer speculates whether the price of the food item will go up or down in the future and hedges the risk by signing a contract in the present for a future price. This process is conducted at the ‘futures exchanges’. The commodity chains deal in products such as palm oil, cocoa, coffee, sugar, cereals, grains and so on. The supply chain model works with few buyers and many sellers. The process works as a spot market, and price determines the movement of the product. Commodity systems keep information flow between trading partners to a minimum. The processors, when buying in bulk, utilize this to buy quickly, reduce costs by hedging and maintain flexibility in product availability. Since the purchasing between the processor and producer does not happen directly but through the futures contract, the demand signals from consumers cannot be sent to the producers as there is a disconnect in the relationship. The prices of major commodities are influenced by climate change and uncertain weather patterns, variations in global demand and supply, and political processes such as trade agreements. Demand and supply volatility provides the required incentive to the futures trading environment. Traders tend to use flexibility in having diverse sources of the products to gain some profit, as profit margins are low. Volumes in bulk will tend to provide the returns rather than the actual trading price.

**Consumer-driven value chains**

Food traceability and identity are very important within consumer-driven chains, as this is the last stage of the food supply chain and has a direct impact on the well-being of the consumer. Food products within the retail environment are processed, branded and work effectively on the basis of uniformity in processing and high quality. Products traded in the commodity market, for example coffee, are now moving into the retail environment as branded, gourmet coffee,
with close cooperative relations between processors and suppliers. Unlike the commodity chain, the consumer-driven chain is more regulated, sometimes vertically integrated, and works more on the principle of cooperation and collaboration. The consumer-driven chain has barriers to entry, such as ‘voluntary’ standards, codes and benchmarks, international regulations and phytosanitary certification, which can affect the entry to markets. There is a need for consistency, which is achieved through processing and on-time delivery. The application of management systems for quality (for example, ISO 9000) or environment (ISO 14000) or production system (for example, organic) helps to maintain the credibility of the food supply chain. Tracking and tracing are very important, and technology insertion is required in the chain for this to be effective. Stringent traceability and intense scrutiny by retailers are conducted through production site visits. It is necessary to check compliance with buyer codes and standards and especially sustainability performance.

Factors influencing food supply chains

The food sector is a very complex environment influenced by industrial, technological, economic, social and political factors that shape the availability of food, the nature of the food product and the delivery of the food to our plates. Entities within the food supply chain aim to improve the functioning of the chain, from the perspective of quality, competitiveness and pricing along with the necessary requirements for absolute food safety.

These complexities in the food supply chain are derived from within a number of areas:

- agriculture production;
- involvement of various governmental/non-governmental actors;
- processing and maintaining quality;
- consumer and market choices;
- local authorities;
Introduction to food supply chains

- logistics companies; and
- a host of other small companies actively involved in this food supply chain and providing secondary value.

The world around us is constantly changing. Technological innovations, new business models, globalization and the movement of people have made food supply chains rethink fulfilment and effectiveness parameters. Innovations in processing and transport have made products more suitable for global distribution, and innovations in management and information and communication technologies (ICT) have allowed supply chains to become more responsive to the increasingly sophisticated food demands of consumers. Some other factors that influence and affect the food supply chain are as follows.

**Consideration as value chains**

Food supply chains should be viewed as ‘value chain systems’ in which the raw material (from an agro-based source) is transformed for final consumption as it moves through the chain and increases in value. Considering the food supply chain as a value chain also means that entities along the chain can aspire to move up the value chain, thereby increasing their share of the return. In some cases, operators across the supply chain integrate vertically to appropriate a larger share of the total revenue, though at the cost of lower flexibility in supplier selection. Transformation of food systems can influence market power along the chain. The food value chain is the network of stakeholders involved in growing, processing and selling the food that consumers eat – from farm to table. The stakeholders include:

- the input suppliers to the food production process;
- the producers involved in growing food;
- the processors, both primary and value-added, involved in processing, manufacturing and marketing food products;
- the distributors, including wholesalers and retailers, involved in distributing, marketing and selling food;
- the consumers involved in shopping for and consuming food;
Food supply chain management and logistics

- government and non-governmental organizations (NGOs) involved in creating policies and programmes for food sustainability and security;
- regulators involved in monitoring and regulating the entire food value chain from producer to consumer;
- logistics companies involved in moving, storing and managing food throughout the value chain;
- financial organizations involved in providing funding to the entities within the food value chain.

The food value chain is also an important vehicle to address global poverty. The value chain provides opportunity to alleviate poverty and increase food security by investment and employment within the food sector. Increased trade within the sector allows people in developing countries to improve their livelihoods and get access to essential services. The value chain, when focusing on food production and food processing with the aim of reducing food wastage and increasing food security, should also pay attention to food accessibility, food safety and food nutrition.

Legislation

The movement of food across international borders is subject to an agreement on the application of the Sanitary and Phytosanitary Measures (SPS Agreement) of the World Trade Organization (WTO). Other international standards will focus on varied topics related to food hygiene, labelling requirements and so on. These agreements and laws create a greater transparency when dealing in international trade. The EU food law focuses on risks and traceability in the ‘farm to fork’ supply chain, placing equal importance on human health, animal and plant health, and the environment. The principle is to have a precautionary approach and hence the European Commission, through general food regulation, established the ‘one step backward – one step forward’ approach, which requires operators to identify by whom and to whom a product has been supplied. Food labelling is a key focus within EU food regulation.
**Consumer choice**

Global food consumption patterns have shown two diverse scenarios. The developed world has seen an increased propensity towards consuming processed food, led by demand from a time-starved working population. The preference for ready-to-eat or microwaveable food products has led to innovations within the retail and packaging environments to service this demand. However, this produces a strange phenomenon in which fresh fruits and vegetables are more expensive than value-added processed food. One of the reasons for this is the economies of scale that the food industry achieves when processing food for the retail environment. Consumers in the developing world are moving from a cereal, grain-based diet to a protein- and meat-based diet. However, an increase in meat production requires increased animal feed and more input raw materials. To increase the availability of animal feed, food production has taken over intensive farming. With a focus on growing animal-feed-based crops rather than crops required for human consumption, this will have an impact on food security.

**Sustainability**

The global food chain is a significant contributor to global greenhouse gas (GHG) emissions. GHGs are produced at all stages in the chain, from food production (and its inputs) through food processing, food distribution and consumption to the disposal of waste. Sustainability within the food supply chain must be considered on a number of fronts. These include:

- energy consumption;
- carbon emissions;
- water usage;
- food availability;
- ethical behaviour;
- economic sustainability.

The food supply chain should be mapped with a systems perspective in order to understand the links and the locations that are non-sustainable.
Mapping the chain also provides a map of energy usage across the chain and an opportunity to reduce energy consumption. This can be utilized for other resources too.

**Collaboration**

Collaboration among the various stakeholders along the food value chain is extremely important. The interdependencies between stakeholders in the chain and the wider network should be considered as potential locations of collaboration. The recent global cases of food recalls, food safety and traceability have become a major concern within the food sector. Collaboration between the entities in the chain provides the entities with confidence in the sourcing, handling and quality control of food. Collaborative platforms help supply chain partners to have an end-to-end view of the chain. Collaboration between producers and processors (with the use of appropriate technology) can help reduce post-harvest food losses.

**CASE EXAMPLE**  The milk-processing value chain

Figure 1.2 depicts a brief schematic of the milk-processing value chain. A detailed mapping of the milk supply chain will include all the relevant entities, along with the primary milk-processing supply chain entities. These will be input suppliers to the dairy-farming process, raw material suppliers for packaging, logistics providers, technology providers and so on. However, the focus of this example is to show the value chain path of milk as a farm product and how it travels through the value chain to reach the final consumer in diverse forms.

Dairy farming is a very important sector for any country. This does not always have to be milk from cows, but includes milk from buffaloes, goats and sheep. Milk features as a staple product on the shopping lists of most consumers and hence sufficient availability of milk within the supply chain is of concern to governments and retailers alike. As seen recently in the UK, price wars between supermarkets have tended to focus around the price of four pints of milk. Milk, although much of it is consumed fresh, is also a major raw material in many food-processing industries. This can be in the form of fresh milk or a processed value-added product used instead of fresh milk. Figure 1.2 starts with the dairy farm as the
The dairy farm will have an upstream supply chain with input suppliers to the milk-producing process; however, this is not discussed here. The milk as an output of the dairy-farming process can progress to a number of destinations:

- the consumer;
- milk consolidators, which collect and consolidate milk from small dairy farmers on a local, regional basis – these could be private companies or a cooperative;
- milk processors;
- own farm-based processing;
- retailers and caterers.

Following each path depicts the nature of the business and the value chain.

*The consumer:* Dairy farms will provide a service to the final consumer by supplying milk directly to the consumer’s door step. Generally, in the UK these are the milk rounds which take place every day, very early in the morning. However, as...
the price of milk in supermarkets has reduced, farms find it difficult to match prices and hence have seen a fall in demand.

*Milk consolidators*: These are companies which provide a local or regional collection centre for small dairy farmers to sell their milk. The consolidators act as distributors of the milk through the downstream value chain. Sometimes, dairy farmers will come together and form a member-based cooperative to consolidate and distribute the milk produced by its member farms. This is done with the intention of providing a fair price to the farmers and having a more equitable relationship. Sometimes, large food processors will form a cooperative to strengthen their supply chain and create better relationships with farmers. At other times, dairy cooperatives will integrate vertically in the value chain to become food processors (for example, Amul cooperative in India). The cooperatives will supply milk to food processors and retailers.

*Milk processors*: These are food-processing companies that use milk in its various forms to create further value-added products. Some of the common milk-processing companies are:

- further milk processing – for example, milk powders, evaporated milk, condensed milk;
- yoghurt, cheese, butter manufacturing;
- confectionery and bakery manufacturers – for example, chocolate, biscuits and so forth.
- baby milk powder.

Within this value chain, there will be another link that connects one processor to another as a raw material supplier. For example, further milk processors will act as suppliers for confectionery manufacturers, supplying milk powder, butter, yoghurt and so on as raw materials.

*Own farm-based processing*: Dairy farms that have a surplus of milk or that find it difficult to supply at very low margins integrate vertically in the value chain to begin processing. Individual dairy farms will manufacture cheese, yoghurt, butter and ice cream to sell individually as a local farm-based brand or in the retail environment. Not all farms have the capability and financial backing to become processors; however, some farms, such as Rachel’s Organic in the UK, have been successful in this venture. Moving up the value chain is also discussed in the wider literature as a means for small farmers to become economically sustainable in the long term.

*Retailers and caterers*: These are classed together in this example as they are the entities closest to the final consumer. Retailers will stock a variety of
milk-based products, both as fresh milk from individual farms or cooperatives and value-added milk-based products from farms and food processors. These will include: cheese, butter, yoghurt, ice cream, milk powder, all types of confectionery and bakery products, snacks and so on. The retail environment is not restricted to large supermarket chains but also includes corner shops and off-licences.

Caterers in this case are entities in the hospitality business, restaurants, street food vendors, cafés and so on that source fresh milk or milk-based products to fulfil the final consumers’ bespoke demands.

### Summary

This chapter has provided a brief introduction to food supply chains. It has discussed the different actors in the food supply chain and their roles. The main actors are:

- producers;
- processors;
- distributors;
- hospitality;
- retailing;
- consumers.

The chapter has also discussed the various factors that influence food supply chains. Along with technological innovations, new business models, globalization and the movement of people, the chapter also discussed the following factors:

- value chains;
- legislation;
- consumer choice;
- sustainability;
- collaboration.

The remaining chapters in this book focus on the key points discussed within this chapter.
Notes

1 World Population Prospects: The 2012 revision, Department of Economic and Social Affairs, Population Division, Population Estimates and Projections Section, United Nations


“The food and drink supply chain is a complex place, and the inherent risks are many. Samir Dani has provided an insightful overview supported by relevant case studies, making this an essential text for anyone involved in food and drink production and distribution.”

Steve Osborn, Principal Consultant, Aurora Ceres Partnership

“A must-read for everybody who wants to address one of the cardinal challenges of humanity: the supply of food. Comprehensive, well researched and rich in up-to-date cases.”

Constantin Blome, Professor of Operations Management, University of Sussex

Food Supply Chain Management and Logistics is both indispensable and accessible.

The growth of the food industry brings unique logistical challenges: new supply routes and demand dynamics are reshaping the future of food logistics. It is therefore essential for the industry to innovate, not only in demand management but also in order to ensure that food sources for a growing population are sustainable. Food Supply Chain Management and Logistics examines and assesses the support mechanisms that help overcome the challenges to food supply chains and make sure that food reaches our plates safely.

Showing readers how to stay ahead of the game, Food Supply Chain Management and Logistics covers the design and governance of the food supply chain and looks in detail at:

- food supply chain: production and manufacturing
- food logistics and regulation
- safety and quality
- sourcing and retailing food
- risk management
- food innovation
- technology trends
- food sector and economic regeneration
- international food supply chains

The book contains a wide range of international case studies including India, China, South East Asia and Brazil.

Samir Dani is Professor of Logistics and Supply Chain Management and Head of Logistics, Operations and Hospitality Management at the University of Huddersfield. He has led research projects on a range of management and supply chain topics and has worked on food supply chain risks, food sustainability and food value chains. Professor Dani has published widely and has presented to both academic and practitioner audiences.