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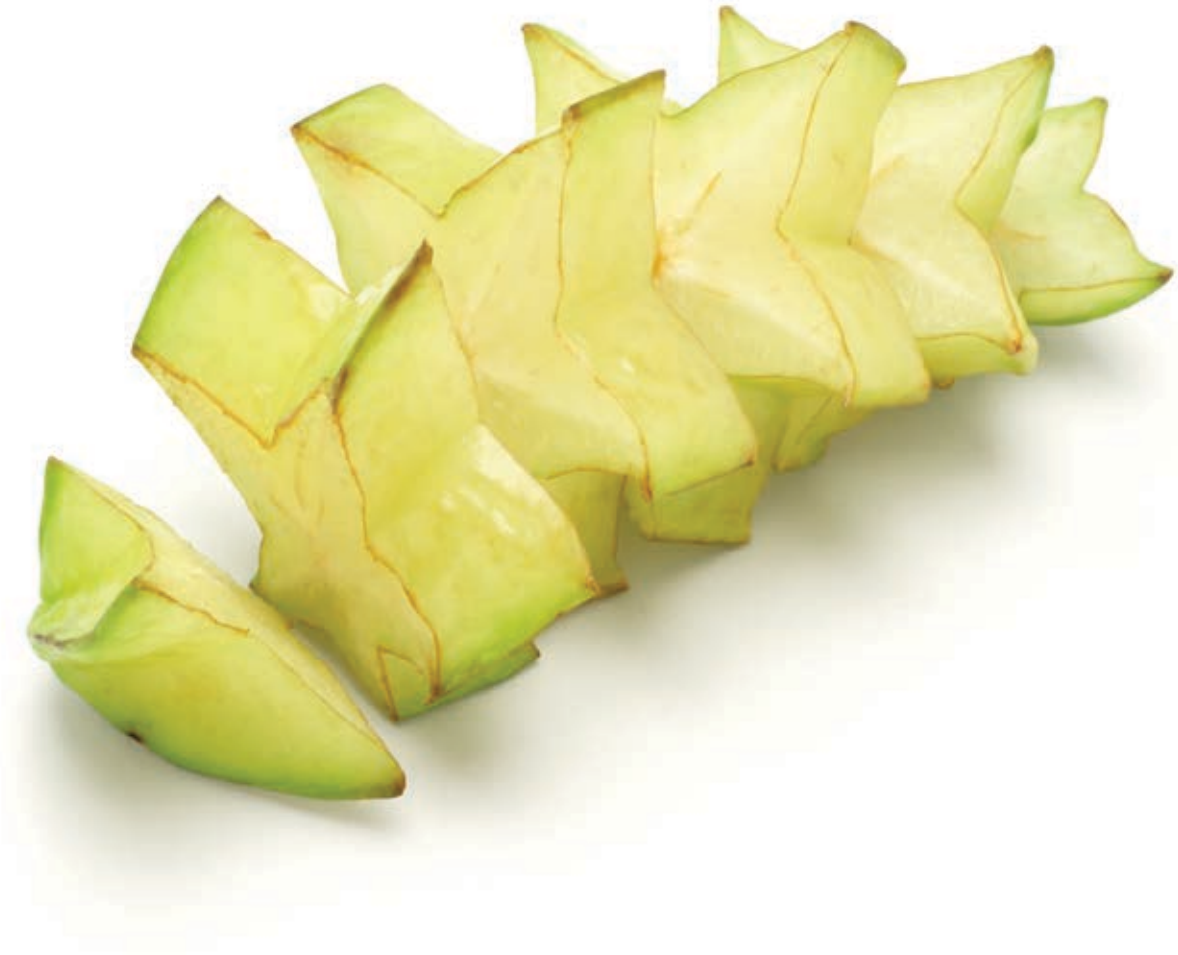
The food value chain
A challenge for the next century



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Introduction

In October 2011, the world population passed the 7 billion mark. This milestone was celebrated in the global media with photos of the symbolic 7 billionth baby, born in the Philippines. Clearly, such precision in accounting is impossible, but it is true that our population has reached a new record. Further, the world population is projected to exceed 10 billion[i] by the end of the century. Such growth will put a massive strain on the global food supply. Most of this growth will occur in emerging markets. These markets have traditionally been agriculture-based economies, but in recent years they have witnessed explosive growth of the middle class, driven by greater industrialization and urbanization. An emerging middle class creates changing dietary habits, such as consuming more meat and dairy. These foods are more resource intensive, which puts local supply chains under greater pressure. These factors alone make the production and distribution of food a critical issue for the 21st century.

While change in emerging markets is dramatic, the developed economies are also experiencing a shift in consumption patterns. Modern North American and European consumers are more health conscious than ever before. They are worried about the content of their food, its origin, freshness, and safety. These consumers are increasingly concerned about the sustainability of food production and its impact on the environment. Modern farming techniques, such as genetic modification, are being debated and are often perceived as negative. Buying local and the organic food movement are growing trends that have taken hold with the modern consumer.

Product distribution and sales channels are also changing. Retailers are increasing the number of convenience stores in strategic locations that cater to the "grab and go" consumer (e.g., gas stations, public transport stations). To supply these small shops, which maintain little inventory, the underlying distribution network must be able to match supply and demand with the rapid replenishment of stock. The food and beverage sector is also participating in the growing popularity of online shopping. To offset the costs of home delivery, companies will need to establish a network of convenient pickup points and closely collaborate with logistics partners.

Further complicating the global food supply chain is the resource intensity of food production. Water and energy are two scarce resources in heavy demand in the production and distribution of food. Water is a scarce commodity in many parts of the world where the population is growing the fastest. Climate change is also impacting water supply in some areas of the world. At the same time, pumping, treating, and moving large volumes of water requires a great deal of energy. Modern farms use large amounts of energy to plant, fertilize, irrigate, and harvest crops. In many cases, traditional fossil fuels are used to provide this energy, and a change to more sustainable energy resources will be required. Finally, commodities such as corn are now consumed as a source of energy as well as of food production and are therefore, more expensive. The result is a dramatic rise in the cost of food worldwide.

Such volatility and imbalance in the availability of resources relative to demand can be seen as a disaster in the making and something that only governments can solve. However, while government clearly has a role to play in regulating and facilitating trade, members of the food value chain are likeliest to have the most impact on solving these problems.

This document sets out the premise that the food industry, throughout the value chain, has a tremendous opportunity, as well as an obligation, to meet the needs of new, more sophisticated and more demanding consumers while satisfying shareholders' demands for returns—and in doing so creating a sustainable food supply for the new millennium. The report addresses stakeholders across the value chain: producers, primary and value-added processors, retailers and distributors, consumers, and governments/NGOs/regulators. As the world's largest advisory organization, with a large number of staff and clients in the food sector, Deloitte member firms are committed to helping those in the food value chain achieve this vision. We hope you find this report compelling.

Macro-level food trends

Two centuries of improvement

For the past 200 years, there has been a persistent concern that human population growth would not be met by sufficient increases in agricultural production. Yet the opposite has been true. The supply of food has increased dramatically, fueled by increasingly capital-intensive agriculture, continuing application of biological/genetic science to food production, greater ability to save crops from pests, and greater ability to preserve perishable products during transport.

Yet the question arises as to whether this process of improvement can continue to meet the needs of a growing and more affluent global population. The answer is probably yes. There remains plenty of room for increases in land productivity. Consider the fact that the amount of coarse grain yielded from a hectare of land in the United States is three times greater than the average for the rest of the world. If land productivity in the rest of the world can be increased, food production will rise accordingly.

This is important given the trends taking place in the global marketplace. In the coming decade, it is likely that a disproportionate share of global economic growth will take place in emerging markets. In these markets, the number of middle-class consumers will rise rapidly. In part, this will be driven by continued migration of rural inhabitants into the cities. Already today, about half of the world's population is urban. Middle-class consumers tend to consume far more meat, fish, and dairy products than poorer consumers. In addition, these products require more grain inputs to achieve a given level of calories. Thus, not only will food demand rise due to a rising population, but also due to rising incomes.

What next for global food production?

Boosting land productivity in the emerging world will require several things to take place. First, there will have to be a more capital-intensive form of farming similar to what now takes place in affluent countries like the United States. Capital investment, in turn, will require that the prices of farm output be set by the forces of supply and demand rather than by governments.

Today, subsidized agriculture in rich countries leads to low-price farm products being exported to poor countries. This harms the ability of farmers in poor countries to remain competitive. In addition, some poor countries engage in policies designed to support the needs of urban dwellers, thus discriminating against farmers. Changing these factors is politically difficult but necessary.

In addition, farmers will need to have proper access to credit to fund new capital investments. They will also need to be assured of property rights as an incentive to inreasing productivity—and value—of the land for future sale. Finally, there is considerable room for improvement in food distribution throughout the emerging world. In some poor countries, a large share of perishable food is lost during the process of distribution because of inefficiency or lack of refrigerated transport. A good solution to this problem is the development of modern retailing. Allowing foreign retail investment into poor countries has been an important tool in creating greater efficiency in the supply chain. The result of this is not only greater availability of food, but lower prices and, consequently, greater purchasing power for poor consumers.

For now, it does not appear that the world's agricultural productivity is rising sufficiently to keep up with increasing demand. One reason is the increase in global food prices in the past decade. Another is the shift in land away from farming toward urban use, which is likely to continue. Still another reason for rising food prices is the rise in global energy prices. This may continue in the coming years as demand in emerging markets grows rapidly. On the other hand, vast increases in energy production are now possible in several parts of the world where new discoveries and new technologies are changing the dynamics of the global energy market.

The food value 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 This includes (1) the producers that research, grow, and trade food commodities, such as corn and cattle; (2) the processors, both primary and value added, that process, manufacture, and market food products, such as flour and bread; (3) the distributors, including wholesalers and retailers, that market and sell food; (4) the consumers that shop, purchase, and consume food; as well as (5) governments, non-governmental organizations (NGOs), and regulators that monitor and regulate the entire food value chain from producer to consumer.

Collaboration among the various stakeholders along the food value chain is more important than ever. The interdependencies between stakeholders are no longer mainly between the functions most closely linked along the chain but can encompass stakeholders anywhere in the network. Because of the global food supply chain and a number of high-profile global food recalls, food safety and traceability have become a major concern.

Every stakeholder must be responsible and accountable for the sourcing, handling, and quality control of food because a food-related illness due to a mishap anywhere along the value chain can ruin a company's reputation, even if it is not specifically at fault. Therefore, food safety policies and regulations require the input and collaboration of all stakeholders.

Knowledge and data sharing (e.g., food storage best practices, consumer trends, inventory levels) is another area where collaboration among stakeholders can improve efficiency along the value chain. In addition, greater vertical integration within the value chain (e.g., retailer private label programs) means that individual stakeholders are taking on additional roles and responsibilities.

The following sections delve further into the key issues, trends, and leading practices of each of the stakeholders outlined above and provide opportunities for improvement and collaboration across the supply chain.

Stakeholder	1. Producers	2. Processors	3. Distributors	4. Consumers
Role	• Research and development • Farming • Ranching • Trading	• Harvesting • Butchering • Processing • Value add processing • Manufacturing • Marketing and sales	• Distributing • Retailing	• Shopping • Consuming
Key issues	• Mangement capabilities (e.g., brand and risk management, skill gaps) • Strategy (e.g., market strategy, M&A for scale) • Financial issues (e.g., input and sale price volatility)	• Strategy (e.g., going global, regulatory • Achieving scale (e.g., M&A) • Supply chain strategy (e.g., vertical integration, security, safety)	• Strategy (e.g., consumer) • Supply chain strategy (e.g., vertical integration, traceability)	• Food prices (e.g., high prices, price volatility) • Food security (e.g., availability) • Food safety (e.g., traceability) • Health and wellness (e.g., obesity)

Stakeholder	5. Goverments/NGOs/Regulators
	• Public health and safety • Public policy
	• Food and product safety • Security (e.g., resource, land and food availability and allocation) • Policy and support

Producers

Economic growth in developing countries—leading to a more protein-based diet—coupled with the overall growth of the global population to 10 billion by the end of the century will require a near doubling of food production. This will be a big challenge for the world's food producers who must deliver against the ill winds of climate change, soil degradation, and competition for land and water resources also needed for urbanization—e.g., the California experience.

So who are the world's food producers? They are millions of small farming businesses, often third- or fourth-generation family farms, with few national and even fewer international corporate players. These farming business are small in scale compared with the global input suppliers (e.g., seed, fertilizer, machinery) and have concentrated sector-oriented customers. The consolidation in the supply chain that has occurred over the past 30 years has not played out at the producer level, and it is the weaker for it. This is why it is often said that farmers buy retail and sell wholesale!

But the world has changed. Farmers have moved from trying to sell what they produce to producing what they know they can sell. For the past 30 years the talk has been "subsidy" and "surplus," but these words will be replaced by "shortage" and "security of supply" in the next 30 years.

Consumers could be forgiven for thinking that food inflation costs them but profits producers, but they would be wrong. The recent rise in grain prices in response to downgraded harvest estimates has hit dairy, pig, poultry, and beef producers hard, and few are making money. Even grain producers are suffering because the high prices do not compensate for the lower yields and high fertilizer costs. Sitting uncomfortably between powerful suppliers and retailers, they cannot pass on the cost increases. Nobody wants food inflation, least of all governments seeking re-election, so the pressure is on the supply chain to absorb the increase with consequent erosion of margin. Producers and primary processors bear the brunt of this, and so are trapped between the proverbial rock and a hard place.

Issue #1: Efficiency

Throughout the world, the majority of farms are small, privately owned, family enterprises. Whether they are small plots in an emerging country providing food to a handful of citizens to larger acreages in North America and Europe, these independent operations often struggle with economic scale. Farming is a capital-intensive business and productivity is enhanced with investment in new equipment. Similarly, marketing channels are more difficult to access for smaller producers.

Collaboration within the supply chain has only really happened during periods of agricultural crisis, as farmers are notoriously independent. However, the 20th century saw increasing collaborative behaviour, including the establishment of local buying/marketing groups; sharing of machinery and farming operations; and establishment of producer organizations and larger cooperatives. The most successful of these are now expanding across borders (e.g., Arla Foods/Milklink merger in July 2012). This is set to continue, particularly in the more specialist sectors of dairy, pig, fruit, and vegetables, where scale and linkage with primary processing is critical. At the operational level too, producers will collaborate to achieve scale, production efficiency, and risk management. In the UK, there are now groups of grain farmers effectively pooling their acreage and sharing the enhanced profit on a simple area basis. It works, and there is huge potential to capture the benefits of scale and professional management with such arrangements.

Issue #2: Market Volatility

Volatility of input costs and selling prices, coupled with the unpredictability of weather and yields, is particularly difficult to manage in farming because of the long production cycles and the inability to respond to market movements. Grain producers can have working capital tied up in their crops for up to 18 months before realization, and they have to consider price, exchange rate, and interest rate movements before planting.

Risk management is now an integral part of farming. Producers mitigate operational risks through spreading of crops, farming across different weather regions/soil types, and using long-term customer contracts and commodity markets to hedge price movements.

Issue #3: Capital

Historically, capital has not been an issue for farmers whose farms have been in the family for generations. However, recent market volatility and weather-induced lower yields not only create risk as noted above, but also working capital strain due to the long cash cycle. The appreciation of land values is also creating a financing gap for newer farmers. Values are being driven up by a combination of urbanization and offshore investment. Both the private investment community and the sovereign wealth community have begun to invest in farm property as a safe haven.

Producers will need to be innovative in the way they grow their businesses, and there will be greater acknowledgement that landowning and farming are separate businesses with different risk and return models. There will be more land leases, joint ventures, and contract farming arrangements in response to this. Long term contracts with customers in the value chain will enhance farmers' ability to obtain working capital financing.

Issue #4: Innovation

Enhanced farm research is needed to increase efficiency and yield and to meet new consumer demands. In some countries governments have lowered incentives for this type of research, but the research must continue to help increase global food production. This is another area for value chain collaboration, particularly where other funding is not available. Customer information from the retail end of the value chain needs to be incorporated into its processing and farming elements.

Progressive farmers are investing in crop field trials and breeding programs either individually or collectively through agreements and producers' associations and co-operatives. Research on such arrangements needs to be performed with greater transparency and collaboration with other members of the value chain. In addition to the sharing of consumer information and preferences, there needs to be greater collaboration with manufacturers of fertilizers and pesticides to ensure continued growth in yields. Similarly, seed producers need to work with farmers to develop seed stock that is more resilient in the face of changing climate conditions. A long-term commitment, a strong balance sheet, and, ultimately, profitable farming are required in order for producers to deliver.

Processors

Processors are involved in both the preparation of fresh foods for market as well as the production of prepared food products. As such, food processing is composed of a relatively diverse collection of companies processing products at different stages: meat slaughtering and processing; fruit and vegetable preserving; grain and oilseed milling; seafood product preparation; sugar and confectionery, bakery, dairy, and other food product manufacturing.

Issue #1: Innovation to support growth

As the global population continues to expand, food processors will be challenged to continue to improve productivity. To date, the food supply chain has shown itself to be remarkably adaptive to evolving consumer demands. However, success in the future will require both adapting to changing demographics and consumer preferences as well as managing in an increasingly global and complex business environment.

Food processors are extremely important members of the food value chain that will need to support the expected global population of over 10 billion people mentioned earlier. To do this they will require significant changes to product line, distribution channels and supply chain.

Leading global producers are already working to address new consumer demands, globally diverse diets and calls for sustainable supply chains and manufacturing processes. However, collaboration throughout the value chain is extremely important to this group, as the manufacturing of food—the central activity of the value chain—requires both up-and down-stream collaboration.

Issue #2: Globalization of food

The increasingly globalized food industry has resulted in greater specialization in the processing community and more variety at lower prices. The overall trend over the past 10 years has been increased consolidation across all subsectors of the food industry. Global mergers and acquisitions have been critical to enabling many large multinationals to achieve economies of scale and find new avenues of growth. While this activity declined during the recent recession, it has been increasing steadily since 2010, with food companies brokering some of the largest mergers and acquisitions in the world. Nestle and Pepsico, for example, have done more than 80% of their still very numerous transactions in the last two years in emerging markets. The early 2013 purchase of Heinz was to-date the largest ever in the food industry.[ii]

The developing world will be a significant driver of the growth in demand for food. Feeding this growth will require a very significant change in the way food is produced and distributed, requiring much greater international trade. And modern approaches to farming, processing, and distribution will need to be adopted by many more countries in order to support trade on a larger scale. In addition, the growing global middle class of consumers, many of them in the developing world, will lead to dietary changes, with consumers seeking a diet that is more diverse and where meat and fish protein play a larger role.

Processors will need to continue to acquire assets to build scale and secure market channels. They will also need to look to an M&A or joint venture strategy to secure the raw materials required in their production process. This is no easy task when the strategy, most

Issue #3: Secure/safe supply chain

Today, more than ever before, consumers are thinking about food—from how it's produced and what's in it, to where and when they eat it. They are also increasingly prone to anxiety about food safety. That's not surprising given that, on average, over 300 food recalls are reported every year, which result in more than 75 million food-borne illnesses, 325,000 hospitalizations, and 5,000 deaths.[iii] Among food industry executives, product quality failure is considered to be one of the biggest risks.

Food & Product Safety (F&PS) has become a critical area of concern for companies whose success depends on the public's confidence in the safety of the nation's food supply and the products they consume. New regulatory requirements, increased supply chain complexities, and ongoing scientific developments present many challenges and opportunities

Leading companies are investing in securing their supply chain, developing plans to manage recalls, and enhancing product labeling and traceability. They are building compliance systems to ensure they are in compliance with all regulatory regimes where their product is consumed. Such systems include regular verification procedures to ensure ongoing compliance.

Systems are also improving supply chain transparency through track and trace technologies, often many different systems throughout the supply chain. Once again extensive collaboration and cooperation is necessary to ensure these systems operate effectively. Processors are also working with their partners in the value chain both up and downstream to enhance communication and to ensure all members of the chain