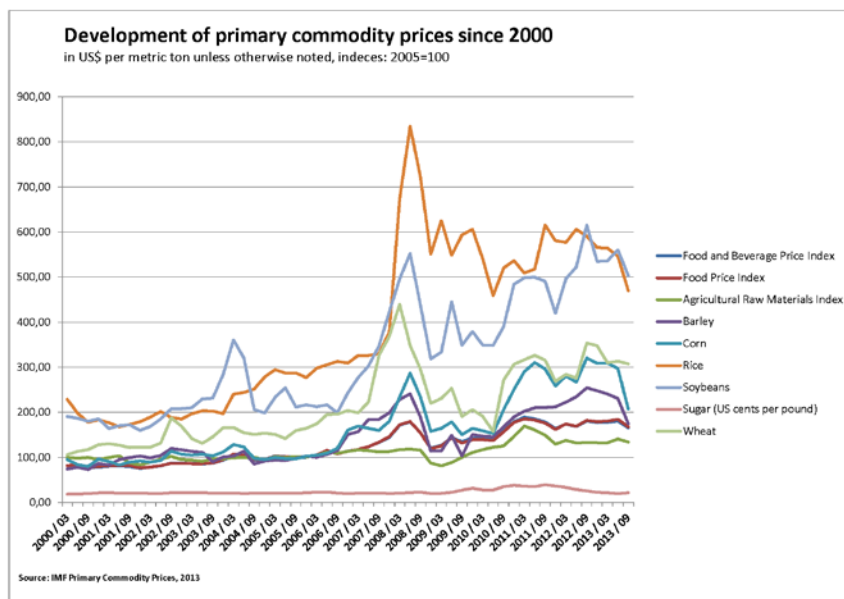


Volatility: The Agribusiness Response

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Widely fluctuating and generally rising agricultural commodity prices over the last seven years (see **Figure 1**) have brought a host of challenges and opportunities to agribusiness firms at all levels of the value chain. While grain and oilseed farmers have enjoyed several years of record incomes and seen farmland values soar, many processors and food retailers have been caught between two constraints. On one hand, they need to take rising and volatile prices into account and allow the market signaling mechanism to work, while on the other hand they need to ensure that their products are cost competitive and that their customers are not overly affected when raw materials suddenly get more expensive.

Figure 1



Given the prospect of significant future demand growth due to increases in population and income, little expected change in government policies towards carryover stocks, and the likelihood of increased weather variability due to climate change, it seems unlikely that volatility will diminish anytime soon. With this landscape in mind, this paper explores four ways in which agribusiness firms are attempting to combat volatility and seek growth in this dynamic environment. The content is based on several years of extensive field research conducted by Harvard Business School for its annual Agribusiness Seminar for senior industry executives.

STRUCTURAL *TRANSITIONS*
IN GLOBAL AGRICULTURE

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Tightening Supply Chains

Around the world we see evidence that firms of all types—from independent restaurants to national grocery retailers to global branded food companies—are thinking “farm-to-fork.” In the U.S., Domino’s Pizza now works with its protein suppliers to determine the best time to purchase animal feed. In Italy, Barilla is contracting with farmers for specific wheat varieties and building massive storage silos for the durum used in its pasta. In China, Nestlé and Fonterra are building large-scale dairy farms. In Ireland, McDonald’s front page newspaper ads and in-store signage prominently feature local beef producers.

Adoption of a total supply chain view is being driven by myriad short-term and long-term factors. Along with the need to manage increased price volatility (one industry leader described the new agricultural environment as having a “smaller surge tank” to absorb variations in supply and demand), firms are shortening and tightening their supply chains in order to secure current and future supply, ensure food safety, enable traceability, meet sustainability targets (sustainability cannot be built into a product after it comes off the farm), and/or protect brand reputation (bad news spreads like wildfire in today’s digitally connected world¹).

Instead of purchasing on the open market, firms are generally seeking to move closer to their input suppliers through a mix of actual and “virtual” integration—bypassing middlemen and working directly with producers; entering long-term contracts or partnerships; acquiring or investing in processing, storage, and sometimes even farmland, etc. A key objective is to learn how to “source better” and to increase information sharing up and down the chain. Benefits of integration include improved decision making, faster response time, reduction of waste, elimination of layers of margin, and the flexibility to capture profits at whatever stage of the chain they occur.

*Olam*²

From its beginnings as a cashew trader in Nigeria in 1989, Olam grew rapidly into one of the world’s top agricultural trading companies. Olam’s “up-country” managers sourced specialty commodities from the farm gates of multitudes of small African producers, blended and processed them to meet customer requirements, and delivered them to major food companies such as Nestlé, Kraft, and Mars. The firm was recognized for its disciplined approach to growth, asset-light business model, and financial savvy.

Yet 20 years after the firm began, Olam founder and CEO Sunny Verghese executed a dramatic shift in strategy. By the middle of 2012, the Singapore-based firm had invested in farms, plantations, and forest concessions covering 2.2 million hectares across 10 products—from almonds to rice to dairy—in 11 countries. New midstream activities included cashew processing in Tanzania and Cote d’Ivoire, cotton ginning in Mozambique, and flour milling in Ghana and Nigeria, where Olam had also acquired a food processing company and a dairy.

¹ In late 2012, news of contaminated chicken at KFC China caused sales in the chain’s 5,300 stores to plummet by 40% in January 2013.

² David E. Bell and Mary Shelman, “Olam: Charting a New Course,” HBS Case 513-044 (Boston: Harvard Business School Publishing, 2012).

A major driver of Olam's new approach was the belief that margins would increasingly migrate toward the farmer due to constrained supply outstripping burgeoning demand. In addition, the resulting full-chain control would provide a secure, sustainable, and fully traceable supply chain for Olam's current customers, while investments into local food businesses would lay the foundation for future growth.³

*Tesco*⁴

In 2010, U.K.-based Tesco, the world's third-largest food retailer with stores in 13 countries, faced an extremely difficult domestic environment. Cash-strapped British shoppers were turning away from gigantic "hypermarkets" on the outskirts of town—Tesco's forte—to shop at smaller stores closer to home. At the same time, the rapid expansion of "hard discounters" Aldi and Lidl substantially reduced industry margins. This made it extremely difficult for Tesco to absorb sharp commodity price swings and win customers back with superior offerings.

Tesco responded by transforming its traditional buying organization. Instead of country-based commercial teams responsible for both buying and selling, a new centralized sourcing department was created for fresh food and store-brand grocery products. "Group Food" hired global sourcing specialists, set up supply hubs in key producing countries, cut out middlemen, and formed partnerships with a small number of carefully selected suppliers. Frequent RFPs were replaced with multi-year contracts. Information sharing was emphasized to reduce waste and enhance the new product development process.

Tesco's reorganization centered on four main tenants: a dedicated sourcing team that could build deep category knowledge and leverage scale in buying and logistics; closer relationships with preferred suppliers, many of which agreed to work on an open-book cost-plus basis with fixed margin targets; working deeper in the supply chain, for example buying beef carcasses from farmers rather than cuts from processors; and an advanced demand planning and information sharing network for suppliers.

Group Food allowed Tesco to reduce costs and sharpen consumer pricing while cutting food waste across the supply chain. Suppliers also gained from the integration, as the guaranteed quantities and margins reduced their commensurate volatility risk and the new relationship provided opportunities for product development that would not be possible without the long-term commitment and direct access to Tesco sales data. In the future, Tesco plans to use its buying expertise and scale to purchase agri-inputs, such as animal feed and fertilizers, for the farmers that produce its meat and dairy products.

³ Not everyone agreed with Olam's new strategy. In November 2012, the short-seller Muddy Waters issued a report that opened with "Olam runs a high risk of failure. It's 'asset heavy' strategy appears to be an off-the-rails CapEx and acquisition binge." (Michelle Yun, "Muddy Waters Attacks Olam's Purchases, Likens to Enron," Bloomberg, November 27, 2012) The price of Olam shares fell from S\$1.95 in early November to S\$1.40 in mid-December, but recovered over time. In May 2014, Singapore's state-owned investment firm Temasek, Olam's second largest shareholder at the time of the Muddy Waters report, gained majority control of Olam with 80% of outstanding shares (acquired at S\$2.23/share).

⁴ Jose B. Alvarez, Damien P. McLoughlin, and Mary Shelman, "Tesco Group Food," HBS Case 514-022 (Boston: Harvard Business School Publishing, 2014).

Differentiation

While some firms seek to lock-in prices through supply chain integration to reduce their exposure to volatility, others are looking to stabilize margins and move them back into their favor by tailoring their commodity-based products to meet specific customer or consumer needs. By creating extra value through differentiation (either through special product traits, sustainable and/or ethical sourcing, whole-chain traceability, or a combination), firms can achieve premiums—and ultimately create brands⁵—for their products and reduce the threat that volatility has on margins. For example, Italian tomato processor Mutti pays farmers extra for high quality fruits that produce a tastier product without added flavorings, a difference that customers appreciate. Mutti-brand canned tomatoes sell at a 38% premium over competitors, leaving Italy's top-selling tomato brand with room to absorb price swings.

Supply chain alignment and the feedback loops that accompany it allow a firm to deliver customer insights and preferences to upstream production and successfully differentiate its commodity products. By controlling more aspects of the supply process, firms can also satisfy consumers' growing need for information on where their products come from and how they are produced. For example, New Zealand clothing firm Icebreaker provides a "baa code" for each garment that it sells; entering the code shows the living conditions of the high country sheep that produced the specific item's merino wool fiber. This end-to-end connection creates a virtuous cycle that allows agribusinesses to continually refine a product's value proposition or characteristics and receive feedback on the changes, either through pricing mechanisms or commentary.

IdentiGEN⁶

Irish technology firm IdentiGEN has developed DNA tracing systems for a range of customers throughout the protein supply chain. The firm's operating model allows the testing and verification of specific meat product origin and path to market. Making headlines in early 2013, IdentiGEN testers were the first to verify and trace the presence of horsemeat in packages marked as ground beef in British retail stores. While hardly the first incident of the type, the horsemeat scandal and subsequent massive outcry brought to light the hazards of lengthy supply chains while underscoring consumers' desire to know where their food came from and if it was safe to eat.

Retailers and their partner producers employing IdentiGEN services are able to show their consumers that they are committed to transparency and traceability surrounding the origin of the meat they sell. British retailer Marks and Spencer's "We trace it, so you can trust it" campaign features IdentiGEN's "DNA TraceBack" logo on packages to give customers confidence that the product they are purchasing is authentic Aberdeen Angus beef.

⁵ A brand is an established reputation with a customer. It is an asset in three ways: customers are willing to pay more for a brand compared to an unidentified product, customers are more willing to stick with their favorite brands even in the face of innovative products from competitors, and customers are more willing to try innovative products from a favored brand.

⁶ Ray A. Goldberg and Matt Preble, "IdentiGEN," HBS Case 914-408 (Boston: Harvard Business School Publishing, 2013).

However, IdentiGEN's greater potential lies in the continuous feedback loop that it enables. By keeping track of each animal coming through a supply chain through DNA sampling and connecting that with processor and consumer data, IdentiGEN can ultimately determine valuable information such as which farm produced the best quality meat, what feed contributed to the best quality animal, and even what breed or breed mix was most satisfying to consumers. Loblaw's, the largest Canadian grocer, recently unveiled DNA TraceBack-branded beef products in its stores, which allows customers to give feedback about their specific purchase in order to refine future product offerings.

Origin Green

In June 2012, the Irish Food Board (*Bord Bia*) launched a comprehensive initiative, Origin Green, meant to differentiate Ireland's food products based on verified sustainable production. In doing so, it is seeking to capitalize on global environmental trends and the need for origin assurance. The launch of Origin Green was an unprecedented step as it is the only sustainability program in the world that operates on a national scale, involving government, the private sector, and food producers.

Origin Green is based on the Origin Green Charter,⁷ which is intended to promote best practice and continuous improvement in the design, implementation, and reporting of environmental and other sustainable practices in the Irish food and drink industry. Participant companies make a multi-year commitment to either reduce resource use or maximize benefits accrued for their individually designated targets in three areas: raw material sourcing, manufacturing processes, and social sustainability. The initial plan and on-going audits are verified by a third party.

Origin Green builds on the highly successful *Bord Bia* Quality Assurance Scheme, initially designed for beef, pork, and lamb producers and now expanded to dairy and other sectors. At farm level, 38,000 *Bord Bia* Quality Assured beef farms, representing 85% of Ireland's beef production, have been assessed for emissions performance in the first steps to gather data on carbon, water, and biodiversity at farm level. No other country is carbon foot-printing its farms on what is in effect a national scale, and not just once but routinely on an 18-month cycle, and doing so in a process of measurement, feedback, and continuous improvement.

To date, some 345 Irish food and drink companies have registered with the Origin Green program. The anticipation is that, by the end of 2014, 75% of Ireland's food and drink exports will be sourced from Origin Green-verified members. The objective is to have 100% of Ireland's food and drink exports covered by 2016.

Supply Growth

Expanding demand accompanied by lagging and uneven increases in supply drive volatility. Current sources are under greater pressure, with market prices responding sharply in the face of adverse weather events or other supply shocks. Accordingly, another method to combat volatility is to increase overall production, leading to an inventory cushion that dampens price fluctuations. Downstream

⁷ For more information on the Origin Green Charter, see <http://www.origingreen.ie/about/our-sustainability-charter/>, accessed August 2014.

processors and significant importers, such as China, would prefer to buy from a flush market, a condition that shifts power—and thus margins—back in their favor.

Along with input suppliers such as seed and ag chemical companies, agribusiness firms and financial investors are working at the ground level to stimulate production through investments in land, technology, infrastructure, and training. In India, Coca-Cola is partnering with Jain Irrigation to help 50,000 mango growers adopt modern agricultural techniques with a goal of doubling yields—critical because Coca-Cola’s bestselling drink in India is mango-based and the country’s current production cannot support the company’s growth projections. In China, Nestlé’s and Fonterra’s large-scale dairy farms are pilots to demonstrate that Western milk yields can be achieved (in addition, they serve as training centers), while Shuanghui’s 2013 acquisition of Smithfield brings access to U.S. pork production technology and quality systems. Across Africa, Olam and many others are using a “hub-and-spoke” approach, with large commercial farms surrounded by hundreds of smallholders and a strong emphasis on technology transfer.

Mission Produce⁸

As the largest distributor of avocados in the U.S., Mission Produce is enjoying an exploding market due to the fruit’s healthy profile and the rising popularity of Mexican cuisine. U.S. demand for avocados grew 34% in 2012, with consumption per capita reaching record levels of 5 pounds a year. Per capita consumption in Mexico is four times higher, suggesting plenty of room for continued growth. However, not everything was rosy. Declining production in California, the top U.S. producing state, and slow-growing international supplies threatened Mission’s ability to procure avocados at a reasonable price on a year-round basis.

Despite an asset-light business model and no previous farming history, in 2012 Mission acquired 5,000 acres in the Peruvian desert. Over 22 months, the completely barren land was improved with organic matter and irrigation infrastructure and nearly one million trees were planted to create what is now one of the world’s largest avocado orchards (see photos below). Once harvesting begins in 2014-2015, Mission’s Peru orchards will provide a secure ongoing supply at predictable prices and allow Mission to offer its customers long-term contracts.

⁸ Jose B. Alvarez and Mary Shelman, “Mission Produce,” HBS Case 514-023 (Boston: Harvard Business School Publishing, 2014).

Mission Peru Orchards



August 2011



December 2013

International Expansion

Many agribusiness and food companies are being forced to look beyond their traditional footprints as growth slows in mature markets and global sourcing becomes the norm. Through investment in international supply expansion and cultivation of new demand, firms are seeking to spread risks and offset some of the effects of volatility. China and Africa, in particular, have seen substantial new investment.

China

China must feed its 1.3 billion people—22% of the world’s population—with less than 10% of the world’s arable land and only 6% of its water.⁹ At the same time, income growth and relentless urbanization are contributing to dietary shifts away from grains and vegetables toward more resource-intensive proteins and a burgeoning demand for branded foods and convenience products sold in new shopping and eating venues. Yum Brands (parent of KFC, Pizza Hut, and Taco Bell) took full advantage of the changing tastes and demographics of Chinese consumers. Today, Yum is by far the largest restaurant company in the country with 6,000 KFC (a new store opens every 18 hours!) and Pizza Hut restaurants spread across 750 cities. Other international and domestic chains—from McDonald’s and Starbucks to Dicos—are expanding rapidly as well. However, food processors and retailers in China face significant challenges in navigating the country’s fragmented production base, lack of cold chain, unevenly enforced food safety laws, and ongoing food safety issues. Importers face obstacles as well: the August 2014 discovery of

⁹ World Bank, <http://www.worldbank.org/en/news/press-release/2011/09/05/world-bank-china-advance-work-on-china-economy-future>, accessed August 2014.

ractopamine in a pork shipment has led to a ban on several U.S. suppliers including Tyson Foods¹⁰ and China's slow approval of a new Syngenta GMO corn hybrid has shut down U.S. DDGS shipments.¹¹

On a broader level, China's growing appetite is changing the dynamics of global agribusiness. To ensure food security, the country has made large investments into land and infrastructure in Brazil, Africa, Australia, and Russia to stimulate supply and improve logistics. Chinese-owned companies (SOEs and publicly traded alike) have also made significant corporate acquisitions, purchasing such well known firms as U.S. pork producer Smithfield, New Zealand dairy processor Synlait, Dutch ag products company NIDERA, and the agribusiness arm of Hong Kong's Noble Group. Moving forward, China's choice of food policy (e.g., whether to import animal feed or frozen chicken) will have a massive impact on industry structure and commodity price levels as the country decides what to produce and what to purchase.

OSI China¹²

As the world's largest protein supplier to quick-serve restaurant (QSR) chains, OSI opened its first meat-processing facility in Beijing in 1992 at the behest of its long-term customer McDonald's. By 2012, OSI had built a \$350 million business supplying processed meats (primarily chicken), fresh vegetables, and a wide variety of other products to China's fast-growing chain restaurant industry.

Historically, OSI purchased the raw material (including poultry parts) that it needed from outside suppliers. However, China's fragmented poultry production system (there were almost 650,000 enterprises producing poultry in 2012), serious poultry disease problems, and on-going food safety incidents led OSI to decide to begin producing poultry themselves in order to provide their customers with "residue-free" meat. As OSI's CFO noted, "If we can't manage it, then we must own it."

To meet rapidly growing demand, OSI embarked on a \$400 million expansion in 2011 that included an array of large-scale investments in additional processing capacity as well as new facilities for broiler production. Unlike traditional poultry integrators that contracted with farms to grow out chicks, OSI's sites would include their own broiler farms to ensure that production would meet the high levels of food safety and quality control required by its QSR customers. This significantly increased the initial capital requirements but would allow OSI to manage the entire production process. At completion in 2015, the project's three new vertically integrated poultry complexes would have the capacity to produce 300 million broilers a year.

¹⁰ P.J. Huffstutter and Theopolis Waters, "Tyson Foods looks for other pork export markets after China Ban," Reuters, August 15, 2014, <http://www.reuters.com/article/2014/08/15/us-tyson-foods-pork-exports-idUSKBN0GF20K20140815>, accessed August 2014.

¹¹ Dan Charles, "When China Spurns GMO Corn Imports, American Farmers Lose Billions," NPR, July 31, 2014, <http://www.npr.org/blogs/thesalt/2014/07/31/336833095/when-china-spurns-gmo-corn-imports-american-farmers-lose-billions>, accessed August 2014.

¹² David E. Bell and Mary Shelman, "OSI in China," HBS Case 513-045 (Boston: Harvard Business School Publishing, 2012).

OSI's expanding business in China did not come without challenges. OSI found it difficult to access large tracts of land necessary for its production facilities and to maintain high quality standards in construction. In the summer of 2014, one of OSI's processing facilities became the center of a food safety scandal that had extremely sensitive Chinese consumers rebelling against KFC and McDonald's.¹³

Africa

With 6 of the top 10 fastest growing economies and 60% of the world's uncultivated arable land, Africa is a natural home for the next agricultural revolution. The World Bank estimates that Africa's farmers and agribusinesses could create a trillion dollar food market by 2030 if they can expand their access to capital, electricity, and technology.¹⁴ China and Brazil in particular are making significant investments in land, infrastructure, and technology transfer to help unlock Sub-Saharan Africa's agricultural potential.

Companies at all levels of the supply chain are feeling more confident in the economic prospects and stability of Africa. As mentioned in an earlier section, Olam has made African specialty commodities a focal point of its ongoing strategy; it now works with 3 million farmers throughout sub-Saharan Africa and is building local food businesses in a number of African countries. Nestlé announced in 2011 that it would invest \$1.4 billion by 2015 to increase African production capacity, with new plants or expansions in Kenya, Zimbabwe, Nigeria, Democratic Republic of Congo, Mozambique, and Angola.¹⁵ In 2012, Syngenta committed to invest over \$500 million, hire and train 700 people, and build a \$1 billion seed and crop protection business in Africa by 2022.¹⁶

Diageo¹⁷

Diageo, the world's largest premium drinks company, has a long history in Africa primarily through its ownership of the iconic Irish beer brand Guinness. Guinness was first imported to Sierra Leone in 1827 and the first overseas Guinness brewery was built in Nigeria in 1962. Diageo had enjoyed particular success in Africa since the early 2000s as economic growth had accelerated and a new African "middle class" began to emerge. Between 2004 and 2013, the firm invested about \$2 billion primarily to expand

¹³ Tim Loh, "Chinese Meat Scandal Tests Tycoon's Ties with McDonald's," Bloomberg, July 29, 2014, <http://www.bloomberg.com/news/2014-07-29/chinese-meat-scandal-tests-burger-tycoon-s-ties-with-mcdonald-s.html>, accessed August 2014.

¹⁴ "Growing Africa: Unlocking the Potential of Agribusiness," World Bank, March 11, 2013, available at <http://documents.worldbank.org/curated/en/docsearch?query=75663>.

¹⁵ Sarah McGregor, "Nestle Plans to Invest \$1.4 Billion in Africa, Buy Local," Bloomberg, July 5, 2011, <http://www.bloomberg.com/news/2011-07-05/nestle-plans-to-invest-1-42-billion-in-africa-to-maintain-strong-growth.html>, accessed July 2014.

¹⁶ "Syngenta to expand presence in Africa: contributing to the transformation of agriculture," Syngenta website, May 18, 2012, <http://www.syngenta.com/global/corporate/en/news-center/news-releases/Pages/120518.aspx>, accessed July 2014.

¹⁷ David E. Bell, Damien P. McLoughlin, and Mary Shelman, "Diageo: Innovating for Africa," HBS Case 514-054 (Boston: Harvard Business School Publishing, 2014).

brewing capacity in a number of countries. African sales had more than tripled during the period, to almost \$2.6 billion in 2013. Africa's share of Diageo's total sales rose from 9% in 2007 to 14% in 2013. In 2012, Diageo employed over 6,000 people in Africa, equal to one out of every four Diageo employees globally.

To understand and meet the needs of Africa's emerging consumers, Diageo embarked on a massive data collection project and revamped its distribution strategy to reach potential customers who could not easily get to traditional outlets (60% of those living in rural Africa did not have access to an all-season road). Rather than distributing products that sold well in higher income markets, Diageo's innovation team designed new beverages targeted at specific market opportunities in the region. Ruut Extra, a clear beer made from cassava, was developed from concept to first production in only eight weeks after Ghana introduced tax incentives for the use of local raw materials. Snapp, a sparkling apple-flavored beverage, was designed specifically for women who wanted a lighter beverage but did not like the taste of beer.

Africa remained a tough place to do business. Use of local raw materials was critical to minimizing foreign exchange risks, since Diageo's products were sold in local currency; however, supply chains were inefficient, unreliable, or non-existent and knowledge of standards was lacking. Diageo also had to maintain strict compliance to international product and ethical standards throughout its extensive African operation; any deviation would reflect on its global brand reputation and stock price. In addition, Diageo Africa faced a critical shortage of qualified talent at all business levels, a problem common to all firms operating in Africa.

Conclusion

The heightened volatility experienced over the past seven years has created a diverse set of responses from agribusiness firms at all levels of the value chain. Boundaries and business models are changing rapidly in this new environment. Forward-looking business leaders are acting decisively to tighten and integrate their supply chains, differentiate their commodity products, expand available sources of supply, and grow by moving into new geographies. These responses will have significant effects on markets and opportunities in the future:

- As supply chains align and tighten, the quantity and quality of product available to non-integrated players will shrink. This may lead to increased levels of volatility for the firms that do not have captive sourcing.
- As more firms adopt sustainable and/or ethical production criteria to meet the needs of a growing consumer segment, non-differentiated commodities may become the exception in the marketplace. The differentiation added to protect a product's margin from volatility could represent the "new normal" for many agribusiness inputs, with brands and special characteristics ruling in the mind of the end consumer.
- Exploding demand and changing consumer requirements in developing markets such as China and Africa may be enticing, but operating in a foreign market comes with significant challenges. The lack of institutions and infrastructure, cultural differences, and high levels of government

involvement in the sector can pose a serious risk if entered without a deep understanding of local characteristics and dynamics. To succeed, firms must have a strong local presence and be willing to take bold actions to address bottlenecks. Often these are well beyond a firm's traditional business model and thus require new competencies.

- The attractiveness and durability of the new integrated operating models described in this paper must be questioned as conditions change. The examples used here are mainly backward integrations. However, in the situation where profits flow upstream (towards the land), producers may not be eager to tie up with one buyer, preferring instead to retain the flexibility to seek higher (market) prices. In contrast, if supply increases and prices fall, will downstream processors and retailers remain committed to long-term contracts if their competitors have access to cheaper inputs?