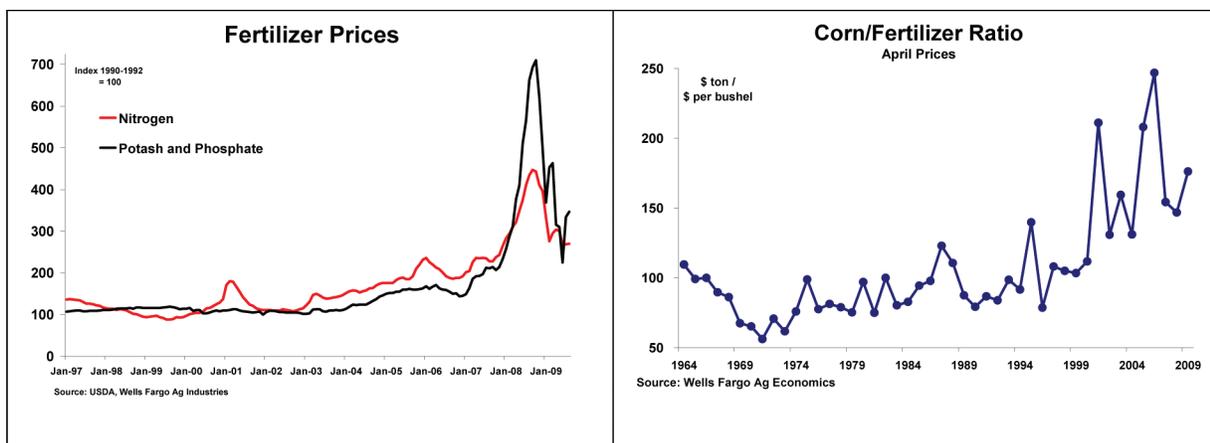


Managing through Commodity Price Volatility from Multiple Perspectives in the Supply Chain

Fertilizer, like all commodities, relies on an interconnected network to move the product from producer to final user. For more than a decade, the fertilizer business ran on thin margins thanks to limited price volatility. Removing a dollar from a ton of fertilizer by improving logistics significantly impacted a player’s competitiveness. Relationships were stable because they were predictable.

Exhibit 1



Then, in late 2007 and with little warning, price volatility ripped through the network, lasting throughout 2008. Initially, rising prices promised higher and easier profits for producers, wholesalers, and retailers. Farmers, seeing grain revenues rise even faster, reluctantly accepted these higher fertilizer prices. But, just as suddenly, the system staggered, and fertilizer prices plummeted (Exhibit 1). Easy profits quickly turned to hard losses, and many long-term relationships were severely strained.

This case study was prepared by Michael Swanson, agricultural economist at Wells Fargo Bank, as a basis for class discussion and represents the views of the author, not the university. The author would like to thank Michael Rahm, vice president of market analysis and strategic planning at The Mosaic Company; Rusty Hollingsworth, general manager of Cone Ag; and Kevin Stoy, partner of Stoy Farms, for participating in this case. No part of this publication may be reproduced or transmitted in any form without written permission from Purdue University.

Michael Rahm from Mosaic (a producer), Rusty Hollingsworth of Cone Ag (a retailer/distributor), and Kevin Stoy of Stoy Farms (a farmer) each play a part in the fertilizer network, and each has been significantly impacted by this historic round of price volatility. All face the same questions:

1. Is the recent fertilizer price volatility a temporary aberration or the new norm for this industry?
2. If it is the new norm, how should they modify their strategies to manage this additional level of risk and ensure the long-term success of their firms?

In addressing these two questions, Michael, Rusty, and Kevin recognize that they must consider the changes others in the supply chain are making. Suppliers, customers, and competitors are all likely to adjust their strategies if fertilizer price volatility is deemed to be the new norm. Each needs to develop and implement a strategy that will ensure long-term viability and success, regardless of how fertilizer prices move.

The Producer Sector: The Mosaic Company

Mosaic, as a North American crop nutrient company, owns major resources in both potash and phosphates. It is the largest producer of finished phosphate products and the third largest producer of potash in the world, with 6.7 and 5.9 million tons of production in fiscal 2009 respectively. The company, based in Plymouth, Minnesota, had fertilizer sales of \$1.5 billion during its first quarter of fiscal 2010, which ended in October 2009. Sales were down 66 percent from the previous year.

Michael Rahm is the vice president of market analysis and strategic planning for Mosaic. He is responsible for assessing the new economic environment and developing an appropriate strategy for the company. Developing a production asset in the crop nutrient industry requires a massive investment. The size of these bets makes employing a strategic planner, like Michael, an ideal resource for Mosaic. When approaching a challenge like this, Michael cautions people not to make generalizations about farmers or the supply chain because it can cause them to lose sight of important details.

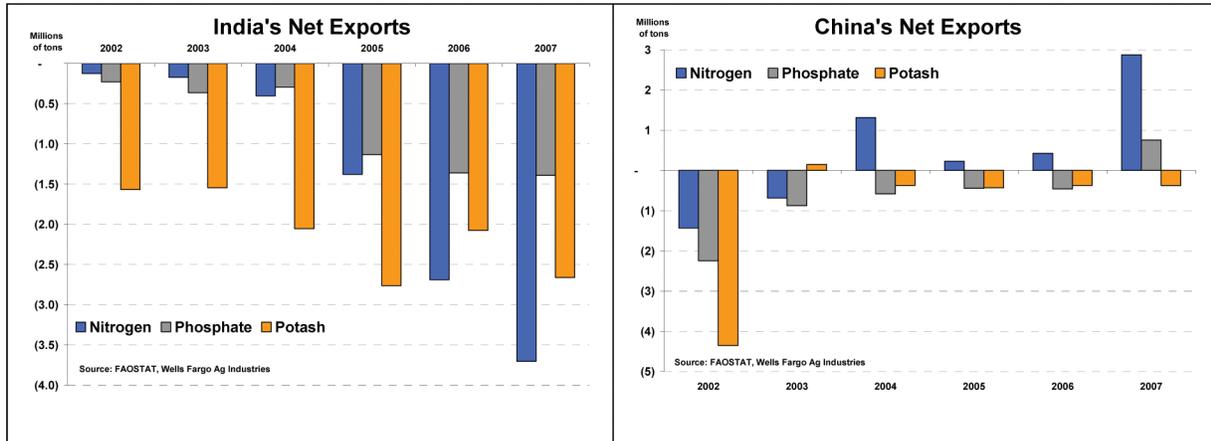
Until last year, Mosaic included nitrogen as one of its major product lines. However, the company made the strategic decision to exit the nitrogen production market. This decision represents a major shift in its investment strategy, the result of changing market dynamics within the fertilizer industry. The U.S. nitrogen industry is about one-half the size it was a dozen years ago due to changes in relative natural gas costs. The largest U.S. nitrogen producer at one time (Farmland) went through Chapter 7 liquidation, and the United States now relies on imports from offshore (i.e., excluding Canada) origins for more than one-half of its nitrogen needs. Michael says that the company divested its nitrogen business mainly because it had no viable growth opportunities in that sector. Mosaic was a seller, rather than a buyer, of North American capacity at 2008–2009 valuations, and offshore growth opportunities were full of political risks. Mosaic is redeploying the capital from a low multiple business (nitrogen) to expand its higher multiple business (potash).

The nitrogen and phosphate sectors of the fertilizer industry, which historically tracked reasonably closely, have diverged markedly over the past few years. Changes in the global fertilizer market caused this split. Over the last decade, many new producers have entered to compete with the traditional U.S.

suppliers based on “cheaper” natural gas. With the explosive growth in global agriculture production and demand, many companies and hedge funds are making major bets on crop nutrients.

The crop nutrient market has a global reach. The phenomenal economic growth of India and China makes them more important players than ever (Exhibit 2). Of the two, India suffers from a poor endowment of the major three crop nutrients for its indigenous supply. It has a well-publicized history of supporting its farmers through strong subsidies for fertilizer. Michael explains that the

Exhibit 2



Indian government controls the retail price of fertilizer (it sets a Maximum Retail Price or MRP). These MRPs are set at low levels and haven't change in about eight years. The government pays domestic producers or importers of crop nutrients the difference between the global price and the MRP. The fertilizer subsidy bill varies with the global price of crop nutrients, and during the run-up of crop nutrient prices in 2007–2008, their subsidy was about the same size as their defense budget. Reforms are under consideration today, Michael says. Given the size of India's crop production area, this variation in government support has a huge impact on international fertilizer prices.

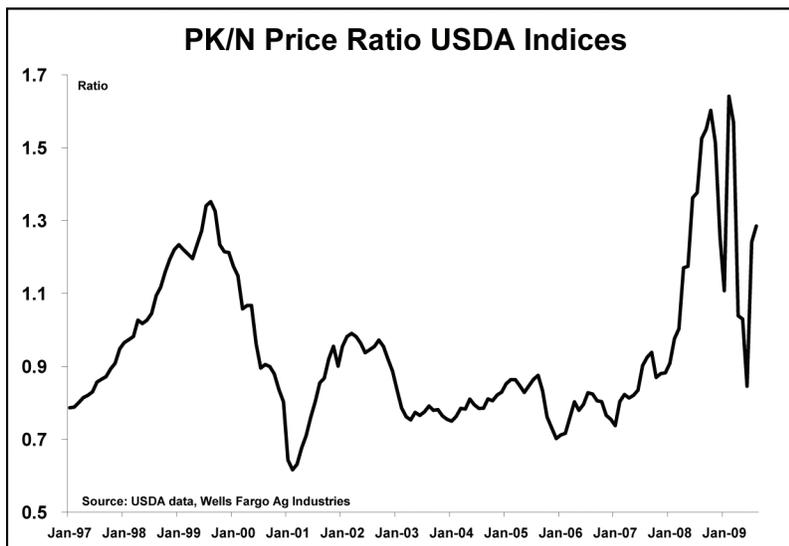
Historically, China has been a large fertilizer importer. However, the country made the strategic choice to develop its nitrogen capacity using coal as a feedstock. Typically, natural gas represents a better feedstock for the production of nitrogen fertilizer. It requires a much lower capital investment and has a lower cost of production. The use of coal as a feedstock requires it to be first pushed through a synthetic gas process. This approach involves crushing and heating the coal, which is more expensive. It also generates a higher carbon dioxide output per ton of fertilizer produced. The process would be subject to major environmental scrutiny in many countries, but not in China. Similarly, China has access to phosphate reserves that are of lower natural quality than some countries, such as Morocco. But, the lower-yielding quality of phosphate rock did not deter the Chinese from developing their fields. The Chinese want the strategic ability to control their phosphate production, even if it results in higher processing costs. China remains dependent on potash imports, but given its focus on food security, it may develop potash, as well. Most industry analysts do not expect them to become self sufficient in potash.

Michael recognizes that, as expected by classic economics, the higher price of crop nutrients has caused farmers and all the other links in the supply chain to re-evaluate what is possible. For

example, there have been significant advancements in variable-rate application, along with grid sampling. Many of the supply chain participants and investors in the United States have wondered about 2009's low rate of application but strong crop yields. Michael points to a logical explanation. He says that many farmers were incented to assess the nutrient levels in their fields prior to application. Then, using variable rate-application and grid sampling, they were able to reduce application of most nutrients. However, he feels that inventories from the mouth of the supply chain to the farm field were drawn down sharply in response to record-high prices.

Mosaic has commissioned and worked with detailed analysis of the stock and flow of nutrient application throughout the markets and its impact on crop yields. Based on this analysis and global research, the company decided to exit the nitrogen market. Several years ago, the assumption was that the United States wouldn't be competitive in nitrogen production due to the cost of U.S. natural gas. However, the recent expansion of U.S. natural gas supplies from shale sources might force a reconsideration. As the price difference between the Middle East, Caribbean Basin, and United States has narrowed, U.S.-based production has become more attractive. This structural volatility

Exhibit 3



due to technological change clouds the future of the fertilizer distribution network and adds complexity to the decision-making process.

Another consideration is the current divergence in the price of the three nutrients—phosphate, potash, and nitrogen. Currently, phosphate and potash remain in relatively short supply compared to nitrogen. Developing new phosphate and potash mines takes years and requires huge initial investments. Exhibit 3 shows that the price ratio between phosphate and potash relative to nitrogen

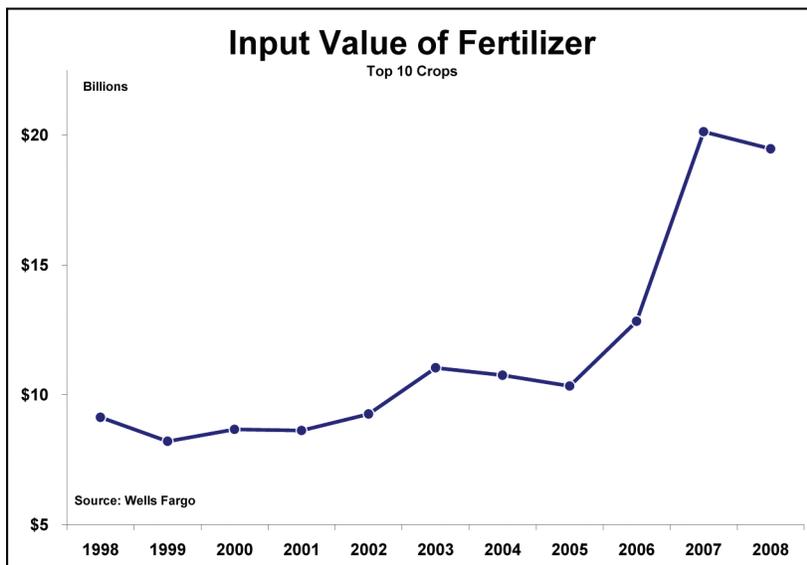
is well above its long-term average. It is not clear whether phosphate and potash can maintain the relatively wide price premium to nitrogen. If this ratio holds, Michael wonders if wholesalers and retailers of potash and phosphate can recover the premium from end users?

Ultimately, crop nutrients derive their value from their ability to increase crop production. In economics, the marginal revenue product equals the marginal factor cost. In this case, that would be how much more value in a crop will be produced if more crop nutrients are applied at a given price. The theory is simple, but the reality gives everyone a headache. The agronomic production functions have been studied continuously, but new genetics constantly change the relationships. Furthermore, weather variation affects the outcome. And, most importantly, the output price volatility often overshadows the input cost consideration. If a producer doesn't know the output price, he cannot calculate the marginal revenue. Given the price volatility of crops over the last two years, it is not surprising that the supply chain has difficulty agreeing on the value of fertilizer as an input.

Michael sees Mosaic as a price taker. He believes the main factors that contributed to the sharp price run-up were: strong demand growth, along with higher energy and raw material costs. From 2006 to 2007, suppliers such as Mosaic had little problem passing along any price increases to both wholesalers and retailers. Given the unprecedented increase in crop prices, everyone was eager to apply maximum amounts of nutrients to maximize crop yields. During this period, farmers who purchased their inputs early and sold their crop late were the clear winners. Even though wholesalers, retailers, and farmers were paying higher prices than ever before, farming and retailing profits were more than offsetting the higher costs.

When everyone's profits are rising, promises are easy to keep. Promises (formal/informal, explicit/ implied) form the backbone of relationships. A cynical view states that most people's promises are only as strong as the reasons they have for keeping them. While this underestimates people's ethics (perhaps more so in the farming community), the risk this view represents became clear in 2008 when the commodity and financial markets collapsed. Farmers saw the value of corn and soybeans plunge. They became stressed by the prospect of applying as much as \$200 per acre nutrients to

Exhibit 4



produce a crop that would be much less valuable (Exhibit 4). So, they delayed their fertilizer purchases. Wholesalers and retailers with stockpiles of record high-priced inputs faced the possibility of relinquishing the profits that they had earned in the previous two years. All parties scrambled to avoid being left holding the bag and losing money.

Most supply chain relationships have been stable over many years. In an environment where price changes little, long-term relationships revolve around giving and taking from year

to year. However, when price volatility moves into ranges that threaten financial viability, these relationships can become severely strained. A business that takes on its supplier's or customer's problems might not survive to reap the benefit of its benevolence. Furthermore, the financial risk and reward are asymmetrical for the various players involved in the network. Michael raises some tough questions about measuring "relationships." As an economist/commodity analyst, he is skeptical and struggles to quantify the value of relationships. He says that companies have to deliver more value—competitive price, good quality, on-time delivery, etc.—or the customer will go elsewhere.

For companies such as Mosaic, its entire business depends on the sale of fertilizers. For the distributor/retailer, fertilizer represents just one element of their total services offered to their customers. Although, they can benefit from a strong profit in fertilizer sales, they don't depend on it for their financial well-being. For producers, fertilizers are an indispensable but adjustable

component of their cost structure. For corn production, nutrients represent the second largest cost component, typically about 21 percent of the variable cost depending on the price ratios of crop to fertilizer (Exhibit 5). Each party in the supply chain has a different urgency determining how to manage the price volatility of the fertilizer market. And, each has different profit incentives for managing that price risk.

Michael believes that Mosaic is facing two major challenges. To operate efficiently, the company must run its high fixed-cost facilities steadily throughout the year. But wholesalers, retailers, and end users are reluctant to commit, preferring to wait and see what industry conditions will be. As a result,

Exhibit 5

Direct Expenses	Spring				Sugar		
	Corn	Soybean	Wheat	Hay	beet	Barley	Sunflower
Seed	16%	15%	9%	2%	10%	8%	13%
Fertilizer	21%	3%	24%	14%	7%	23%	19%
Crop chemicals	9%	12%	14%	3%	21%	12%	12%
Fuel & oil	6%	7%	6%	14%	8%	8%	9%
Land rent	24%	37%	26%	26%	29%	26%	22%
Sub-total	76%	74%	79%	59%	75%	77%	75%
Total variable cost per acre 1998-08 average	\$ 273	\$ 165	\$ 149	\$ 139	\$ 515	\$ 125	\$ 146

a huge transportation and stockpile bottleneck is forming. Mosaic needs to move the product before it is priced. One solution involves a much greater use of “No Price Established” (NPE) contracts. These contracts have been used occasionally in the past, but over the last

12 months, they’ve become more prevalent. NPE contracts allow wholesalers or retailers to take possession of the product without establishing a price. Mosaic offers this option because there is inadequate transportation capacity to move all the crop nutrients at one time.

Under the NPE contract, the wholesalers or retailers specify how much product they want and at what location without a price. They have the option to choose a price based on a benchmark over a specified time frame. Typically, the window for establishing the price has remained limited, from 30 to 90 days. Currently, much of Mosaic’s potash is moving on NPE contracts. These allow the retailer or wholesaler to sell some of the product and take a price that assures some reasonable level of profit. This arrangement shares the risk between the manufacturer and the retailing and wholesaling components. Michael wonders if this arrangement will last or if there is better mechanism. Other developments in response to increased volatility include smaller and more frequent orders, just-in-time inventory management, and consignment (or exclusive warehouse space agreements).

He also considers future options. Mosaic, as part of Cargill in the late 1980s and early 1990s, made a major effort to establish futures contracts for diammonium phosphate (DAP) and anhydrous ammonia on the Chicago Board of Trade. The company became a market maker, investing time and money educating wholesalers, retailers, and farmers. It tried to bring speculators into the market for liquidity. But when the price volatility disappeared, interest in fertilizer futures waned, and the futures contracts were delisted. Maybe it is time to bring them back, Michael considers. But, what would be different this time? Some analysts claim that futures increase volatility in markets because speculators use them to swing prices even further. But, this claim doesn’t seem to correlate with the real-world experience where fertilizer prices have swung widely even without a futures contract at play.

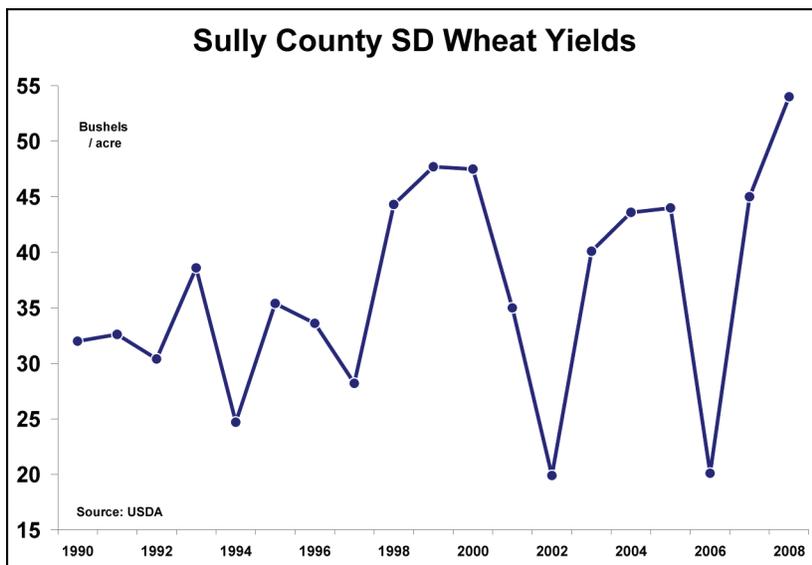
NPE and futures contracts are formal ways to manage price volatility, but there are informal methods, as well. Historically, sales contracts between the nutrient producers and wholesaling and retailing companies were flexible in their implementation. But currently, contract flexibility has largely disappeared. Given high price volatility, allowing a retailer or wholesaler to avoid taking the entire contracted amount may materially impact the producer: if a buyer found that he had bought “smart,” he would take the contracted amount, but if he had bought “too high,” he would opt out of the contract. This inflexibility impacts the entire supply chain. As producers have reduced flexibility in their contracts with wholesalers and retailers, the rest of the supply chain has become less flexible.

The Distributor/Retailer Sector: Cone Ag

As Michael at Mosaic ponders the big-picture questions, Rusty Hollingsworth at Cone Ag faces a smaller, but equally difficult, task. Rusty started out as a chemical applicator, and over the last 25 years, has risen to be the general manager of Cone Ag, located in Pierre, South Dakota. The company is one of the largest suppliers of agricultural services in central South Dakota. It sells fertilizer, crop chemicals, seed, and services to a wide variety of producers. Rusty knows that without product on-hand Cone Ag won't be able to implement its strategy of being the premier agricultural service provider in its market. But, he doesn't want fertilizer price risk to jeopardize his core business.

Central South Dakota is a somewhat unique agricultural region. Like much of the Midwest, it relies on rainfall, rather than irrigation, during the growing season. However, central South Dakota is notorious for its variable rainfall. In favorable rainfall years, crops are big, and producers are profitable. But, in too many years, rainfall is inadequate and crops fail. This boom-and-bust farming style creates a unique approach to buying inputs (Exhibit 6). Unlike central Iowa, most South

Exhibit 6



Dakota farmers wait until the last minute to make decisions based on the precipitation outlook. They will change cropping patterns and application rates quickly and radically. In years where the moisture outlook is favorable, acreage is added, fertilizer pounds per acre increase, and fertilizer sales are much stronger. Rusty's customers count on him and Cone Ag to have the seed, fertilizer, and other inputs ready.

In addition to weather volatility, central South Dakota faces structural change. Five years ago, approximately 15 percent of the acreage was planted to corn. Today, approximately 30 percent of the area goes into corn production. This shift has major implications for the amount

of fertilizer used. Traditional crops such as wheat, sunflowers, and dry beans, use significantly less fertilizer per acre. Rusty faces the challenge of determining his customers' future fertilizer needs. In 2008, the three counties surrounding Pierre (Hughes, Sully, and Stanley) produced record corn yields, averaging 118 bushels per acre. This record yield would be considered a crop failure in the Corn Belt. Central South Dakota farmers do not plant the seed counts and apply the fertilizer quantities required to produce Corn Belt yields, even if they get sufficient rainfall. However, farming practices could change: more aggressive producers may adopt high-performance, drought-tolerant varieties and apply more fertilizer in pursuit of higher yields.

So far, South Dakota growers have not pushed the level of fertilizer application like many other areas. Rusty estimates that the region's average wheat or corn farmer applies approximately 80 pounds of nitrogen and 20 pounds of phosphate, along with 5 to 10 pounds of sulfur. By comparison, farmers in the Corn Belt apply from 200 to 250 pounds of nutrients per acre. With the spread of drought-tolerant corn, the cropping practices could change over the next five years. Cone Ag must forecast what these changes will be to make appropriate investment decisions on future handling facilities. The company completed a 5,000-ton shed for dry storage in 2008, increasing its dry storage capacity from 30 percent to 75 percent of anticipated dry fertilizer needs. Considering price volatility, weather, and technological changes, Rusty wonders how much inventory Cone Ag should take on and who should bear these risks.

Rusty's challenge is compounded by recent trends among fertilizer producers. He sees fertilizer manufacturers becoming increasingly transactional and less relationship oriented in their business dealings. Quarter-to-quarter profitability is increasingly superseding relationship building as a goal. Thus, fertilizer producers seem more intent on enforcing short-term contracts. Reinforcing this transactional approach, manufacturers continue to remove sales authority from their field representatives. Individual sales representatives once had greater pricing authority and flexibility. Today, nearly all transactions need centralized approval. Even decisions on quantity and timing adjustments have been moved from field to headquarters.

This trend toward centralization appears to be growing and leaving smaller wholesalers and retailers like Cone Ag at a disadvantage. Rusty wonders whether his total 40,000 tons (dry and liquid) of fertilizer sales will mean that much to a larger fertilizer supplier. It is an important amount for Cone Ag, but a centralized seller may view it differently. And the trend toward centralization of selling decisions appears to be spreading to all inputs. Rusty's not sure if relationships will matter in an environment increasingly focused on short-term profitability?

Retailing of fertilizer and crop inputs is not Cone Ag's primary profit generator or source of future success. Cone Ag positioned itself to be the premier agricultural service provider for central South Dakota. To be successful, it must have all the inputs that its customers will require during a growing season. The inputs allow Cone Ag to provide value-added services. Rusty understands the value of high-quality service. He knows that success in the field is tied to accuracy, timeliness, and consistency. Attracting and keeping successful growers based on premium service forms the core of his business success—not being the cheapest input supplier. He knows that he needs to be competitive in price, but he has no desire or intention to outguess the market. Rusty wants to manage margin on input sales and avoid speculative risk. Cone Ag wants to avoid price swings that could potentially wipe out all the value added from their premium service.

Cone Ag serves different types of buyers. Over the past few years, prepaid fertilizer sales have risen from approximately 10 percent to almost 40 percent of sales. These types of sales are low risk for Cone Ag. Rusty has been paid at a price that generates a profit for Cone Ag. The remaining 60 percent of sales are higher risk. These sales are split equally into two groups. Half are his reliable customers who will honor their agreement through nearly any price variation. They expect Cone Ag to be efficient and reasonable in pricing, but are not intent on extracting the last dollar from every transaction. These customers value Cone Ag as a partner and the services it provides.

The other 30 percent of sales are the “wheel spinners,” customers always spinning their wheels from supplier to supplier looking for better deals. Rusty feels these buyers, rather than buying smart, are wasting time that could be better devoted to agronomic and management practices. He does not think that they will find a significant advantage among different input suppliers from year to year. Furthermore, if they are not loyal to their supplier, then their supplier will not prioritize them in terms of crop scouting and other services. The difference in yield between a timely application and more thorough field scouting could easily outweigh the savings on fertilizer.

Cone Ag’s objective is to be a premium crop service provider while remaining competitive on input sales. But, segregating the margin contribution between the services and input sales is not easy. Certain farmers, based on pricing and acreage, are major contributors to Cone Ag’s profitability. Others probably don’t contribute much to the bottom line, and some may even be net losses. This lack of margin information at the account level makes it difficult to determine how much fertilizer price risk Rusty should assume for the different accounts.

Cone Ag’s primary competitor in its market is Harvest State Cooperative. So far, the cooperative has not changed its business practices; accepting the additional price risk (which they can spread among locations) and operating in a less formal way. Given its competition, Cone Ag’s efforts to implement stricter operating practices must be tempered.

Last year, some farmers expected that Cone Ag would change its contracts when prices dropped. When Cone Ag enforced the contracts, farmers took their non-contracted input needs elsewhere. But, Cone Ag attracted some customers the same way. Rusty feels that grudges are not held as long as they once were. Farmers see that business has become more formal. The inflexibility in contracts that started with manufacturers is being pushed through the supply chain to farmers. For the moment, farmers must accept this new reality. Between the gains and the losses of customers due to strict contract enforcement, Rusty believes Cone Ag may have netted more customers.

Looking forward, Rusty sees three primary challenges for his business: price volatility, predicting his customers’ fertilizer needs, and differentiating Cone Ag as a premier service provider. With limited risk management tools to work with, Cone Ag has moved to smaller and more frequent fertilizer orders to minimize pricing exposure. It is seeking new pricing tools from suppliers, but sees less flexibility and expects more transactional focus. Rusty hopes increased prepaid fertilizer sales will move price and credit risk to the farmer, but, if competitors assume greater price risk, he doesn’t know if he can avoid it and still keep his customers.

Forecasting will be more difficult and will raise more questions. In the past, Rusty took the previous year’s usage and increased it by 5 percent to adjust for organic growth. However, maintaining reserve

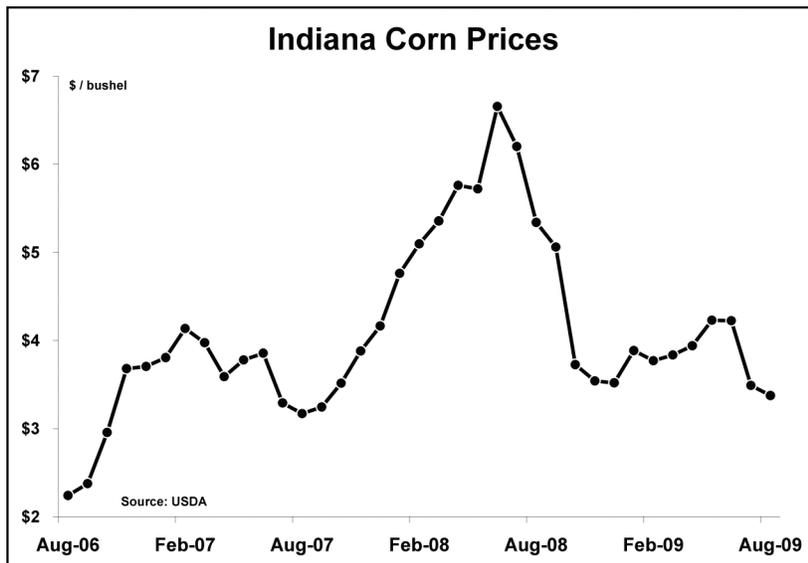
inventory for potential new customers may no longer be feasible. Rusty ponders the following: What effect will the new cropping patterns have on fertilizer demand? What if last year's fertilizer volatility had coincided with a drought? How can Cone Ag find and keep profitable relationships with farmers who value its "premium service" model? And, how can he untangle the margin contribution from input sales and service fees while taking his risk into account?

The Grower Sector: Stoy Farms

A thousand miles away from Pierre, South Dakota, Kevin Stoy of Stoy Farms in Ashley, Indiana, runs the numbers. With 12,000 acres to manage, Kevin typically runs numbers more than he runs tractors. He understands that he gets paid to manage the farm, not turn a wheel or a wrench. He also knows that he gets paid for his smarts, not his time. Stoy Farms represents a growing phenomenon in the farming world. While their numbers are relatively small, the acreage they manage impacts the world of producers, such as Mosaic, and retailers/distributors, such as Cone Ag,

in a big way. An account like Stoy Farms can represent 10 other average operators.

Exhibit 7



Stoy Farms has been at the receiving end of both the grain and input price volatility. The biggest driver of Stoy Farms' financial success is the grain price (Exhibit 7). But, fertilizer costs are his second biggest profit determinant (excluding land rent). Kevin sees three major "deltas" in his management world. The first major delta is crop yield, which he manages through best agronomic practices and crop insurance. The second

delta involves his input costs, with the top four being cash rent, fertilizer, seed, and chemical. The last delta is the crop's price. Kevin does not see himself needing to be the high-yield producer in the business. It is his philosophy that too many farmers chase yield without regard to managing the economics of the business. Kevin manages for the "right" ratio of output/input price and multiplies them across acreage for economies of scale.

Stoy Farms has more incentive to manage risk than most operations. It only owns approximately 15 percent of its acreage. This ratio stands in direct contrast to the owned/rented ratio in central South Dakota. Even in northern Indiana, the owned/rented ratio typically runs much higher than that of Stoy Farms. Kevin operates on higher leverage. This has been a key element in allowing the operation to expand faster than retained earnings would permit otherwise. Higher leverage also leaves less room for downside in bad years. So, Stoy Farms seeks to layoff more risk to lock in reasonable profits.

With the major price spike in fertilizer, Kevin has adopted a straightforward, but unconventional, approach. In 2009, Stoy Farms built three major storage tanks that will hold approximately 1.1 million gallons of fertilizer, about a two-year supply for the farm. At approximately \$650,000, these tanks are a major capital investment for the operation. Kevin estimates that he paid about \$100 a ton for the storage capacity in this tank farm. This installation cost per ton is much higher than what a wholesaler/retailer would have paid due to fixed costs in the land and construction. Kevin sited the tank farm on a rail spur for access to both truck and rail delivery. He expects that through superior logistics and better inventory management Stoy Farms will gain an advantage in crop production relative to other farmers. In fact, he believes that even if the price of fertilizer were to stabilize, his improved logistics would give the investment a payback period of five to seven years. He sees this investment, despite tying up capital, as a major tool to differentiate himself from his local competition.

Kevin is aware of the risk this new approach will bring to Stoy Farms. Currently, the tanks are empty as he awaits better fertilizer prices. His approach is to “wait until there is blood in the streets.” At the moment, he doesn’t think that the market has seen the bottom of nitrogen costs, so he waits. He plans to adopt two possible approaches to filling the tanks.

The first approach might be called the “price-line” approach. Kevin will put out a tender to multiple suppliers to fill his tanks to capacity. This 1.1 million gallon tender would be large by individual farmer’s standards, making it attractive to retailers looking for volume. Given the rail access, multiple bidders could be attracted from a wide area. He would offer to buy at a price well below the current market price, anticipating that some supplier would be in a major overstock position and would need cash quickly. He would solve their problem by taking a large amount of product and paying cash; they would solve his problem by giving him a large price advantage.

The other approach that Kevin is considering would be the “remnants” approach. In this case, he would buy smaller increments from a variety of sellers who are overstocked. Under this strategy, he hopes that sellers who have large inventories and need to dispose of them without distorting their local market will take him up on the below-market offer. He solves their problem by helping them balance their inventories without discounting to their regular customers.

Kevin’s remnants approach occurs frequently in the newspaper advertising industry. Newspapers sell advertising space at established prices; however, they often end up with excess space for various reasons (e.g., an advertiser drops out). Newspaper firms don’t want to sell these “remnants” to regular customers at big discounts because it hurts future pricing. Given that the ad space is perishable, the firm must use it or lose it. Newspapers turn to out-of-market buyers who place orders ahead of time to take these spots at big discounts. These buyers don’t know when or where their ads will run, but they know the price they pay will be a fraction of the standard. If Kevin’s 1.1 million gallons of capacity allow him to absorb overstock from various suppliers, he could serve as the remnants buyer.

While buying at a better price and reducing logistics costs are important, Stoy Farms has a larger reason for making this investment. The operation has dozens of agreements with landowners, some stretching out more than five years. Land rent per acre is Stoy Farms’ single largest expense, and managing these rent relationships is the long-term driver of success. By taking physical possession

of the fertilizer, Kevin can manage the two largest cost components (land and fertilizer) beyond the time horizon that the industry offers to its competitors. If the industry will not offer him long-term pricing for fertilizer, he will take possession of physical product and sell long-term crop futures when he sees the incentive between the two price ratios. This helps him match his revenues and costs, which is the essence of margin management. Many farmers lament not selling 2009 through 2011 grains in 2008 when record-high prices were available, but they didn't sell for a number of reasons. One reason was they couldn't line up their input costs through the same time horizon.

Kevin's decision to build two years worth of fertilizer storage reflects the industry's lack of any significant alternatives. Tying up capital and working capital instead of developing a financial arrangement represents a straightforward, but capital-intensive, approach. In this sense, Stoy Farms decided waiting for the industry to come up with a solution was not sufficient. Access to ground drives Stoy Farms' success, and it doesn't want to jeopardize that by not controlling its second largest expense per acre. Using crop futures, Kevin can control his most important "delta" three years out, which is more than anyone else in this supply chain. He considers the following: Will more farms decide to own larger fertilizer inventories? If more farms build on-farm storage, what will that do to retailers? What if price volatility subsides? Will his on-farm storage become a white elephant?

Throughout the fertilizer supply chain, changes have emerged to deal with historically high price volatility. Currently, phosphate and nitrogen prices have decreased considerably from last year's record highs. Some participants feel that it was a one-time fluke and that old arrangements will reassert themselves. Others have taken major steps because they believe the opposite. Given the lack of financial futures, the industry cannot trade off risks among those willing to take it for a premium and those wanting to avoid it for a cost.

Questions for Discussion

1. What is your perspective of each player's strategic response to the increased volatility in the fertilizer market (Mosaic, Cone Ag, and Stoy Farms)?
2. What is the potential for transferring the risk (both price and availability) across the fertilizer supply chain or to someone outside the industry?

Broader Implications

3. How have other industries faced similar price and availability risks, and how did they resolve them? Are there lessons that can be learned from the fertilizer industry's recent experience that can be applied to other agricultural industries?