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THE IMPACT OF CHANGES IN CORN PRICES ON PESTICIDE DEMAND

Abraham D. Vermeulen
Student No. 27529119

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ABSTRACT

Commodity prices have recently seen record grain prices with most growers generally improving their profitability. In 2007 the USA crop protection value experienced its biggest annual increase since 1984 with a US\$30.5 billion increase compared to 2006. South African growers increased their gross margin even with lower historical yields, from US\$480 per hectare in 2004, to an estimated US\$1,133 per hectare in 2008. With the current global grain stock-to-use ratios maintaining their lowest levels in 35 years, higher and more price volatility is expected to continue.

Whilst growers have benefitted from these more favourable crop prices, agro-chemical suppliers have battled to increase their chemical prices. In South Africa, other suppliers (seeds and fertiliser), managed to increase prices at least twofold the percentage agro-chemicals achieved from 2003 to 2008. The purpose of this research was therefore to try and understand how commodity prices influence corn growers' pesticide demand, as well as to better understand their pesticide buying behaviour under fluctuating crop prices.

A structured web-based questionnaire to collect primary data from corn growers within South Africa and Hungary was used. Besides the impact of commodity prices to business buying behaviour, the research also focused on the price elasticity of agro-chemicals, futures trading as a risk reduction mechanism and the value of agro-chemical sales representatives.

From the findings the survey managed to highlight that even though commodity prices do impact agro-chemicals, it was not the biggest influencer towards agro-chemical buying behaviour. The survey further indicated that similar to many other industrial goods, agro-chemicals represented fairly inelastic prices, most growers use hedging to reduce price uncertainty and the majority value the relationship with their agro-chemical representatives. The data also highlighted additional similarities that exist within the business buying behaviour of Hungarian and South African growers.

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.



Abraham D Vermeulen

11 November 2008

Date

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1. INTRODUCTION TO THE RESEARCH PROBLEM

1.1. Research title

The impact of changes in corn prices on pesticide demand.

1.2. Research problem

Global food commodity prices, such as grains and vegetable oils, have dramatically increased compared to historical trends. According to the United States Department of Agriculture's (USDA) economist, Trostle (2008), some of the current commodity prices are greater than 60% compared to 2005. The report goes on to highlight that the current high prices are a combination of supply and demand trends. Globally, slower growth in production (supply) was influenced by decades of agricultural land being converted to non-agricultural usage, less agricultural water available, climate change and lower annual global average yield growth.

Since 1990 the annual supply growth rate for aggregate grains and oilseeds has been slowing at a rate of 1.3% per annum compared to 2.2% per annum for the period 1970 to 1990 (Trostle, 2008). The average aggregate yield has been the biggest contributor to the supply increase, with a 2% annual increase from 1970 to 1990, and 1.1% for the period 1990 to 2007, with area expansion only contributing 0.15% on average per year for the last 38 years (Trostle, 2008).

At the same time globally, the market experienced rapid growth in demand, which was driven by an increase in consumption of biofuels (an estimated 24% of US corn from the 2007/8 season was converted to ethanol), population growth and higher disposable income driving a change in food preferences. Government policy changes such as China reducing their grain stocks and various countries liberalising and minimising trade barriers drove global grain stock holding down

to reduce the global grain stock-to-use ratio from 30% in 1999 to less than 15% in 2007, the lowest level in more than 35 years, all of which added to increased price volatility (Trostle, 2008).

The impact on the consumer is higher food prices. In a recent publication of Agra Europe (May 2008), it stated that since 2000 the prices of corn, rice and poultry have nearly doubled. For growers however, the higher commodity prices are more positive as it results in higher income and generally increased profitability, pending crop yield. The USDA (2007) reported in their Agricultural Income and Finance Outlook, that the US crop production value increased during 2007 by US\$30.5 billion compared to 2006, the largest annual increase since 1984.

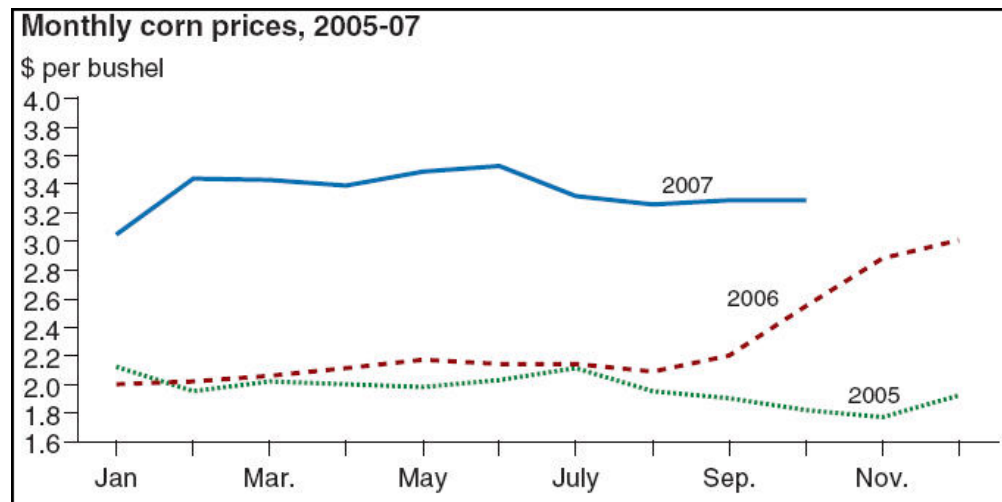
South African corn growers increased their gross margin per hectare from an average of US\$480 per hectare in 2004, with an average corn price of US\$90 per ton of corn, to an estimated US\$1,133 per hectare for 2008, when the corn price was on average US\$248 per ton (Ramsey, 2008). This improved gross margin was also achieved against a weaker yield, with the 2008 average expected yield being 4.6 tons per hectare compared to the 5.3 tons per hectare obtained during the 2004 harvest.

Hungarian growers were less fortunate during the 2007/8 season with a significantly lower yield estimated at an average of 3.8 tons per hectare compared to the 2004 to 2007 historical average yield of 6.4 tons per hectare. Their gross margin declined to a negative US\$80 (€56 converted at exchange rate US\$1:0,702€) per hectare of corn for 2007/8, despite the more favourable corn price of US\$303 per ton of corn compared to the historical corn price of US\$182 per ton (LMC International, 2008).

Trostle (2008) estimates that crop prices will not decline much over the next decade, and with more favourable outlook prices for growers

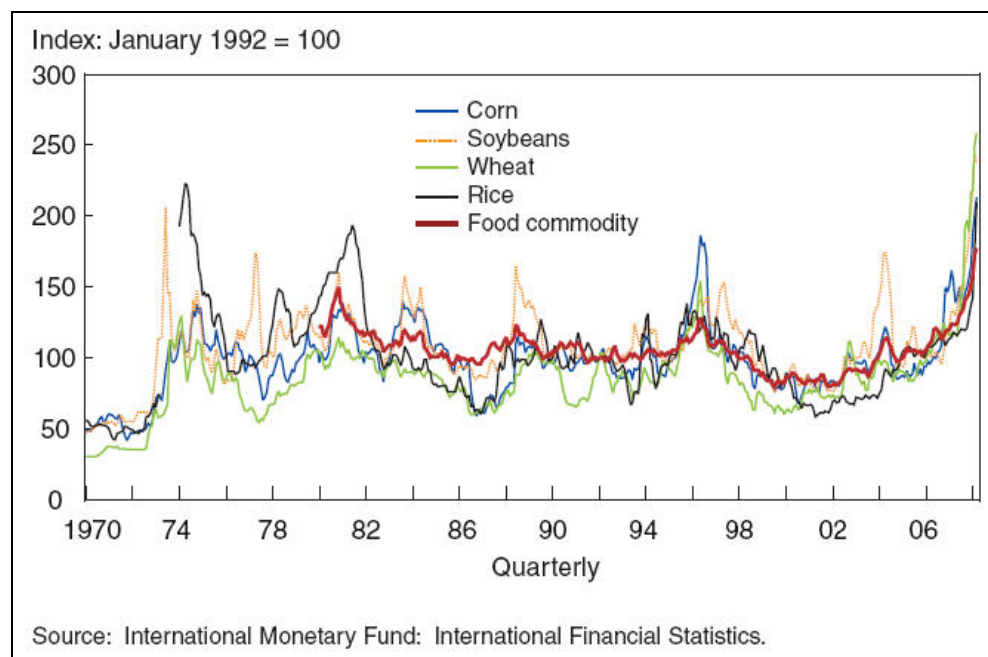
the incentive will exist for growers to increase their crop supply. Similar studies such as that done by Mahmood, Sheikh and Kashif (2007), support the notion of price being a driver for increase in supply.

Graph 1: US monthly corn prices since 2005



Extracted from – USDA (2007), Agricultural Income and Finance Outlook 2007 report (Note: Bushels to metric tons = 39.3679 bu of corn = 1 metric ton of corn)

Graph 2: Food commodity price spikes since 1970



Source: International Monetary Fund: International Financial Statistics.
Extracted from USDA (2008), Global Agricultural Supply and Demand: Factors contributing to the recent increase in food commodity prices

Trostle's (2008) statement regarding prices not declining could be challenged, as part of the current high prices might not be all supported by structural supply and demand changes for commodity prices. Agra Europe (2008) claimed in October 2008 that evidence suggested as much as 60% of the current high prices could be characterised as "bubble" driven by speculative activity through fund managers. This statement was also support by Mississippi State University Economist, John Anderson (Southeast Farm Press, 2008), who stated that: "corn trades consistently with oil and the situation in the financial sector – those issues and others are in the driver's seat rather than corn market fundamentals".

Whilst global commodity prices have showed an upward trend (Graph 1 and 2), the global crop protection (pesticide) market has not had the same positive trend. Sales for the last seven years only reflected growth in real terms twice; 4.7% for 2004 and 2.8% for 2007 (Table 1). However in a recent publication, Agrow (2008) stated that due to the recent increase in global food prices, growers were encouraged to maximise yield through the careful application of pesticides. This resulted in the 1st half-year pesticides sales for 2008 versus 2007 to increase by 7.8%.

Table 1: World Crop Protection Market Value

	2001	2002	2003	2004	2005	2006	2007
World CP \$ bil	25.76	25.15	26.71	30.73	31.12	30.43	33.39
Real Change %	-6.80	-5.00	-1.60	4.70	-2.50	-6.50	2.80
Nominal ch %	-7.40	-2.40	6.20	15.00	1.50	-2.50	9.70

Source: Phillips McDougall, May 2008

This lagged growth in increased pesticide sales compared to the recent record high commodity prices, possibly supports the notion of lagged price and volume changes within industrial markets, which are driven by derived demand (Kotler, 2003 & Jakobi, 2001), and are prone to resist price changes due to, amongst other factors, the existence of established pricing contracts (Jakobi, 2001).

For agricultural input suppliers, the constant change in a farmer's business environment, which influences their buying behaviour, makes it difficult to market, determine demand and set price increases (Kotler & Armstrong, 2008). Not knowing how much producers have to spend and to what extent business buying behaviour changes with commodity price fluctuations, makes it extremely difficult to plan pesticide product demand.

1.3. Research aim

The objective of this planned research will be to assess how the corn commodity price influences business buying behaviour and what impact this will have on the demand for pesticides. The research aims to answer the following questions:

- Do corn farm organisations change their business buying behaviour towards pesticides when their productivity, income and profit fluctuate?
- What is the impact on pesticide price sensitivity when corn commodity prices fluctuate?
- Do corn farm organisations (with different risk behaviours) that fix part of their corn commodity prices (hedging) during the planting season, have a different pesticide business buying behaviour to corn producers that do not hedge their crop prices?
- How much do government policies, with specific focus on subsidy support, influence business buying behaviour patterns of corn producers, compared to corn producers with no governmental subsidy support?
- Do changes in farm profits impact on the relationship between the buyer and the supplier within the business buying context?

2. LITERATURE REVIEW

2.1. Impact of supply and demand on farm profits

Agricultural market prices are determined by the changes in both supply and demand within an open, competitive market (McKenzie & Lee, 2006). McKenzie and Lee further explain that various factors influence the supply and demand curves. These determinants of demand can range from an increase in the consumer's desire for specific goods (example: food preference changes driven by higher disposable income (Trostle, 2008)), to an increase in the number of consumers (example: continued population growth and the continuous increase in demand for food (United Nations Population Division, 2007)), or an increase in the price of substitutes or a decrease in complementary product prices.

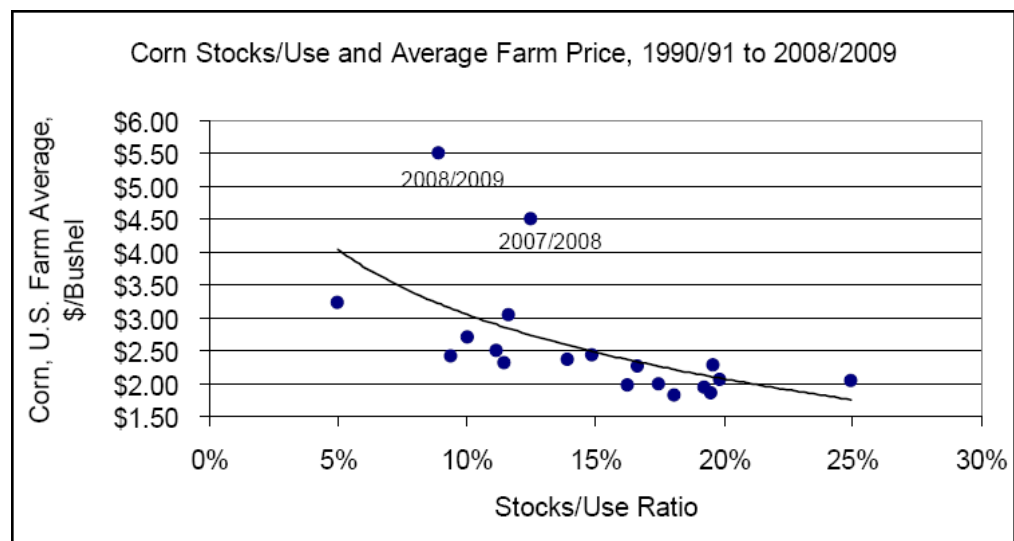
Supply determinants (McKenzie & Lee, 2006 and Mahmood, et al. 2007) are broad and include amongst others, changes in productivity due to technology changes, profitability of producing goods and changes to scarcity and cost of production resources.

The World Agricultural Outlook Board (May 2008) recently estimated that the total world grain supply will increase in the 2007/8 season to 2,435 million metric tons (compared to 2,383 million metric tons in the 2006/7 season), but predict lower world stocks as demand (consumption) is also expected to increase from 2,048 million metric tons (2006/7) to 2,112 million tons (2007/8). These fluctuations in supply and demand will result in fluctuating grain commodity prices, as the supply and demand curves shift to re-adjust their price equilibrium on a continuous basis (McKenzie & Lee, 2006 and Mahmood, et al. 2007).

The global corn stock-to-use ratio also indicates a non-linear corn price relationship, with corn prices adjusting as the stock-to-use ratio

fluctuates (refer Graph 3). Elam (2008) also indicated that whilst this non-linear relationship seems to exist, the 2007/8 and 2008/9 corn prices seem to reflect prices not supportive of his non-linear graph. These two price points support the earlier statements of Agra Europe (2008) and economist John Anderson (Southeast Farm Press, 2008), who felt that part of the current corn price was over inflated by speculation rather than supported by corn price fundamentals.

Graph 3: Corn Stock/Use and Average Farm Price 1990/91 to 2008/2009



Source: FarmEcon LLC Dr. T. E. Elam

Peterson and Tomek (2004) also highlight the difficulty of capturing future agricultural commodity prices due to the biological nature of production, supply and demand shocks, fluctuations in yield and changes in harvest timing. Osborne (2002) simplified demand for grain through two factors - current consumption and speculative storage - which depend on speculators' expectations. When a good harvest is expected, speculators will decrease their demand for storage and the result will drive price downward. The same principle will apply when unfortunate incidents, for example crop failure due to flooding, occur, as speculators will increase their demand for storage and the price will increase.

Commodity prices also generally have a high positive relationship to crop areas planted and can be observed in the study of Mahmood, et al. (2007), where price explained 84.5% of variation in rice planting areas. Tomek & Peterson (2001) also confirmed current supply as a function of expected price.

The literature of Tomek & Peterson (2001, p. 955) effectively summarise the impact of supply and demand on commodity prices: “Fundamentally, commodity price behaviour over time is a mixture of systematic intra- and inter-year fluctuations plus randomness, and the variability of prices depends on information flows regarding supply and demand”. They further expand their commodity price determinants by highlighting the work of Williams & Wright’s modern theory of storage to explain occasional spikes in prices based on the results of total or close-to-full stockouts. From their work they proved the nonlinear relationship between price and stock-to-use ratios, with a larger increase in price effects when a small stock-to-use ratio is present.

The corn farmer’s profit is driven by the trading of corn on the open market. The corn supplied will realise the market spot price, which is determined by the market shifts of demand and supply for corn. As the corn price fluctuates through the constant shift in demand and supply curves (McKenzie & Lee, 2006), so will the corn farm’s profits. Thus, the question exists: How do growers evaluate input cost spending, if the price fluctuates over time and revenue uncertainty exists?

2.2. Price sensitivity and demand within business buying

Product demand changes are influenced by various factors (McKenzie & Lee, 2006). Availability of substitutes, product tastes and preferences, as well as the buyer’s future expectation concerning

income and product costs, are just some of the drivers that influence price sensitivity (McKenzie & Lee, 2006). To determine to what level price changes will impact on pesticide demand, economists calculate the elasticity of demand (Pindyck & Rubinfeld, 2005).

Lipsey & Chrystal (2004) highlight that agricultural products are known for large price fluctuations, driven by factors outside human control such as extreme weather. Fluctuating weather could result in either crop failures or exceptionally high yields, creating markedly high or low crop prices as supply and demand curves shift to adjust to crop prices. With most agricultural products defined as having inelastic demands, growers could have a record yield crop and experience lower income, or when faced with a low yield crop during extreme drought receive record prices (Lipsey & Chrystal, 2004).

“When demand is inelastic, unplanned variations in output will cause producers’ revenue to vary in the opposite direction as output varies and to fluctuate more the further the elasticity of demand diverges from the unity in either direction”, Lipsey & Chrystal (2004, p.87)

The simplest economic way to understand customer price behaviour is by calculating the demand elasticity of a product to determine price sensitivity (Morris & Joyce, 1988). Pindyck and Rubinfeld (2005, p. 32) describe price elasticity as “the percentage change in quantity demanded of a good resulting from a 1-percent increase in its price”. Income elasticity of demand determines the relationship between income and changes to product demand (McKenzie & Lee, 2006).

Morris & Joyce (1988) highlight the following characteristics for products with generally more inelastic demand:

- Contain unique differentiating attributes versus their competitors.
- Have limited substitutes.
- Have built-in complexity in their offer, making cost comparisons difficult.

- Small part of customers' total spend.
- Perceived necessity.
- High perceived cost for switching e.g. might have added service component added to product.
- Prestige image of some customers to purchase high priced goods.

McKenzie and Lee (2006) highlight the impact of income on demand through the use of an income-consumption curve. As consumer incomes increase, the demand for certain goods could either increase or decrease. The previously consumed 'normal' product now gets classified by the consumer as an 'inferior' product, when the income-consumption curve bends backwards and the quantity demanded decreases as income increases.

Kotler and Keller (2007, p. 220-221) state that "generally speaking, customers are most price sensitive to products that cost a lot or are bought frequently. They are less price sensitive when price is only a small part of the total cost of obtaining and servicing the product over its lifetime." Pesticide only represents a small portion of a corn grower's input cost; an estimated 7% of total variable cost for South African growers during 2007/8 season (Ramsey, 2007) and 7% for Hungarian growers (LMC Arable Crop Profitability Report, 2008). Pesticide is also only applied during limited periods of corn growing. According to Kotler and Keller (2007), corn producers should thus be less sensitive towards pesticide prices compared to more frequent inputs like diesel, or more expensive inputs such as seeds or the purchase of capital goods such as farm equipment.

In organisational buying, additional factors will influence the price sensitivity of pesticide demand. Businesses have different risk acceptance levels and corresponding buying behaviour. Risk adverse businesses might pay more for known, proven and trusted products compared to risk takers who might try cheaper products

(Jakobi, 2001). We further know that consumer market prices are a function of elasticity of demand, whereas industrial market prices are driven by derived demand (Jakobi, 2001).

Consumer and industrial goods have different pricing policies, with consumer prices being well published and known by almost everyone, versus industrial prices which are often negotiated and not as transparent (Jakobi, 2001). Industrial goods' prices tend to react much slower to market forces compared to consumer prices, as they are driven by various factors such as industrial price contracts and agreements (Jakobi, 2001). This statement is supported by Trostle (2008), stating that farmers experience a time lag from the time the oil price increases to when they experience increases in the cost of fertiliser.

Within industrial buying markets, products with lower prices tend to have a demand which is more inelastic, while at higher prices these goods tend to be more sensitive and elastic (Morris & Joyce, 1988). This is however a broad generalisation, as elasticities do vary across industries such as agricultural commodities (Morris & Joyce, 1988).

Morris & Joyce (1988) analysed two general approaches suppliers take to determine prices (cost-based and market-based). Cost-based pricing is described as estimating and covering cost, incorporating cash flow and achieving a desired rate of return. Market-based pricing aims to focus on the perceived value products have in the mind of the customer, the elasticity of demand and also considers competitors' offers.

The most common method used within industrial markets is cost-based pricing, where pricing has the sole objective of maximising profit. This risk avoidance approach which aims to cover costs, is generally easier to calculate and requires less effort than market-based pricing. Market-based pricing will require additional work to

establish customers' perceived product value, but once established will allow for long-term profits. Many organisations focus on price in a very mechanical way instead on determining and promoting product features to create a differentiated product which customers will perceive differently and result in a more positive impact to ensure greater and more favourable price elasticity (Morris & Joyce, 1988).

This raises the question of whether perhaps it is not only growers who might resist price increases, but also the pesticide supplier's pricing approach being cost-based rather than market-based? Table 2 indicates how the average compound increase for South African corn growers' total production cost from 2003 to 2008 is 6.8%, with pesticides over the same period only realising a 2.7% compound increase.

Table 2: South African corn cost evolution from 2003 to 2008

South African Corn Grower Cost per hectare (US\$) comparison from 2003 to 2008							
	2003	2004	2005	2006	2007	2008	CAGR %
^a Pesticide Spend	33	39	39	37	39	38	2.7%
^b Seeds Spend	39	52	54	77	75	78	15.0%
^j Fertiliser Spend	97	117	124	116	124	119	4.3%
ⁱ Crop Insurance	12	11	55	53	51	49	33.2%
^o Marketing Costs	14	17	26	25	24	23	11.1%
Total Variable Costs	387	458	563	554	551	538	6.8%

Source: Ramsey, S. (2007) The Cost of producing crops around the world - 2007 Update, Global Insight Inc.

Various drivers influence price sensitivity and product demand within business buying, with competitor activities and availability of substitutes being among the most common, and quality, value propositions, proportions of expenditures spent and degree of product differentiation to a lesser extent (Morris & Joyce, 1988). Morris & Joyce (1988) previously established that prices are more randomly available than in the past, and it would be fair to assume with the

improvement of communications through the internet that buyers have become even more price conscious, hence the importance of understanding the price sensitivity for one's product. Various aspects influence price sensitivity, however the research focuses on analysing the changes in the economic environment (corn price fluctuations) and the impact they have on price sensitivity and the demand for pesticides.

2.3. Risk reduction and maximising farm profit

Growers, like all other businesses, have various risks they need to manage to ensure farm sustainability. Most industrial buying markets classify risks across performance-, social- and economic risks (Henthorne, LaTour & Williams, 1993). Performance risk focuses on the likelihood of product failure (the pesticide applied does not secure a crop yield), social risk, where the existence of the perceived risk of products sourced does not meet with the approval of important reference groups, while economic risk is a potential monetary impact risk caused by incorrect purchasing.

This research will however, focus on two of the risks affecting farm profitability, namely price and yield. Due to world commodity prices being erratic and historic prices not being able to predict future prices accurately, the use of futures trading increases have been noticed, giving more certainty on future prices to producers and offering risk avoidance (Vámos & Novák, 2008). Their report supports the price insurance theory of hedging which was established by Keynes, Kaldor and Blau, who highlighted hedging as a means of risk avoidance. This theory is also supported by the work done by Pennings & Leuthold (2000), which summarises hedging as shifting risk.

Various other practices exist for price risk management, which could include spot-market strategies (diversifying the frequency of selling), the use of forward- and deferred-pricing contracts, general yield and

revenue insurance or by farmers securing higher prices through selling to niche markets (Tomek & Peterson, 2001).

Bryant (2003) describes future contracts as a valuable tool that assists with facilitation of the effective reallocation and management of risk among various agents within the economy. Farmers will generally select a combination of marketing strategies to maximise revenue subject to their individual acceptable level of risk (Tomek & Peterson, 2001). The same study indicates that farmers will vary in when they utilise price risk management strategies. Some growers believe that by selling part of their future crop pre-harvest it could increase the average price, compared to selling at harvest, when prices generally decline. This supports the notion that growers might use futures contracts to not only limit risk, but also to attempt to maximise returns.

The increased availability of the price risk management tools results in more frequent marketing of crops. It is interesting that younger farmers tend to hedge more frequently compared to older farmers. The same increase frequency in marketing applies to larger sized farms. (Tomek & Peterson, 2001). These large farms also utilise marketing tools to enhance profits rather than utilise the tools available for managing price risk. Henthorne et al. (1993) investigated whether a different locus of control for individuals within organisational buying resulted in a different risk preference, but found no difference between the two groups. It was established that businesses using external influences to improve their business purchasing did reduce economic risk by a greater extent than businesses using only internal information sources.

Whilst growers can limit price risk through various price risk management strategies, it is key to protect their crop yield (supply), which can be done through the use of improved technologies and management influences (Tomek & Peterson, 2001 and Kim &

Chavas, 2003). Crop yield distributions are skewed and generally have a larger probability of negative deviations (Tomek & Peterson, 2001). Various farmer decisions on input selection can improve productivity (yield) as well as reduce risk (Kim & Chavas, 2003). These decisions include amongst others the selection of seeds (including utilisation of genetically modified crops) and the level and type of fertiliser and pesticides.

The value of pesticides is to protect as well as maximise crop yield in order to ensure a greater quantity of harvest is available to growers for supply into the free market. Without the use of pesticides it is estimated that the global loss for corn producers would be 31% on an average yield (Oerke, 2005). During the period 2001 to 2003, 50% of actual corn production would have been lost if no manual, mechanical or chemical crop protection was used (Oerke, 2005). Kim & Chavas (2003) also state that growers are generally averse to downside risk and want to avoid low returns, which can be prevented by technologies such as pesticide usage (Oerke, 2005) or selecting the best corn hybrid seeds. It is clear that besides increasing productivity, technological progress also ensures lower exposure to risk and enables higher grower profitability (Kim & Chavas, 2003).

It is clear that the purchase of industrial goods will be influenced by the perceived risk of the buyer, which is driven by the level of future uncertainty (Garrido-Samaniego & Gutiérrez-Cillán, 2004). Garrido-Samaniego and Gutiérrez-Cillán's (2004) research conclusions also stated the existence of a positive relationship between purchase importance (measured according to the purchase's impact on future profitability and productivity) and the level of participation and influence, which will exist during industrial buying.

Various strategies for price and yield risks exist, however the key question is whether growers utilise price and yield strategies such as

pesticides to protect and limit risk, or to focus on increasing profitability?

2.4. Business environment and business buying behaviour

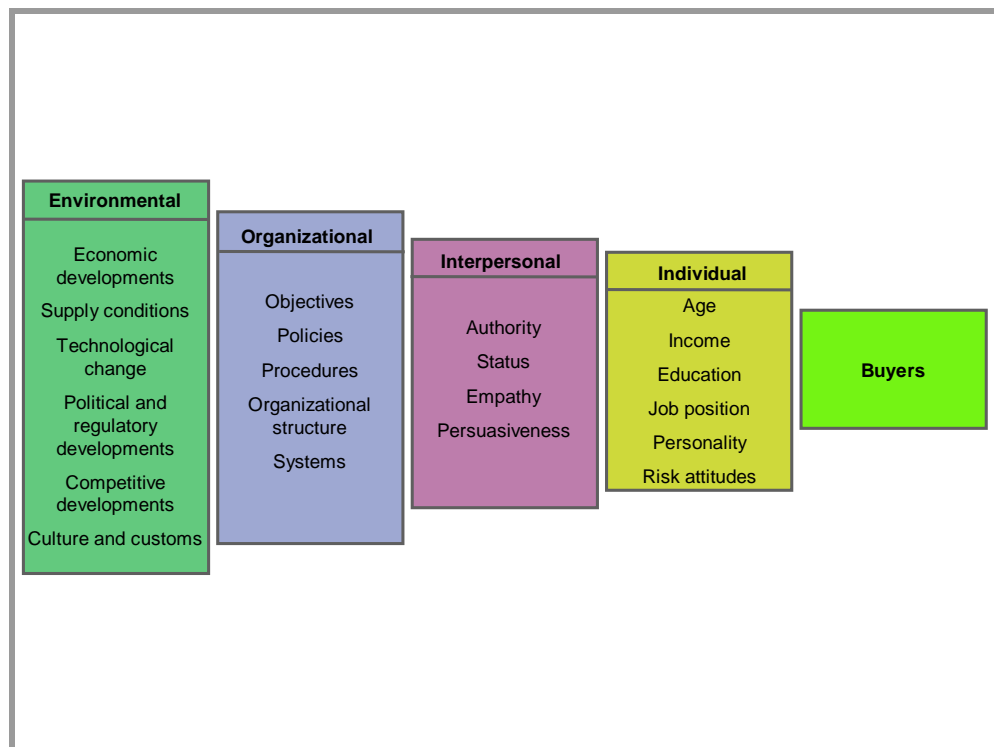
Business buyers are distinctly different to individual consumers. Commonly referred to as organisational buying, Kotler (2003) defines business buying as the formal decision making process of businesses to establish the need for purchased products. Business markets have the general characteristics of price inelasticity and more volatile demand when compared to traditional consumer markets (Kotler, 2003). In business buying, goods are only purchased when needed for production, sometimes in advance (speculative) to benefit from price fluctuations, and could involve several people during the buying process. They also have a longer decision making time and take place under rational conditions with the objective to maximise profits (Jakobi, 2001 and Wells, Moriarty & Burnett, 2006).

Business buying behaviour has undergone dramatic change since the late 1970s, driven by global competitiveness, emergence of total quality management, use of information technologies and industry restructuring. Mergers have also reorganised purchasing from a purely administrative function towards a strategic function (Sheth, 1996). A further change has been the shift from a transaction-centred to a relational-centred philosophy, as well as moving from centralised to global sourcing.

Business buying behaviour can be influenced through the environment, the organisation, interpersonal and individuals within the organisation (Kotler & Armstrong, 2008). Environmental influences include amongst others; economic development, competitive changes, and political and regulatory developments (Diagram 1). As demand and supply shifts drive corn commodity price fluctuations in an attempt to achieve price equilibrium, so will corn farm profits

fluctuate and impact on the corn farm business buying behaviour. The study focuses on the impact of changes within the economic (corn commodity price fluctuations), political and regulatory (free market versus subsidised corn farms) developments.

Diagram 1: Major influences on business buying behaviour



Source: Kotler, P. & Armstrong, G. (2008) *Principles of Marketing*. New Jersey; Pearson Education Incorporated.

The success of companies is linked largely to the performance of their supplier relationships and purchases they make (Hakansson & Snehota, 2002). The organisational purchase decisions of pesticide usage will determine crop protection and yield, which in turn influence farm profit (Oerke, 2005). Kotler and Armstrong highlight that organisational development, such as a change in objectives, policies and procedures, will also drive business buying behaviour change (Diagram 1).

As an example, corn producers might change their business objective to increase the farm area planted to benefit from higher consumer

demand. This will result in greater derived demand for corn input suppliers, including pesticides. Kotler (2003) states that one of the differences between consumer and business markets is that business markets have derived demand. Derived demand is demand which is ultimately created and influenced by demand for consumer goods (Kotler, 2003).

Buvik (2001) defined industrial buying behaviour within two broad frameworks. These two frameworks assess whether organisations will be resource dependent, and secondly what level of transaction cost focus the company follows. Some buyers might have a high transaction cost focus and will implement processes and policies to establish the best and most cost effective purchasing approach and strive for economising production costs. Resource dependent organisations would rather focus on being an open systems organisation, dependent on supplier input to deliver their organisational goals and seeking partnerships to assist in handling external uncertainties.

For pesticide input suppliers it is clear that the demand for their product is influenced by the derived demand of corn farm business buying. The question then remains whether the corn farmer buys to reduce production costs, or purchases and maintains supplier relationships in an effort to reduce external uncertainties?

2.5. Government influences on business buying behaviour

Kotler & Armstrong (2008) highlight that political and regulatory developments influence business buying behaviour. During the 2003 EU Common Agricultural Policy (CAP) reform, a new single payment scheme was introduced in an effort to support growers within the EU to obtain a more stable income (European Commission Agricultural & Rural Development, 2008). Under the new policy farmers could decide, based on market demand, which crop to produce, with the

comfort of knowing that the same aid applied to all crops (Toepfer International, 2008).

Government legislation also influences commodity prices by implementing policies in an effort to minimise food inflation. Eliminating export subsidies, introducing export taxes, having export quantity restrictions or total export bans (such as recently introduced in Ukraine, Serbia and India), subsidising the consumer and reducing import tariffs, are all various approaches governments have recently taken in an effort to limit food price increases (Trostle, 2008 & Mahmood et al., 2007).

Limited studies could be found to establish if countries with different political backgrounds and policies have significant differences in business buying behaviour. A study by Banting, Beracs & Gross (1991) compared industrial buying between Canada and Hungary post socialism, but even then found more similarities than differences.

The research focuses however, on whether different buying behaviours generally exist between Hungarian corn farmers who receive agricultural subsidies, when compared to South African corn farmers, who since the 1996 dismantlement of the South African maize board obtain no subsidies and generate corn revenue by selling on the free market.

2.6. Business buying and supplier relationship

Hakansson and Snehota (2002) highlight various supplier-relationship characteristics within business markets. As industrial markets are generally concentrated in terms of suppliers and buyers, turnover in customer base and suppliers normally tends to be low. Industrial markets tend to have a complex flow of products and require more support, services, knowledge and understanding of the customer's business. A company's buying performance depends to a large extent on the reliability and performance of their suppliers and their

products. Hakansson and Snehota (2002) further state that the buyer and seller relationship varies in strength, scope, duration, content and many other dimensions. Past studies within industrial markets also highlighted that generally buyers are more loyal towards brands than to suppliers (Dion & Banting, 1995).

From a traditional economic perspective, business relationships can also be viewed as restrictive obstacles, as relationships bind buyers and sellers to circumstances that exist outside the exchange transaction and prevent the free functioning of the market (Hakansson & Snehota, 2002). Relationships will also be built and maintained by the buying organisation, depending on the expected economic consequences, which are created through the value added by utilising supplier resources, knowledge and capabilities (Hakansson & Snehota, 2002).

Loyalty is defined by Kotler and Keller (2007) as a commitment to re-buy a preferred product in the future despite situational influences. These situational influences are very broad and could include changes to business buying behaviour.

Customers can be classified into two main categories, those who value a high-service supplier and are committed over a long-term (resource dependent), versus customers who value cost (transaction cost focus) and switch with ease (Zineldin & Philipson, 2007 and Buvik, 2001). For relationships to be sustainable, the relationship revenue must exceed the cost of the relationship. Organisations should also be aware that some customers prefer a distant contact with suppliers, as they prefer to purchase on the basis of price and quality competition, rather than having a long-lasting relationship (Zineldin & Philipson, 2007 and Buvik, 2001).

Should suppliers be able to establish the loyalty of their customers, the benefits to the organisation are great. Loyalty creates referrals,

reduces the cost of serving, customers would rather complain than defect, channel mitigation, greater awareness of brand assets and a psychological contract of reluctance to defect (Duffy, 2003).

The Dion & Banting (1995) study shows how buyers are most likely to react on non-service delivery and stock-outs. Various drivers such as past service history, handling of product complaints, brand strength and availability of substitutes will determine how buyers will react. Their findings indicate that 40% of buyers switch suppliers if they could not supply, but only 13% switch away from past brands. Large economic losses would also provide greater likelihood for changes in suppliers or brands (Dion & Banting, 1995).

The research aims to determine how buyers react to supplier loyalty as their economic environment is impacted by corn price changes and as their risk exposure varies. Will they change suppliers if buyers aim to limit cost and move to cheaper products, or if they wish to maximise yield and their current supplier cannot offer the latest technology?

3. RESEARCH QUESTIONS

Blaikie (2003) states that research can have various objectives - explore, describe, understand, explain, predict, change, evaluate or assess aspects of social phenomena. The aim is to understand if corn commodity prices influence corn business buying behaviour and the impact on pesticide demand. A structured quantitative research survey is used to gain primary data to assist with the understanding of the impact of commodity prices on corn pesticide demand.

3.1. Commodity price change and pesticide demand

The first point of analysis is to understand how much a change in profits actually influences grower pesticide demand. From the business buying behaviour model of Kotler & Armstrong (2008) it is clear that various aspects influence business buying behaviour. The

first research analysis therefore focuses on trying to establish if farmers change their pesticide demand as commodity prices fluctuate and they face obtaining different profit levels. Questions are structured to establish past buying behaviour against past corn prices.

3.2. Commodity prices and impact on pesticide price sensitivity

Pindyck and Rubinfeld (2005) explain that as a consumer's income increases it could impact on the consumer's price elasticity with regards to demand. Jakobi (2001) however, highlights the various factors which make industrial product demand inelastic and says that industrial market prices are slow to react to demand changes. The second analysis determines the impact of commodity prices (change in farm profits) and to what level a demand for pesticide is inelastic.

Price elasticity can be established either through qualitative (intuition and experience of managers or key sales personnel) or quantitative approaches, which aim to generate estimates of elasticity coefficients based on actual data (Morris & Joyce, 1988). The research will make use of a quantitative approach to establish price sensitivity, which is a similar approach to that of Morris & Joyce (1988). A structured questionnaire survey will be used to establish farmers' price elasticity by requesting farmers to indicate their intended behaviour towards pesticides along various corn prices.

Each question will include past, present and future corn price simulations, to allow for further analysis upon which price farmers based a greater proportion of their decision (Tomek & Peterson, 2001). This is aligned with the work by Tomek & Peterson (2001) which indicates that farmers have different time approaches as to when they market their crop.

3.3. Risk reduction through hedging and its impact on buying behaviour

Business risk behaviour influences the business buying behaviour (Jakobi, 2001). Byrant (2003) states that the use of future contracts is a valuable tool that helps facilitate the effective reallocation and management of risk. Growers have different approaches and tools to apply during risk management of which hedging (trading via futures markets) is one that allows for risk reduction (Vámos & Novák, 2008 and Pennings & Leuthold (2000), and is viewed by some growers as a profit maximising tool (Tomek & Peterson, 2001).

The research will ask farmers to what extent they make use of hedging, when and how often they market, and whether they use the tool for risk reduction, profit maximisation or both. Finally, this research section will strive to establish whether farmers apply the same focus on hedging, frequency in decision making and whether they view pesticide as risk reduction and/or yield maximising during pesticides purchasing?

3.4. Government influences on business buying behaviour

Political and regulatory developments influences business buying behaviour (Kotler & Armstrong, 2008), yet past studies show more similarities than differences between different countries' business buying behaviour (Banting, et al. 1991). The focus of the research went on understanding whether significant differences exist between Hungarian and South African growers' business buying behaviour. The overall analysis of the two samples will be compared to each other to establish if significant variances exist.

3.5. Buyer-seller relationship and loyalty during commodity price fluctuations

Hakansson and Snehota (2002) highlight the value of supplier and buyer relationships and the tendency of a low supplier and customer (buyer) turnover. The research will clarify whether change to business profit drives change to customer and supplier loyalty. Does the broad classification of Zineldin & Philipson (2007) and Buvik (2001) apply to farm organisations? Will growers who focus on cost reduction change suppliers more frequently as corn prices fluctuate and profitability is threatened, or is pesticide purchasing complex requiring more resource dependant relationships, which are not impacted upon negatively through fluctuations in farm profits?

4. RESEARCH METHODOLOGY

4.1. Unit of analysis

The unit of analysis was whether corn commodity prices influenced growers' pesticide demand.

4.2. Population of relevance

This study focused on corn producers with the group sharing the following three commonalities:

- Corn producers that have produced corn for at least three years to ensure that the producers had been exposed to corn commodity price fluctuations.
- Producers that have traded corn within the free market and generated income from commodity prices.
- Had an e-mail address to facilitate the web-based research questionnaire.

To determine if a difference exists in business buying behaviour between producers with government support (subsidies) and producers without any support, the research focused on two population sets - South African corn producers farming without government subsidies, and corn producers from Hungary (Hungary being a member state of the European Union). The selection of Hungary was also motivated because Hungary represents 1.1 million hectares of corn during the 2007/8 season and from area coverage point represents an estimated 13% of total EU corn area (LMC, 2008).

The population relevant to the research was drawn from two databases supplied by crop protection suppliers. One dataset for South African corn growers and a second dataset for Hungary corn

growers were utilised. The Hungarian and South African population sizes were not known as both suppliers only supplied us with the sample frames after application of the quota sampling.

4.3. Sampling method and size

Two sample frames from pesticide suppliers were used. The research used quota sampling. Zikmund (2003) classifies quota sampling as a no probability sampling technique that ensures the population sample is delivered with preset characteristics. A minimum of three years corn production, producers who traded corn on the free market and an e-mail address were the three set quotas for the population sampling.

The sample size for the South African corn growers was initially 244, with 10 extra grower names added afterwards by a sales representative when the response rate, with one week left during the collection period, was low. The Hungarian sample size contained 522 corn growers.

4.4. Data collection process

The research utilised a survey questionnaire to collect primary data in order to understand commodity prices and the impact on pesticide demand. The survey was web-based with each potential respondent receiving an internet link to a pre-loaded electronic survey. Malhotra & Briks (2003) estimated that traditional mail surveys without any previous contact between the interviewer and respondents receive responses as low as 15%, hence the minimum sample frame used was 200 growers for each country. The objective was to try and achieve at least 30 respondents from each country. Within the South African sample a number of ten growers were contacted telephonically with one week left during the collection period, in an effort to increase the response rate.

Zikmund (2006, p. 175) describes a survey as “a research technique in which information is gathered from a sample of people by use of a questionnaire or interview; a method of data collection based on communication with a representative sample of individuals”. Surveys have various advantages for data collection. They are quick, relatively cheap, efficient and an accurate data collection method (Zikmund, 2003).

The questionnaire contained simple-dichotomy (fix alternative questions), frequency-determination (explores frequency of occurrence from a fixed list), as well as checklist questions (fixed alternative questions with multiple answers). To avoid order bias, the web-survey had functionality that allowed for answer order to change with each survey being answered. Growers were also given two price scenarios to provide clarity on the drivers that influenced their business buying behaviour. A single question also contained weighting of low, medium and high which required respondents to indicate the importance they attribute to each of the different corn commodity prices during their input decision making process.

Malhotra & Briks (2003) highlight the importance of special considerations to be taken into account when conducting international research or cross-cultural research. Different governmental, legal, economic, socio-cultural and structural (e.g. communication platforms) environments do exist, therefore the research used a local agro-chemical specialist to determine if the survey met all of the above mentioned considerations. With the exception of a single question related to the different marketing tools being available to Hungarian and South African growers, all other questions were exactly the same.

A native Hungarian assisted with the translation of the questionnaire from English to Hungarian. The survey was offered to the South African growers in both English and Afrikaans in an attempt to

improve response accuracy. The questionnaire pre-testing was done via the native Hungarian and the South African agro-chemical specialist. During pre-test, the Hungarian growers reduced the based corn price utilised within the survey down from HUF42,000 to HUF36,000, as they felt this price to be closer to the past season's obtained grower price.

4.5. Data analysis approach

Zikmund (2003) describes descriptive analysis as transforming the raw data into a meaningful form, to allow ease of understanding and interpretation. Descriptive analysis uses averages, frequency distribution and percentage distribution as some of the ways to summarise the data (Zikmund, 2003).

The aim was to run a descriptive analysis on the impact of corn commodity price changes on business buying behaviour, price sensitivity and their influence on buyer and seller relationships.

For price sensitivity, the research determined if producers are more sensitive to product prices at different profit levels. The research aimed to establish if an association between changes in commodity prices (business profit) resulted in changes in product price sensitivity. "Two variables are said to be associated if the value of one variable vary or change together with the values of the other variable" (Blaikie, 2003).

Generally survey research's ability to control for interactions between price sensitivity and various product or buying situations is limited (Morris & Joyce, 1988), however the use of different crop price scenarios, whilst keeping the suppliers' price changes constant, was used in an effort to gain a understanding of the growers' price sensitivity.

The third set of analysis was to analyse the two samples in order to establish if major variances existed between Hungarian farmers who receive government support through subsidies, versus South African farmers who only receive corn revenue income from trading corn on the free market.

The final analysis was to establish if corn producers with different levels of marketing including hedging, have different business buying behaviours. Averages, frequency distribution and percentage distribution were used for both the third and fourth set of analyses.

4.6. Research limitations

Zikmund (2003) describes a sampling error as being when some sample elements are excluded or if the total population is not accurately represented through the sample frame being used. Thus, a sampling frame error existed as the supplier's sample frames used did not include all respective corn producers that meet the pre-set (judgmental) criteria. It was also unclear how representative the two data sets were of the total corn farmers within each country.

With the low South African corn growers' response rate, an additional ten growers were contacted in an attempt to increase the response rate. These additional growers could also have contributed to response bias error, as the interviewer had to personally convince these growers to participate.

Various drivers will influence business buying behaviour and to fully understand business buying behaviour one would need to assess a much broader set of drivers (Kotler & Armstrong, 2008). The research only focused on the impact commodity prices (producer profit), government regulations (subsidies) and risk behaviours (futures contracts) have on business buying behaviour.

Weather is severely unpredictable and significantly impacts the yield of corn growers and ultimately corn profitability. Our study ignored the impact of weather (Osborne, 2004). A further limitation existed for price analysis. Price analysis has the limitation that the accuracy of the results is limited to a customer's ability to recall prices and under what circumstances they accepted these prices (Morris & Joyce, 1988). To limit the inaccuracy, growers were asked to respond based not on past behaviour, but rather on how they would react to prices under different scenarios of corn prices.

Price elasticity measures the change in quantity demanded of a specific product in relationship to the change in its price (Pindyck & Rubinfeld, 2005). In the survey the questions which tested price elasticity did not isolate only quantity as the changing variable, but also allowed growers to respond to price, volume and supplier choice, which limits the validity of the findings towards price elasticity.

The South African corn growers had also experienced above average historical corn prices over the past two seasons, and the futures price was also very positive (refer Appendix 9.1 and 9.2). This might have influenced the growers' to respond more positively towards input decision making than would have been the case under more normal historical corn price levels.

5. RESULTS

5.1. Sample & respondent demographics

After applying the quota sampling criteria of a minimum of three years farming, having traded corn on open market and having an e-mail address to the two sample frames, the survey was sent in total to 776 corn growers, 522 growers from Hungary and 254 growers from South Africa. The corn growers were given six weeks to respond.

Table 3: Sample size and response rate

Country	Completed	Partial Completed	Total	% Total Response	% Completed Response
Hungary	73	19	92	17.6%	14.0%
South Africa	28	3	31	12.2%	11.0%
Total	101	22	123	15.9%	13.0%
%	82%	18%			

The overall response rate was 123 growers (16%), with the Hungarian sample achieving the highest response rate of 92 growers (18%). Hungarian growers were offered the opportunity to add their e-mail account and request a copy of the high-level survey results as an incentive to complete the survey. No incentive was offered to the South African growers, as this is generally discouraged by the Gordon Institute of Business Science when conducting academic research. The South African growers were offered either an English or Afrikaans survey. Only five of the 31 respondents completed the survey in English.

Of the 123 responses, 22 questionnaires were not 100% completed and were excluded from the analysis. This resulted in the total fully completed survey response rate being 13% or 101 growers (73 from Hungary and 28 from South Africa). Only these fully completed responses were analysed and used within this research study. When assessing the combined samples, one needed to keep in mind that

the Hungarian responses exceeded the South African response rate by 2.6 (n=73) to 1 (n=28), and would skew all combined averages and totals.

Table 4: Average corn hectares planted over the last three years

Ave. corn hectares planted over past 3 years	HU	SA	Total	% HU Split	% SA Split	% Total Split
100ha or less	50	0	50	68.5%	0.0%	49.5%
101ha to 300ha	6	7	13	8.2%	25.0%	12.9%
301ha to 500ha	9	6	15	12.3%	21.4%	14.9%
501ha to 1,000ha	3	4	7	4.1%	14.3%	6.9%
1,001ha and more	5	11	16	6.8%	39.3%	15.8%
	73	28	101			

The average number of corn hectares planted during the past three years varied between the two samples. South African corn growers' hectares were more evenly distributed, with the highest number of growers farming 1,001ha and more. Hungarian growers had much smaller corn areas planted, with 69% of respondents indicating 100ha or less planted. Only 7% of their growers indicated corn areas of 1,001ha and more.

Table 5: Grower profile - age

Average Age	HU	SA	Total	% HU Split	% SA Split	% Total Split
25 years & younger	1	0	1	1.4%	0.0%	1.0%
26 - 35 years	19	3	22	26.0%	10.7%	21.8%
36 - 49 years	32	12	44	43.8%	42.9%	43.6%
50 years & older	21	13	34	28.8%	46.4%	33.7%
	73	28	101			

44% of Hungarian growers were aged between 36-49 years, with a further 29% being fifty years and older. The majority of South African growers were also 36 years and older, with an almost even split between those aged 36-49 years (43%) and those aged fifty years and older (46%).

Table 6: Grower profile – years farming

Years farming	HU	SA	Total	% HU Split	% SA Split	% Total Split
0 - 10 years	17	4	21	23.3%	14.3%	20.8%
11 - 15 years	20	7	27	27.4%	25.0%	26.7%
16 - 20 years	15	3	18	20.5%	10.7%	17.8%
20 years +	21	14	35	28.8%	50.0%	34.7%
Ave Years	18	21	19			

Both samples were very experienced growers. In total, the average number of years farming corn was 19 years, with the average for Hungary being 18 years and South Africa 21 years. The grower with the longest experience had been producing corn for 45 years.

5.2. Commodity price changes and impact on agro-chemical buying behaviour

Most South African growers (89%) have benefitted from a higher year-on-year corn commodity price, with no single grower experiencing a lower year-on-year crop price. Hungarian growers have experienced the opposite with 96% of corn growers experiencing lower corn prices compared to the previous year and only one grower claimed a higher crop price than one year ago.

Table 7: Corn commodity price year-on-year comparison

Corn commodity price year-on-year comparison	HU	SA	Total	% HU Split	% SA Split	% Total Split
Higher	1	25	26	1.4%	89.3%	25.7%
Almost the same	2	3	5	2.7%	10.7%	5.0%
Lower	70	0	70	95.9%	0.0%	69.3%
	73	28	101			

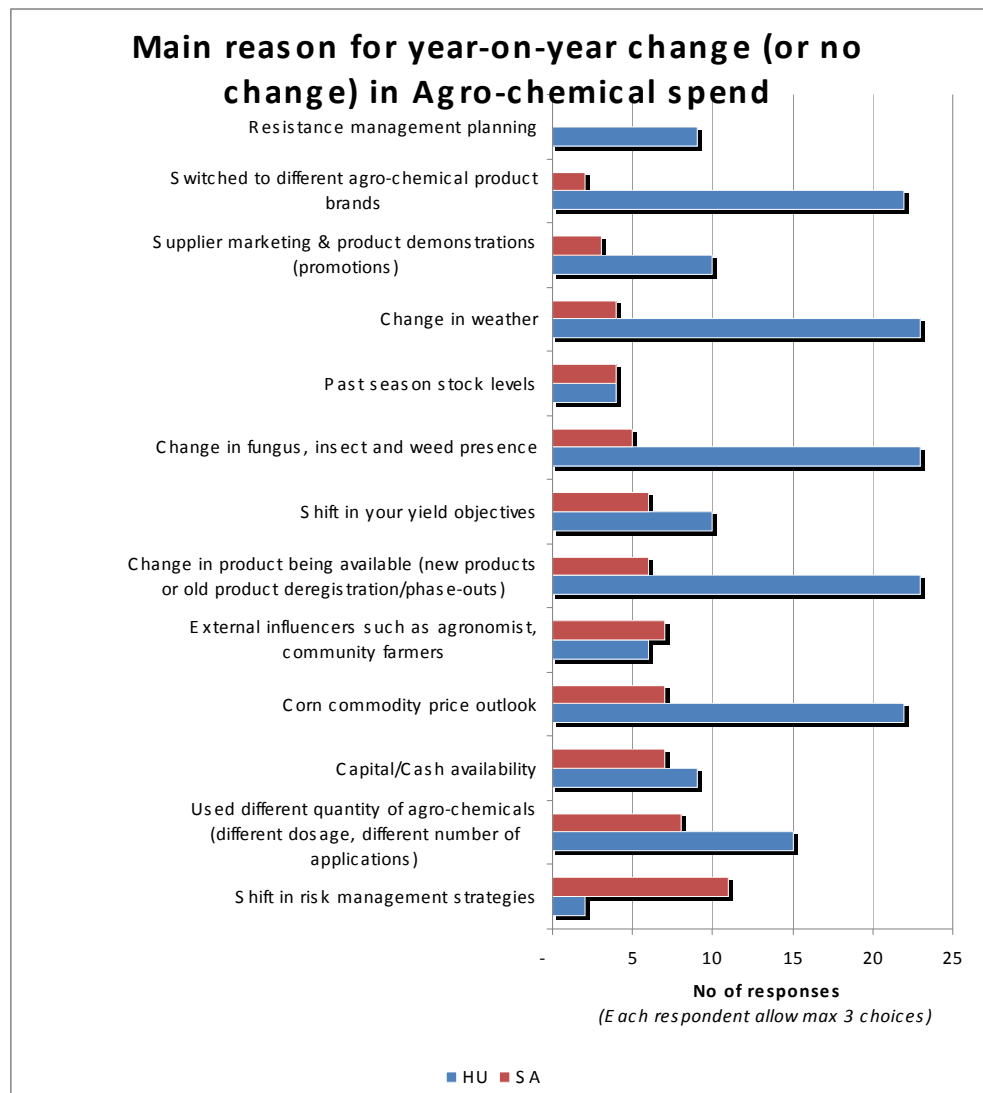
Both the majority of South African (75%) and Hungarian (71%) growers indicated that their agro-chemical spend increased over the last year. Various reasons were given for the change (or lack thereof) in year-on-year agrochemical spend (refer graph below). Each respondent was allowed to indicate three factors he or she felt influenced their year-on-year agro-chemical spend the most. Hungarian growers indicated that all factors influenced their year-on-year agro-chemical spend. Change in fungus, insect and weed presence, change in products being available (new products being introduced or old products being phased out) and change in weather had the most number of responses (n = 23), with commodity price outlook and a switch to different product brands each recording 22 responses.

Table 8: Agro chemical spend year-on-year comparison

Agro-chemical spend year-on-year comparison	HU	SA	Total	% HU Split	% SA Split	% Total Split
Higher	52	21	73	71.2%	75.0%	72.3%
Almost the same	14	7	21	19.2%	25.0%	20.8%
Lower	7	0	7	9.6%	0.0%	6.9%
	73	28	101			

Shift in risk management strategies was rated the highest driver (n = 11) for South African corn growers, with corn commodity price outlook, capital/cash availability and external influencers such as agronomist & community farmers recording the second highest responses (n = 7).

Graph 4: Main reason for year-on-year change (or no change) in Agro-chemical spend



Growers were asked whether they would change their agro-chemical buying behaviour and spend should the corn commodity price increase or decrease by 20%, with the base price being the current expected future harvest price. For South Africa the expected futures price ranged for the period May to July between R1,600 to R2,400 per ton for delivery July 2009, therefore the researcher decided to take the middle range price of R2,000 per ton (refer appendix 9.2). HUF36,000 per ton for Hungary was provided as a good futures price by the Hungarian in-country contact (Kaposztas, 2008).

With a 20% more positive corn commodity price outlook, most growers (70% Hungarian and 82% South African) indicated that they would maintain the same agro-chemical programme as the previous season. Only 23% of Hungarian growers indicated possible increases in their agro-chemical spend. The figure was even lower for South African growers at 18%.

Table 9: Impact on agro-chemical spend with 20% higher commodity price

Assuming you will obtain a 20% higher commodity price for next harvest, how would this impact your agro-chemical spend?	HU	SA	Total	% HU Split	% SA Split	% Total Split
Will increase spend and buy more volumes (increased dosage and/or number of applications)	7	2	9	9.6%	7.1%	8.9%
Will increase agro-chemical spend by changing to more expensive products	7	2	9	9.6%	7.1%	8.9%
Will increase agro-chemical spend through both volume increases & purchase more expensive products	3	1	4	4.1%	3.6%	4.0%
Maintain same agro-chemical programme	51	23	74	69.9%	82.1%	73.3%
Reduce spend and buy less volumes (reduced rates and less applications)	1	-	1	1.4%	0.0%	1.0%
Reduce spend and change to cheaper alternative brands	3	-	3	4.1%	0.0%	3.0%
Reduce spend in both volume and price	1	-	1	1.4%	0.0%	1.0%
	73	28	101			

When growers were expecting a decline of 20% in their corn commodity price, the majority of responses again indicated maintenance of the same agro-chemical programme. South African growers (64%) as well as Hungarian growers (48%) indicated no change. When combining the three choices for reduction in spending, 51% of Hungarian growers indicated less planned investment in agro-chemicals on the basis of a reduced corn price.

Table 10: Impact on agro-chemical spend with 20% lower commodity price

Assume you will obtain a 20% lower commodity price for next harvest, how would this impact your agro-chemical spend?	HU	SA	Total	% HU Split	% SA Split	% Total Split
Will increase spend and buy more volumes (increased dosage and/or number of applications)	-	-	-	0.0%	0.0%	0.0%
Will increase agro-chemical spend by changing to more expensive products	-	-	-	0.0%	0.0%	0.0%
Will increase agro-chemical spend through both volume increases & purchase more expensive prod	1	-	1	1.4%	0.0%	1.0%
Maintain same agro-chemical programme	35	18	53	47.9%	64.3%	52.5%
Reduce spend and buy less volumes (reduced rates and less applications)	9	-	9	12.3%	0.0%	8.9%
Reduce spend and change to cheaper alternative brands	23	7	30	31.5%	25.0%	29.7%
Reduce spend in both volume and price	5	3	8	6.8%	10.7%	7.9%
	73	28	101			

Both South Africa and Hungary indicated that most corn growers revised their agro-chemical spray programme between 1 – 3 times per planting season.

Table 11: Number of times growers revise their agro-chemical spray programme per year

Number of times growers revise their agro-chemical spray programme per year	HU	SA	Total	% HU Split	% SA Split	% Total Split
Once only	13	13	26	17.8%	46.4%	25.7%
Between 1 -3 times	36	14	50	49.3%	50.0%	49.5%
More than 3 times	24	1	25	32.9%	3.6%	24.8%
	73	28	101			

Various factors influenced growers to consider revising their agro-chemical spray programme. On the survey Hungarian growers indicated adjustment for disease and weed pressure, lack of performance and changes to weather as their biggest drivers to revise their agro-chemical spray programme. South African growers also highlighted adjustment for disease and weed pressure and adjustments due to weather, but added recommendations by sales representative as their top three drivers.

Table 12: Influencers of agro-chemical spray programme

Influencers of agro-chemical spray programme	HU	SA	Total	% HU Split	% SA Split	% Total Split
Plan once off prior to season start and leave unchanged	5	7	12	2.9%	13.2%	5.3%
Adjust for weather	48	11	59	27.6%	20.8%	26.0%
Adjust for insect, fungus and weed pressure	57	19	76	32.8%	35.8%	33.5%
Adjust as commodity price fluctuate	10	-	10	5.7%	0.0%	4.4%
Adjust for lack of control performance	48	5	53	27.6%	9.4%	23.3%
Adjust based on sales representative or advisor recommendation	6	11	17	3.4%	20.8%	7.5%
	174	53	227			

According to both Hungarian and South African growers, availability of funds and/or credit and negotiations with the sales representative determines most the amounts spent on agro-chemicals. Past season commodity price and inflation were least considered by growers as determinants to the amount spent on agro-chemicals.

Table 13: Determinants of planned agro-chemical spend

Determinants of planned agro-chemical spend	HU	SA	Total	% HU Split	% SA Split	% Total Split
Previous season agro-chemical cost	33	4	37	17.5%	6.8%	14.9%
Past season realised commodity price	13	2	15	6.9%	3.4%	6.0%
Current commodity price	17	11	28	9.0%	18.6%	11.3%
Future harvest commodity price	32	8	40	16.9%	13.6%	16.1%
Negotiation with chemical sales representative	40	16	56	21.2%	27.1%	22.6%
Inflation	11	5	16	5.8%	8.5%	6.5%
Availability of funds/credit	43	13	56	22.8%	22.0%	22.6%
	189	59	248			

5.3. Commodity price and impact on pesticide price sensitivity

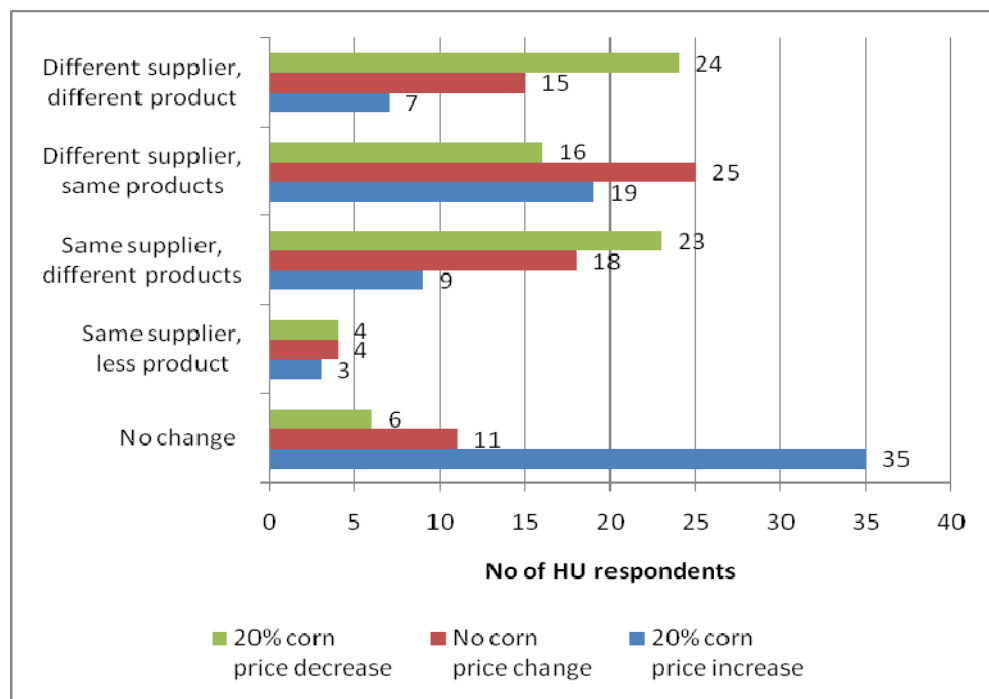
To establish at a high-level the price sensitivity towards agro-chemicals as commodity prices fluctuate, the survey used two agro-chemical price scenarios; a 10% price increase and a 10% price decrease. The respondents were then requested to indicate how they would react to the agro-chemical price changes against three possible corn commodity changes, namely no change, 20% increase or 20% decrease in their future expected corn price.

Scenario 1: Suppliers increased their agro-chemical prices by 10%.

Most Hungarian growers (55%, n = 40) who experienced a corn commodity price decline with the supplier price increase changed

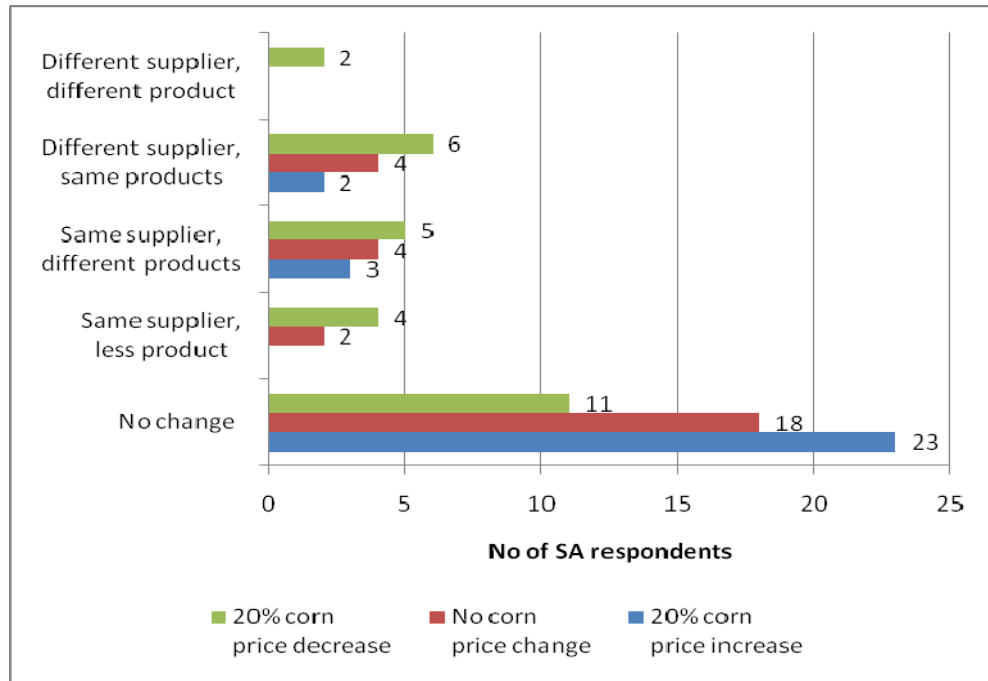
suppliers and either then maintained the same products or indicated they would change products as well. The same trend is also visible with 55% (n = 40) Hungarian growers changing suppliers even if their corn commodity price were unchanged against the supplier price increase. When their corn commodity price increased along with the supplier increase, most Hungarian growers (48%, n = 35) responded with no change to their agro-chemical purchase.

Graph 5: Hungarian corn growers' response to 10% agro-chemical supplier increase at three different future corn commodity prices



South African corn growers responded under all three different future corn commodity prices that most growers would remain with the no change option towards agro-chemicals. The only difference was in the percentage of grower responses, which increased as their corn commodity price outlook improved.

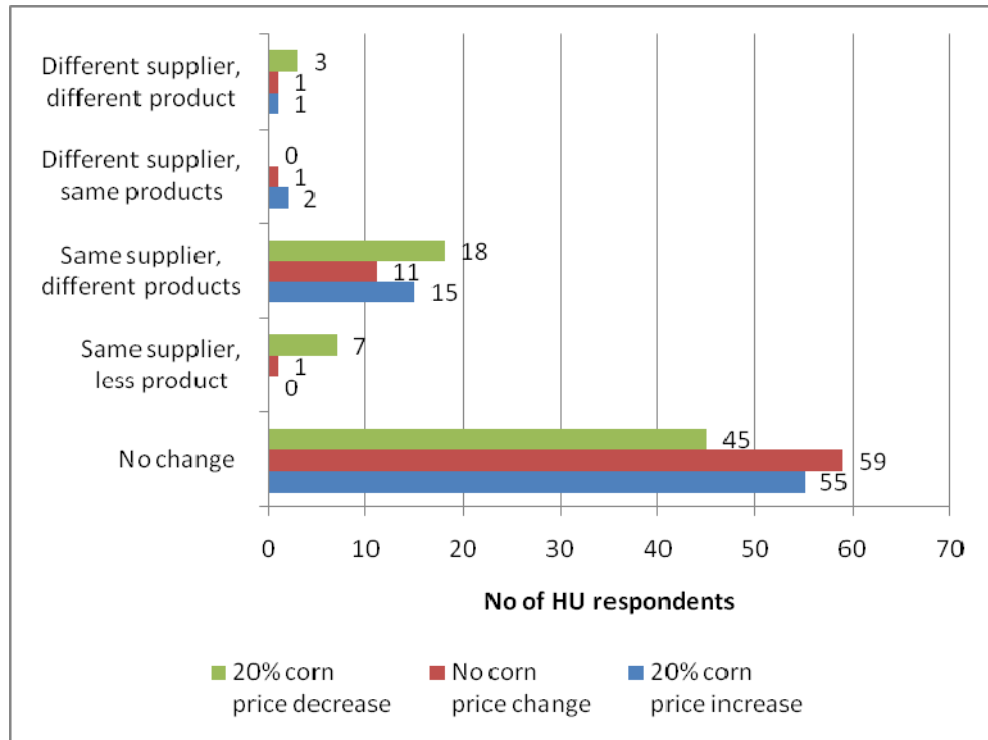
Graph 6: South African corn growers' response to 10% agro-chemical supplier increase at three different future corn commodity prices



Scenario 2: Suppliers decreased their agro-chemical prices by 10%.

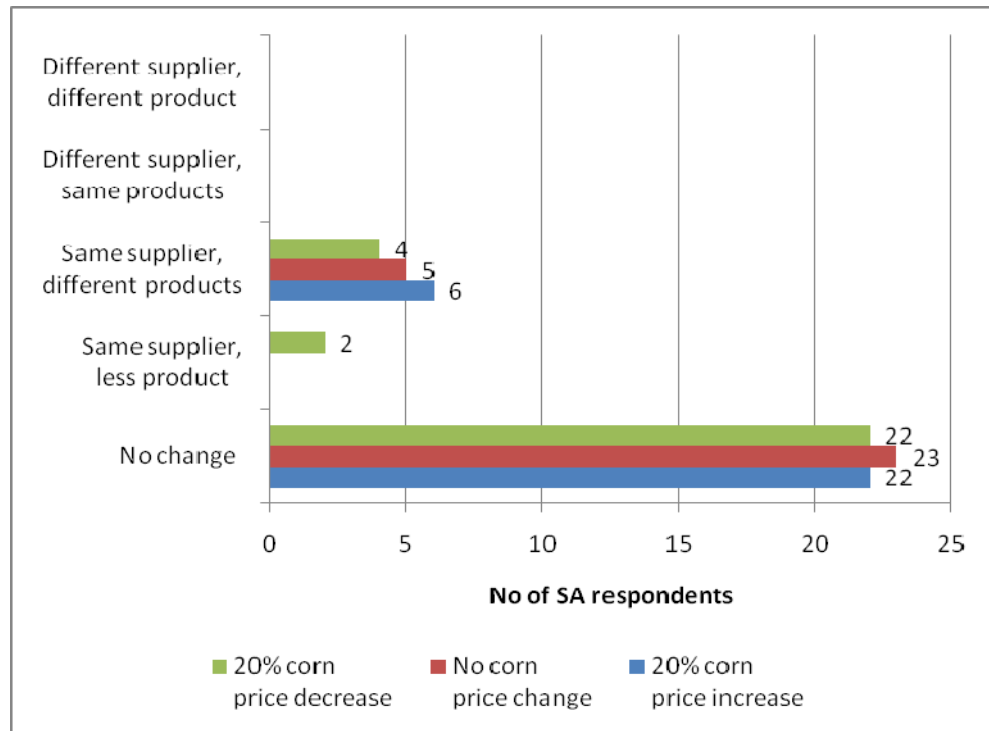
When agro-chemical suppliers decreased the price by 10%, most Hungarian grower responses indicated no change towards their agro-chemical purchasing regardless of changes towards their corn commodity prices.

Graph 7: Hungarian corn growers' response to 10% agro-chemical supplier decrease at three different future corn commodity prices



The South African corn growers indicated the same trend for supplier decreases as for when suppliers increased agro-chemicals prices, with most again indicating no change to the agro-chemical purchasing. The number of respondents did however increase for no change during supplier price decreases.

Graph 8: South African corn growers' response to 10% agro-chemical supplier decrease at three different future corn commodity prices



5.4. Risk reduction through hedging and impact on buying behaviour

The highest number of growers reviewed the corn commodity price on an almost daily basis - 38% Hungarian growers and 71% South African growers. If the once a week frequency is added to the almost daily frequency, the number of Hungarian growers increased to 49 (67%).

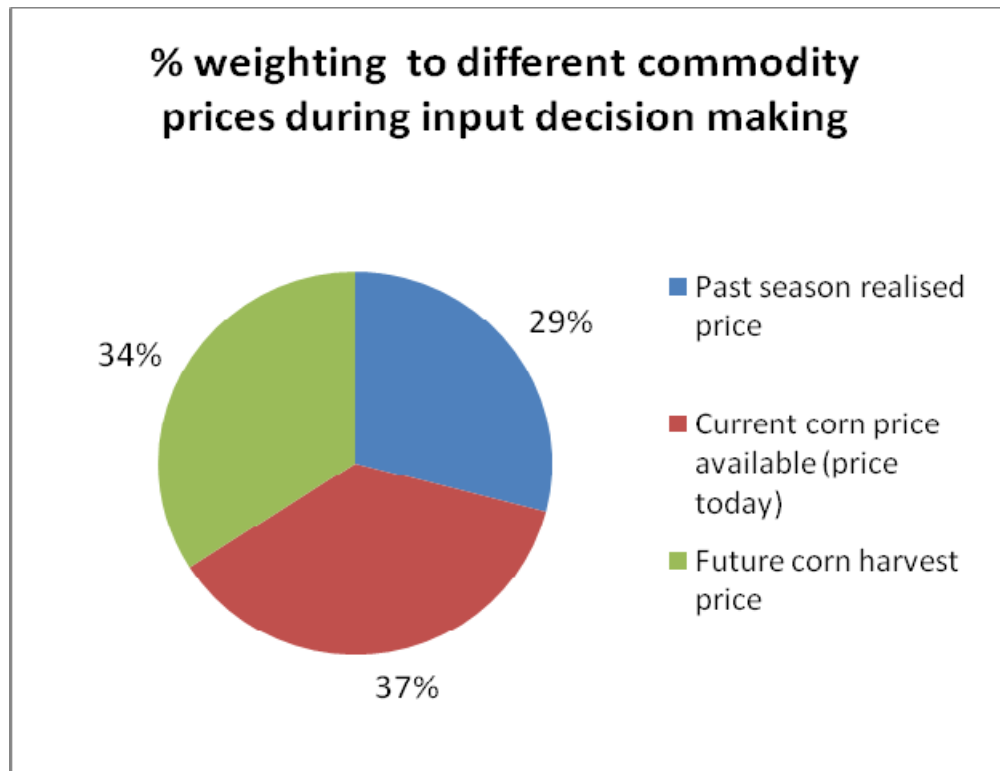
Table 14: Frequency of assessing the corn commodity price

Frequency of assessing the corn commodity price	HU	SA	Total	% HU Split	% SA Split	% Total Split
Almost daily	28	20	48	38.4%	71.4%	47.5%
Once a week	21	1	22	28.8%	3.6%	21.8%
One or two times a month	8	5	13	11.0%	17.9%	12.9%
Prior to planting & close to harvest	2	1	3	2.7%	3.6%	3.0%
Each time I need to make crop input decisions	5	0	5	6.8%	0.0%	5.0%
No fixed frequency	9	1	10	12.3%	3.6%	9.9%
	73	28	101			

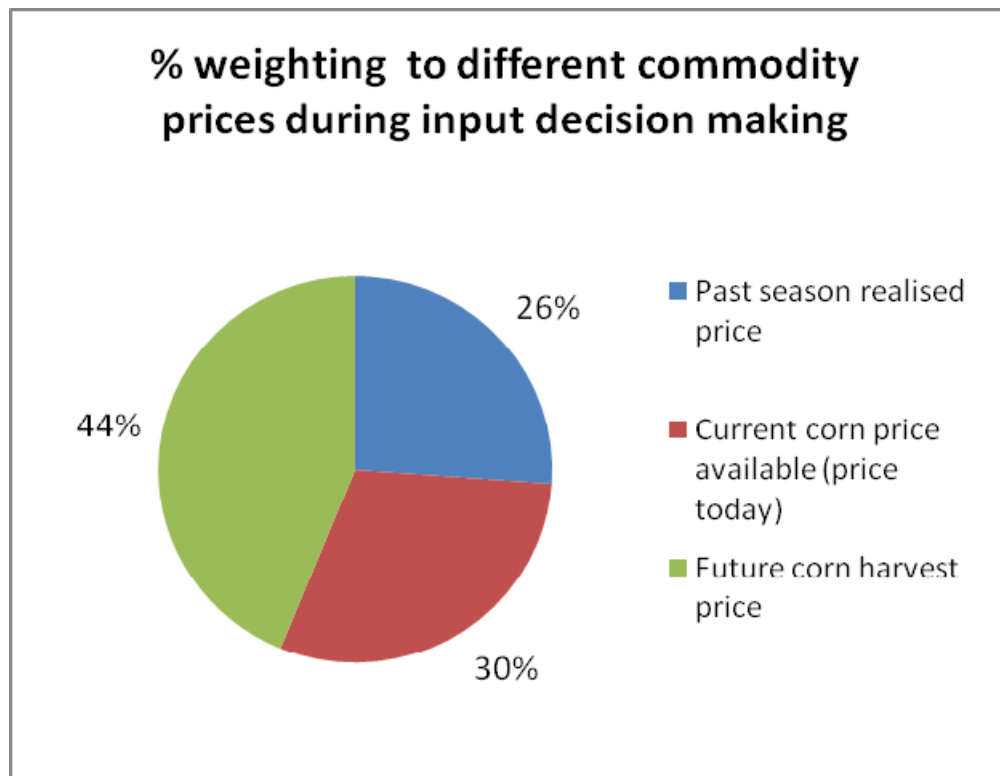
Growers had the opportunity to indicate to what extent they considered the past realised, current and future expected corn commodity price during input decisionmaking. They were offered three choices with low, medium or high consideration for each different corn price. Low ratings were given a weight of 1, medium 2 and high 3 to allow for a weighted average corn price to be calculated.

The results reflected below in Graph 9 and 10 indicated that all three different prices were considered by both sample. Hungarian growers gave a slightly higher consideration to their current corn price at decision making time. South African corn growers considered their future corn price as the most important price to consider when input decisions are taken.

Graph 9: Hungarian growers' percentage weighting to different corn commodity prices during input decision making

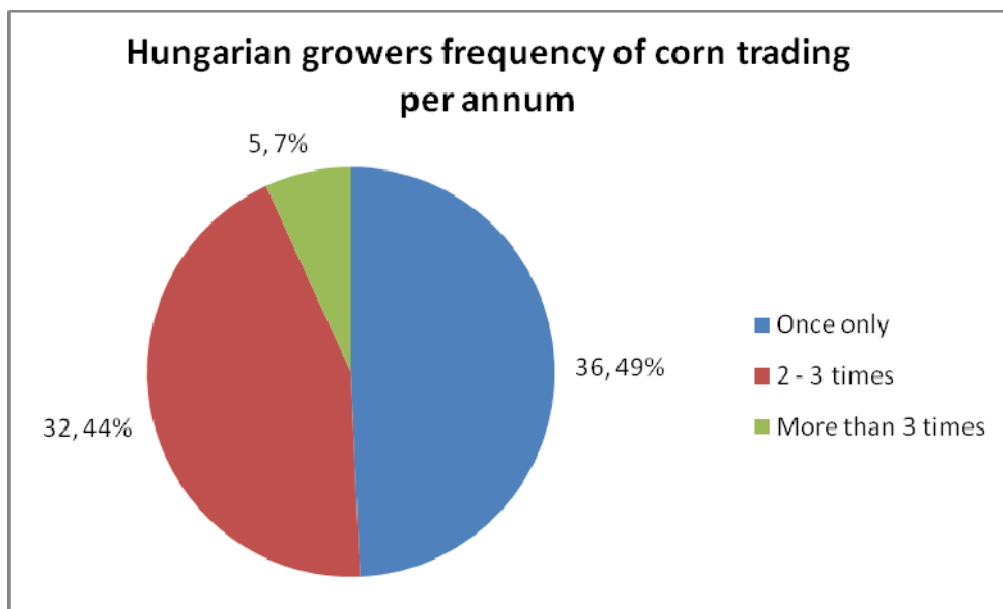


Graph 10: South African growers' percentage weighting to different corn commodity prices during input decision making

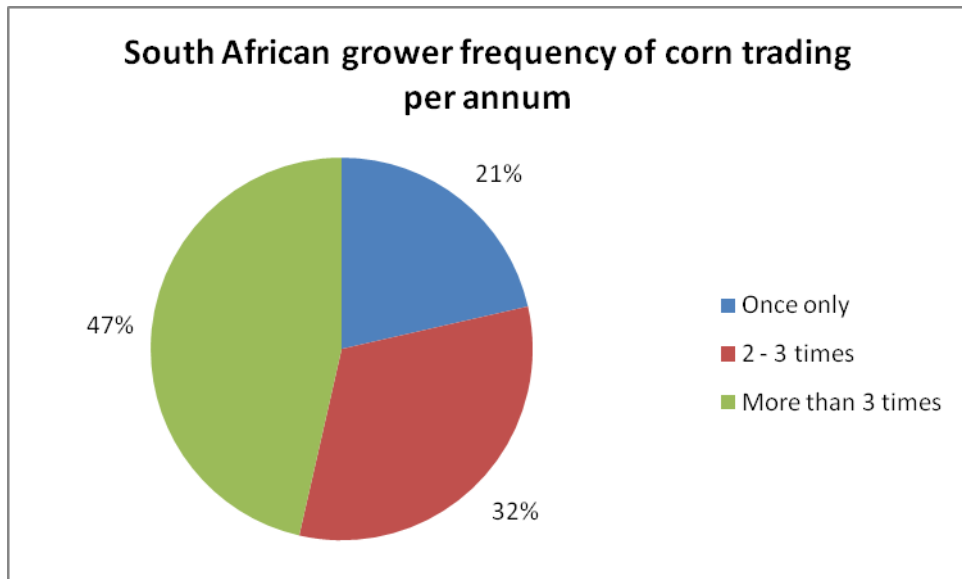


Hungarian growers differ in the number of times they sell their corn crop to South African growers. Most growers in Hungary (49%, n = 36) traded once per annum, versus only a further 7% (n = 5) which traded more than three times. South African growers traded most (46%, n = 13) more than three times with only 21% (n = 6) selling their crop in a single transaction.

Graph 11: Hungarian growers' frequency of corn trading per annum



Graph 12: South African growers' frequency of corn trading per annum



Hungarian growers used crop merchant brokers (48%, n = 35) as their most used marketing tool when selling their crop, followed by integrators (29%, n = 21), who also provide growers with their inputs during planting season. South African growers favoured co-ops (68%, n = 19) as their most used trading mechanism, with SAFEX (54%, n = 15) also being used by more than half the growers.

Table 15: Marketing tool (agency) used to sell crop

Marketing tool (agency) used to sell crop – max 3 choices	HU	SA	% HU used	% SA used
Integrator *	21	0	28.8%	0.0%
Stock exchange (Budapest/SAFEX)	2	15	2.7%	53.6%
Myself directly to manufacturers *	11	0	15.1%	0.0%
Myself **	0	10	0.0%	35.7%
Co-op	9	19	12.3%	67.9%
Crop Merchant Broker *	35	0	47.9%	0.0%
Commercial Bank **	0	0	0.0%	0.0%
Other	11	2	15.1%	7.1%
	89	46		

* Option only in Hungarian survey

** Option only in South African survey

South African corn growers (79%, n = 22) also used futures hedging to a far greater extent compared to Hungarian growers (32%, n =23).

Slightly more than half the Hungarian growers (13 of 25) who did use futures hedging also indicated more than 76% of total crop being fixed to a future corn price. The South African growers who did hedge, had no specific preference to the percentage of the crop being hedged, with an almost even distribution in the responses.

Table 16: % of crop sold using futures (hedging)

% of crop sold using futures (hedging)	HU	SA	Total	% HU Split	% SA Split	% Total Split
None	50	6	56	68.5%	21.4%	55.4%
Yes, but less than 25% of total crop	3	6	9	4.1%	21.4%	8.9%
Yes, between 26% and 50% of total crop	4	6	10	5.5%	21.4%	9.9%
Yes, between 51% and 75% of total crop	3	4	7	4.1%	14.3%	6.9%
Yes, 76% and more	13	6	19	17.8%	21.4%	18.8%
	73	28	101			

Securing the future price of corn is mainly motivated as a method to cover input costs according to the Hungarian growers (n = 13 out of 31 Hungarian growers who do perceive value in hedging) who did indicate value gained through hedging. The most value for South African corn growers (50%, n = 14) when hedging corn prices, was to secure price and reduce price uncertainty. South African growers did not have the option of selecting the 'Do not use these channels to sell'. The biggest portion of the Hungarian sample (58%, n = 42) opted to select this choice, rather than indicating any value in securing a future corn price.

Table 17: Value gained when using futures market (hedging corn prices)

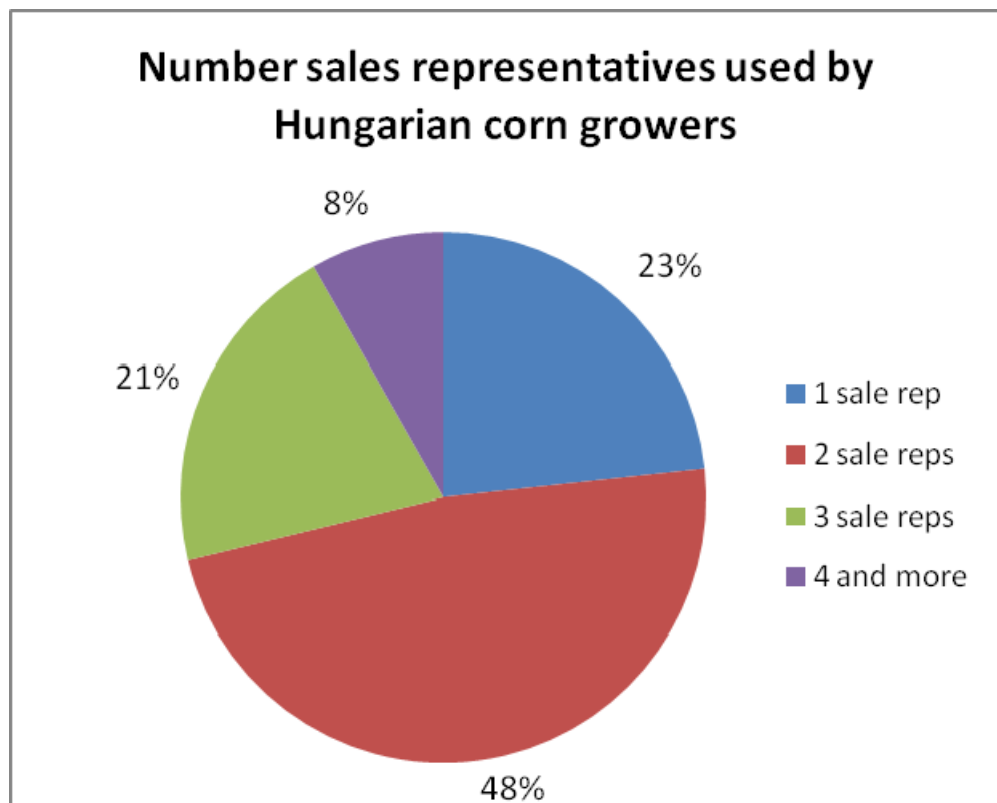
Value gained when using futures market (hedging corn price)	HU	SA	Total	% HU Split	% SA Split	% Total Split
Do not use these channels to sell *	42	0	42	57.5%	0.0%	41.6%
Secure price and reduce price uncertainty	11	14	25	15.1%	50.0%	24.8%
Cover input costs	13	6	19	17.8%	21.4%	18.8%
Allows for improved overall planning	5	4	9	6.8%	14.3%	8.9%
Maximise corn profit	2	4	6	2.7%	14.3%	5.9%
	73	28	101			

* Option was only included in Hungarian survey

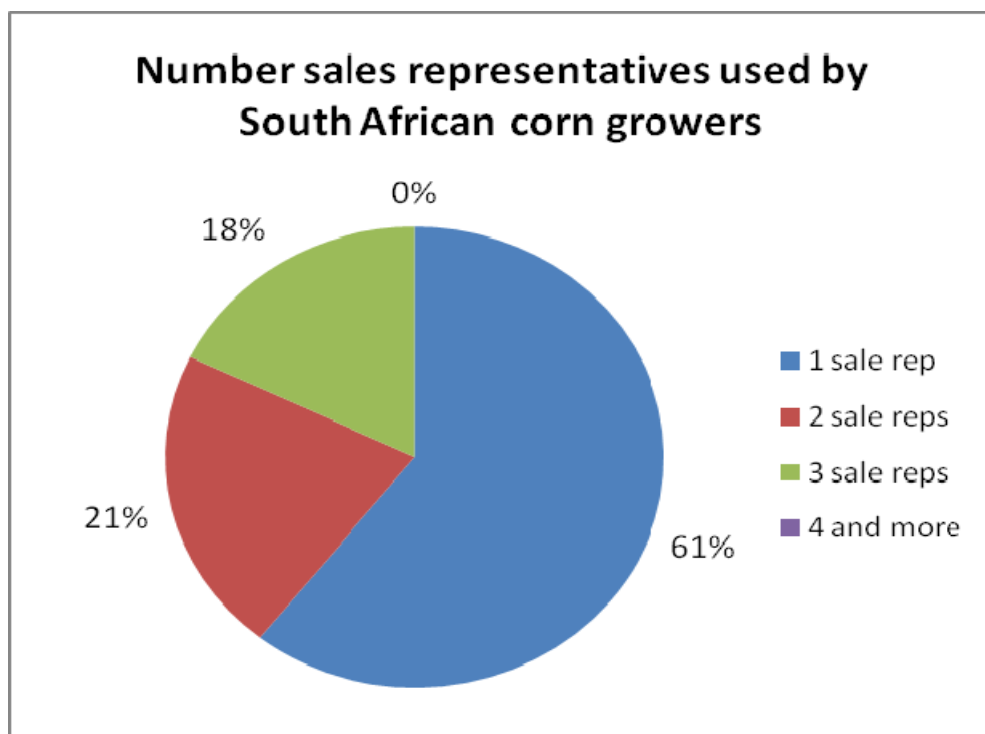
5.5. Buyer and seller relationship

Hungarian corn growers mostly bought their agro-chemicals from two sales representatives, whereas South African corn growers generally preferred purchasing from a single supplier.

Graph 13: Number of sales representatives used by Hungarian corn growers

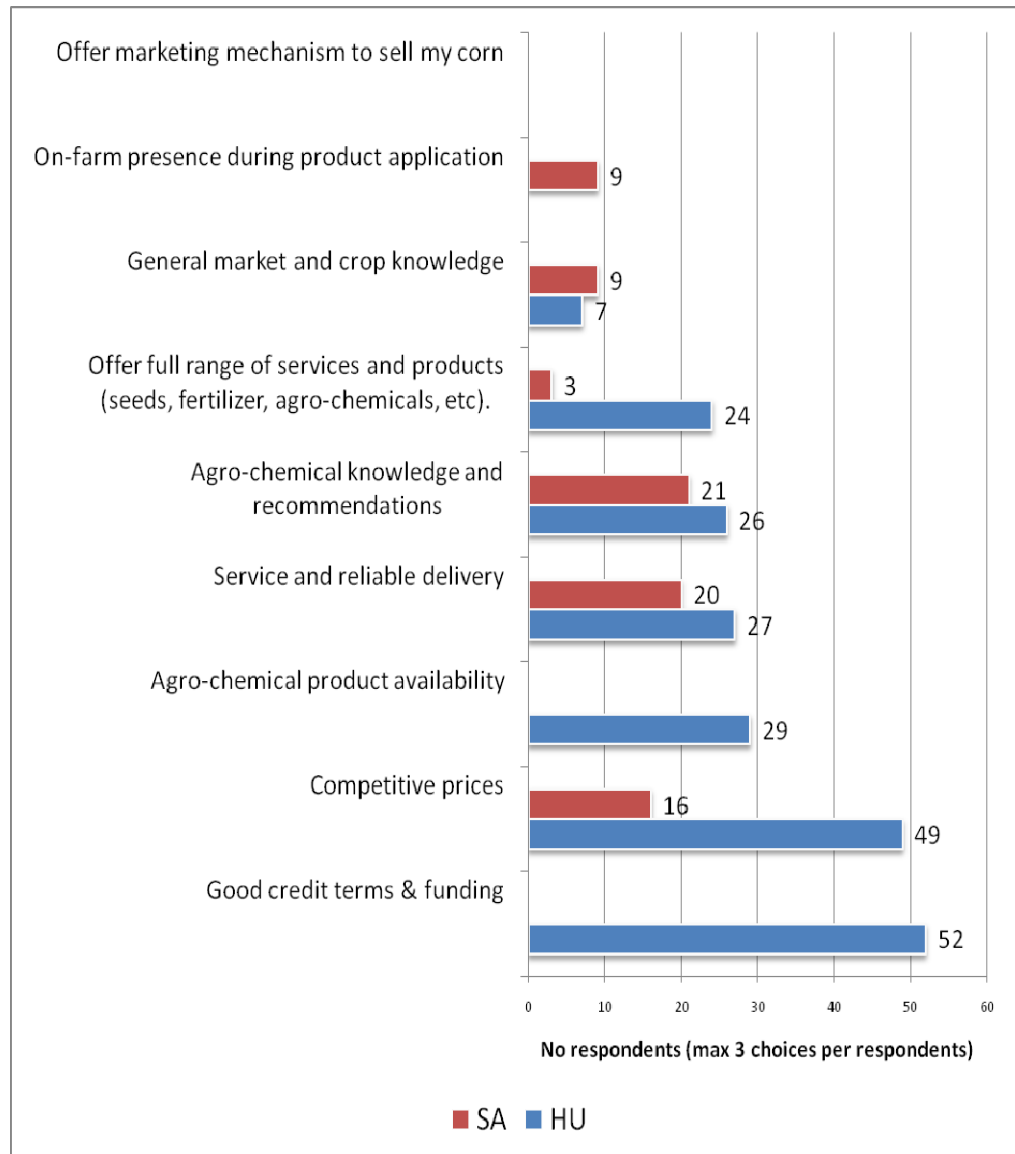


Graph 14: Number of sales representatives used by South African corn growers



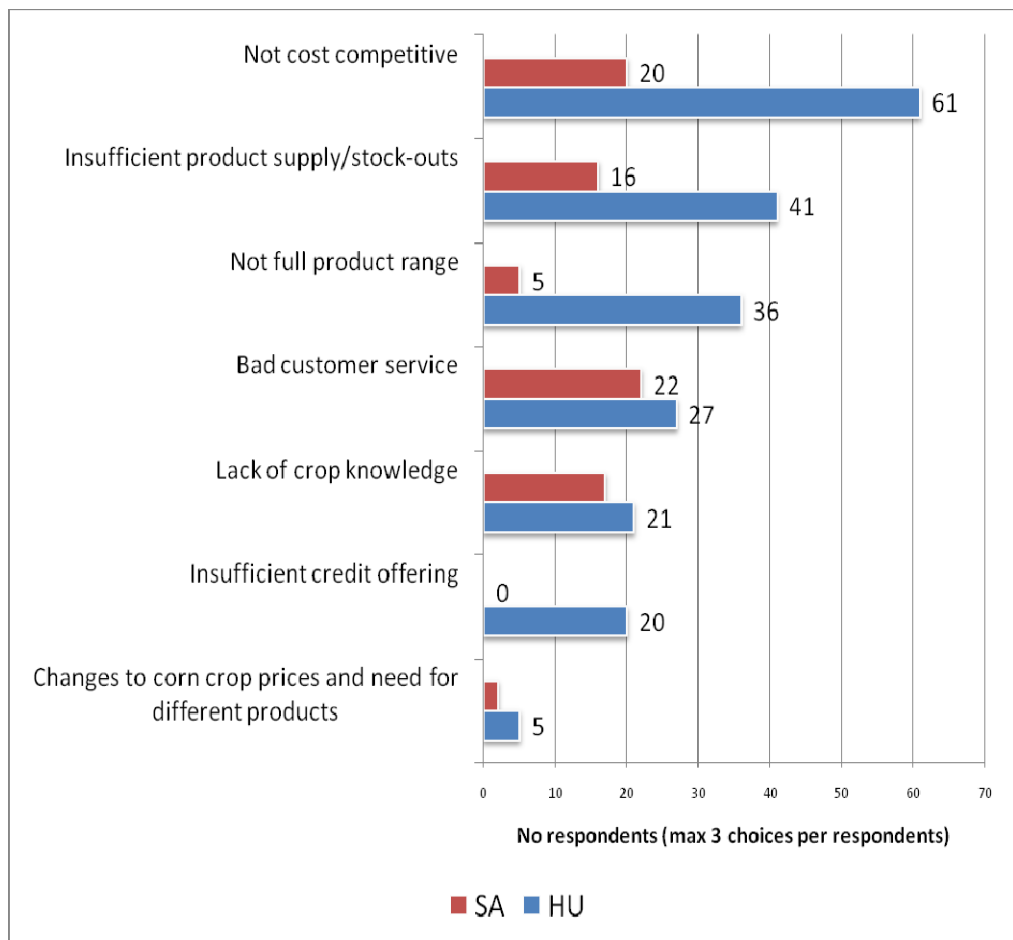
Hungarian growers value good credit terms and funding, competitive pricing and product availability most as important attributes towards being a valuable supplier. South African growers appreciate more agro-chemical knowledge and good spray recommendation, service and reliable delivery, as well as competitive prices. No Hungarian growers indicated on-farm presence during product application or the offering of a marketing mechanism to sell their crop as valuable attributes. South African growers omitted from their choices of valuable attributes on farm marketing mechanism and agrochemical product availability.

Graph 15: Attributes and offerings most valued in agro-chemical sales representatives



Suppliers who did not offer cost competitiveness (n = 61) or had insufficient stock supply (n = 41) risked losing their Hungarian corn growers most. South African growers were most likely to change supplier if their suppliers delivered bad customer service (n = 22) or if they were not cost competitive (n = 20). Changes to commodity prices and the possible need for different products least resulted in growers changing suppliers.

Graph 16: Drivers resulting in growers changing suppliers



Agro-chemical sales representatives play a valuable role on the farm for corn growers. Within the combined samples only 17% (n = 17) viewed their agro-chemical representatives as only an input supplier of agro-chemical products. Suppliers who add value through knowledge, advice and recommendations (37%, n = 37) were rated highest, followed by suppliers being viewed as fully integrated business partners of farm operations (24%, n = 24).

Table 18: Relationship with agro-chemical sales representative

Rate your relationship with your agro-chemical sales representative	HU	SA	Total	% HU Split	% SA Split	% Total Split
Input supplier only of crop protection (agro-chemicals)	14	3	17	19.2%	10.7%	16.8%
Input supplier and service agent (assist with calibration & recommendations)	14	9	23	19.2%	32.1%	22.8%
Supplier who adds value through knowledge, advice and recommendations	25	12	37	34.2%	42.9%	36.6%
Fully integrated business partner of farm operations	20	4	24	27.4%	14.3%	23.8%
	73	28	101			

6. DISCUSSION OF RESULTS

6.1. Commodity price and impact on pesticide demand

The continuous shift in supply and demand curves for corn creates a constant open market corn price fluctuation (McKenzie & Lee, 2006). This fluctuating open market corn price influences the corn grower's profit, cash flow and ultimately his buying behaviour, as it impacts the economic business environment of the grower (Kotler & Armstrong, 2008 and Diagram 1).

Table 14 indicates that growers assess the corn commodity price on a regular basis, with 69% of the combined two samples assessing the corn commodity price at least once a week or more. Agro-chemical spray programmes however, are reviewed less than three times per year by more than 75% of the two samples' respondents (Table 11).

The data from the two samples indicate that 97% of Hungarian growers generally sold at a lower year-on-year corn price, with 89% of South African growers claiming a more positive corn price (Table 7). During the same period the majority of both South African (75%) and Hungarian (71%) growers indicated an increase in agro-chemicals spend (Table 8).

Past, current and future corn prices (Table 13) were all considered as influencers on the amount spent on agro-chemical spray programmes. The availability of funds and credit, as well as negotiations with the agro-chemical sales representative, had however a greater frequency of respondents than any of the three commodity price choices.

Growers were asked what factors drove the change (or lack thereof) in spend for their past year-on-year agro-chemicals, with corn commodity outlook being one of the available choices. Graph 4 however, highlighted that no more than 30% of both South African and Hungarian growers indicated the corn commodity price outlook as a driver that resulted in different agro-chemical spending. The respondents, who were allowed a maximum of three factors, had no single specific driver that they felt drove their agro-chemical spend. The highest number of responses received by a single driver from the Hungarian growers was 23 (32%), claiming changes in disease and weed pressure, different products being available and changing weather as their most influential factors. Shift in risk management strategies received 11 (39%) responses from the South African sample, followed by 8 (29%) responses for using different quantities due to change in dosage or a different number of applications, as the most influential factors which caused their year-on-year increase in spend.

As mentioned, growers do adjust their agro-chemical spray programme (75% respondents less < 3 times per planting season – Table 11). The three drivers indicated to most likely result in an adjustment to their agro-chemical spray programme for Hungarian growers were changes due to insect, fungus and weed pressure, weather and lack of performance from previous agro-chemical applications (Table 12). South African growers indicated changing insect, fungus and weed pressure, weather and recommendation by their sales representative or advisor as their main reason for driving adjustments in agro-chemical spray programmes. None of the South African growers and only 10 (14%) of the Hungarian growers indicated fluctuations in corn commodity price within their top three reasons for adjustment of their agro-chemical spray programme.

Kotler (2003) stated that industrial markets generally have characteristics of price inelasticity and more volatile demand.

Table 9 and 10 requested growers to indicate how an increase or decrease by 20% in the corn commodity price would impact on their agro-chemical spend. When the possibility existed for a 20% higher commodity price, 82% of South African growers and 70% of Hungarian growers indicated no change to their agro-chemical spend. Only 22% of the total two samples indicated an increase through a combination of volume and/or using more expensive products.

When the commodity price outlook was more negative with a 20% decrease, 53% of the total two samples (48% for Hungary and 64% for South Africa) still indicated that they would maintain the same agro-chemical spray programme.

Kotler and Armstrong (Diagram 1) indicate that various influences exist towards business buying behaviour. Commodity price changes which fit within the economic environment of their lists of influences, were assessed within this study. The data from the survey highlighted that even though the commodity price is frequently reviewed, has changed for most growers compared to their previous season and did influence their agro-chemical buying behaviour, it is not the most critical influencer during agro-chemical purchasing.

Table 12 also supported the theory of Kotler (2003) and Jakobi (2001), with the major reason for change in agro-chemical spray programmes being created through derived demand. The data showed the most likely changes to cause growers to revise their agro-chemical programme are the change in disease and weed pressure, lack of control from previous applications or changing weather. All of these would result in revised derived demand being created.

6.2. Commodity price and pesticide price sensitivity

Hungarian growers (96% - Table 7) experienced a lower year on year corn commodity price, whilst over the same period 71% experienced increased agro-chemical cost. If these were the only two items that impacted on their profit they would have made less profit and had fewer funds available for future agro-chemicals.

The data in Graph 5 for Hungarian growers highlights that when suppliers increased their prices by 10% and their own crop prices remained unchanged or decreased, 55% of growers would change to different suppliers. Less than 15% of growers in both crop price cases would keep the same agro-chemical spray programme. If their own corn price increased along with the supplier price increase, the rate of growers who would have moved to new suppliers decreased to 36%.

Graph 7 shows that when supplier prices decreased, no fewer than 62% of the Hungarian growers remained with the same agrochemical programme, irrespective of the change in their own crop prices. This also supports the theory of derived demand within industrial buying (Kotler, 2003 and Jakobi, 2001) with most growers indicating no change in agro-chemical demand, even if supply prices declined.

South African growers indicated no change to their agro-chemical spray programmes as the most likely scenario (Graphs 6 and 8), irrespective of supplier price increases and decreases or their own crop price fluctuations. The frequency of responses did however dramatically increase for no change in agro-chemicals, when supplier prices decreased versus a supplier increased price scenario.

Part of the reason for the more positive approach and less growers choosing to switch suppliers or use different products, could be

attributed to the fact that the South African growers claimed 86% improved crop prices compared to their previous season. The base price of R2,000 per ton is also very high, considering the historic prices (Appendix 9.1) realised for South African growers.

When the supplier prices were kept unchanged and the grower income was adjusted through the corn crop price either being increased (Table 9) or decreased (Table 10), the growers indicated some willingness to reduce and change their agro-chemical spray programme when their crop price declined. When growers expected a 20% decrease in crop prices, 37 (51%) Hungarian and 10 (36%) of South African growers indicated planned decreases in agro-chemicals.

With a 20% increase in crop price, the growers showed very little increase in agro-chemicals. Hungarian growers indicated that only 23% were considering increased spending and for South African growers the percentage was even lower at 18%. The above data supports to some extent the income-consumption curve, which McKenzie and Lee (2006) describe as a change in demand for certain goods as a consumer's income changes.

Both sets of growers indicated (Table 18) that their sales representatives are viewed as more than just agro-chemical suppliers and valued the added services and knowledge offered by sales representatives. This added services and knowledge offering serves to offer differentiation and also complicates cost comparison with substitute products. These two attributes supports some of the characteristics Morris & Joyce (1988) indicate of products with generally more inelastic demand.

Kotler & Keller (2007) indicate that products bought less frequently tend to be less price-sensitive. Data within Table 11 indicates that 75% of the total corn growers surveyed reviewed their agro-chemical

spend less than three times per year, further supporting the argument for less price sensitivity with agro-chemicals only purchased and revised a limited number of times per year.

The counter argument from the data however, can be observed from Graphs 15 and 16. When growers were asked what they value most in agro-chemical sales representatives, 16 (57%) South African growers and 49 (67%) Hungarian growers indicated competitive prices. Not offering competitive prices was the main reason indicated by both South African (71%, n = 20) and Hungarian (84%, n = 61) growers for changing input suppliers.

The data is insufficient to conclude the exact level of price elasticity of agro-chemicals for corn growers. It does however, indicate supporting evidence that agro-chemicals, like many other industrial goods (Jakobi, 2001 and Morris & Joyce, 1998), tend to be generally price inelastic.

6.3. Risk reduction through hedging and impact on business buying behaviour

Securing future crop prices through the use of futures (hedging) is an effective way for growers to secure price and reduce risk (Vámos & Novák, 2008 and Pennings & Leuthold, 2000). With current increased crop commodity price volatility present, an increased number of futures trading are expected (Vámos & Novák, 2008).

The survey data did not indicate whether growers changed their use of hedging. Table 14 however, highlights that 69% of the total survey respondents review their corn crop price at least once per week. Graph 9 highlights that Hungarian growers tend to focus slightly more on the current commodity price (37%) versus 34% for the future corn price. By contrast, South African growers (Graph 10) focused more

on the future harvest price (44%), with only 30% of their weighting towards the current corn price.

Within Hungary very few of the respondents (31%) hedged their future crop price versus the 79% of South African growers who sell at least part of the crop through the futures market (Table 16). Most corn trading in Hungary (Table 15) occurred through crop merchant brokers ($n = 35$) and integrators ($n = 21$), while South African growers preferred co-ops ($n = 19$) and SAFEX ($n = 15$). Many growers prefer co-ops due to their longstanding relationships (some growers still have shares in co-ops), as well as co-ops offering infrastructure (storage and small grain volume consolidation) and financing for their farm inputs (Van Zyl, 2008).

Growers were allowed multiple answers to select their corn marketing tool (Table 15). The survey indicates that only 16 (22%) of Hungarian growers use more than one marketing tool to sell their corn crop, or an average of 1.2 marketing tools per grower. 13 (44%) of the South African growers use two or more marketing tools to sell their crop, with an average of 1.6 marketing tools per South African corn grower.

Tomek & Peterson (2001) indicate that generally growers select a combination of marketing strategies to not only reduce risk but also to maximise revenue. These strategies could include amongst others the use of multiple marketing tools, selling your crop more than once, or fixing part of your future corn price through hedging. Tomek & Peterson (2001) feel that younger growers and larger farms tend to market more frequently in an effort to improve profit.

The survey data highlights that of the 18 corn farms that sold their crop more than three times per year, eight (44%) were farms bigger than 1,001ha ($n=16$). Only 22% ($n = 4$) of farms trading more than three times per year were smaller than 300ha, supporting Tomek &

Peterson's statement regarding farm size and number of increased trading.

The younger age and increased frequency of trading relationship was not that clear from the data. Farmers 50 years and older had eight (44%) of the 18 responses (44%) of the corn traded more than three times per year.

The data above indicates that generally Hungarian growers tend not to hedge their future corn price, but sell through a single marketing tool. If they did indicate the value of trading their crop on the futures market, most growers saw the value as a tool to cover input costs (Table 17).

South African growers utilise futures to a greater extent as a risk reduction strategy, with most growers perceiving the value to be securing price and reducing price uncertainty (Table 17). These growers also focus more on the future crop price at times of making input decisions and marketing more frequently.

Very few growers (5.9%, $n = 6$) felt positive towards futures trading as a driver in maximising corn profit (Table 17). Growers generally (7% of total two samples) do not see agro-chemicals as a method to shift their yield objectives nor to drive (only 5% of growers) a change in their risk management strategy (Graph 4). Oerke (2005) states that the value of agro-chemicals is to protect as well as maximise crop yields. The data in Table 12 highlights that corn growers adjust their agro-chemical programmes mainly to increase their crop protection rather than to benefit from more positive crop prices.

6.4. Buyer and seller relationship within business buying environment

Industrial buying behaviour can be defined into two broad frameworks; the level of resource dependency and the level of cost

focus (Zineldin & Philipson, 2007 and Buvik, 2001). Resource-dependant organisations value their input suppliers' contribution and active participation towards delivering their organisations' objectives. Alternatively, organisations might prefer a high focus on cost and put processes and strategies in place to obtain the lowest inputs at all times.

Hungarian growers classified (Table 18) the majority of the agro-chemical sales representatives as either value adding partners who add value through knowledge, advice and recommendations (34%, n = 25) or as a fully integrated business partner (27%, n = 20). When asked what they valued most in their agro-chemical sales representatives (Graph 15), the three most common attributes were good credit terms and funding (71%, n = 52), competitive prices (67%, n = 49) and agro-chemical product availability (40%, n = 29). These top three preferences indicated less of a resource dependant relationship compared to the relationship classification listed most by the Hungarian growers within Table 18.

Table 18 indicated that South African growers also claimed their relationship with their agro-chemical sales representatives as one which adds value through knowledge, advice and recommendations (43%, n = 12). According to Graph 15, they rated agro-chemical knowledge and recommendations (75%, n = 21), service and reliable delivery (71%, n = 20) and competitive prices (57%, n = 16) as their most important attributes for a sales representative. These attributes are much more closely aligned towards a resource dependant relationship.

Hakansson and Snehota (2002) highlighted that an industrial buyer and seller relationship has a tendency to reflect low customer turnover. Industrial markets do also reflect customers being more loyal towards brands than to suppliers (Dion & Banting, 1995). They

also argue that buyers tend to switch suppliers generally during stock shortages and when large economic losses would be incurred.

The data from Graph 16 indicates that Hungarian growers would consider switching to different suppliers when their agro-chemical sales representatives were no longer cost competitive (84%, n = 61), and secondly for insufficient product supply/stock-outs (56%, n = 41). When suppliers increased their agro-chemical prices and growers experienced fluctuating corn commodity prices, Hungarian growers indicated (Graph 5) that with the exception of when their corn prices increase, most (55%, n = 40) would change to a different supplier. When their corn price increased along with the supplier increase, only 36% (n = 26) would change to a different supplier.

Most growers who indicated they would change suppliers when agro-chemical prices increased at the same time as their own commodity prices either remained unchanged (63%) or increased (73%), also indicated that they would still aim to use mostly the same product as before, supporting the findings of Dion & Banting (1995). If their own commodity price declined at the same time as the supplier's increased and they were forced to seek alternative cheaper brands, 40% still indicated they would remain with the previous product used.

South African growers indicated bad customer service (79%, n = 22), not being cost competitive (71%, n = 20) and lack of crop knowledge (61%, n = 17) as their biggest motivators for changing agro-chemical sales representatives. Under the same scenario of suppliers increasing their product prices by 10% and corn growers experiencing different crop prices, South African growers also switched suppliers but at a much lower rate than the Hungarian growers (Graph 6).

When their own commodity price declined, eight (29%) growers indicated they would switch suppliers, of which six indicated they would remain using the same product as before. A further four (14%)

growers indicated that they would change if their commodity price remained unchanged, and only two (7%) growers indicated a change of supplier if their crop price increased with the supplier product price increase. Both these latter two groups indicated that they would keep the same product used before, once more supporting the findings of Dion & Banting (1995).

6.5. South African versus Hungarian growers' business buying behaviour

Various general differences existed between the two samples. South African growers achieved a more positive commodity price (Table 7), generally had bigger corn areas (Table 4) and farmed without any government support. Hungarian growers received subsidies from the government through the EU single payment scheme (Toepfer International, 2008). Some similarities found were that both samples farmed on average more than 18 years (Table 6), they traded corn on the open market through various marketing tools and generally all growers experienced a year-on-year increased agro-chemical spend (Table 8).

Kotler & Armstrong (2008) stated that political and regulatory developments do influence business buying behaviour. State interventions also impact the crop prices through various interventions such as subsidies, import tariffs and export quantitative restrictions (Trostle, 2008 and Mahmood et al., 2007).

Variances as well as similarities in both business buying behaviour and corn trading did exist between South African and Hungarian growers. When asked what influenced their past year-on-year agro-chemical spend, all thirteen drivers were mentioned by both samples, with the exception of South African growers not indicating resistance planning as a driver which influenced past agro-chemical spend.

Hungarian growers indicated in Graph 4 that their top five drivers were a switch to different product brands, changes in corn commodity price, changes in disease and weed pressure, changes in products being available and changing weather.

South African growers highlighted the use of different dosages and number of applications, capital/cash availability, the corn commodity outlook, a shift in risk management strategies and the influence of external agronomist and fellow community growers as the drivers resulting in past agro-chemical spend change.

The data however indicated drivers resulting in past season agro-chemical change. Though the Hungarian and South African growers varied in four of the five top drivers, the Hungarian growers' plant season (external business environment) could have been influenced by external factors to a greater extent than the South African plant season. Hungary possibly had increased diseases and weeds driven by changing weather, as well as certain products not being available. These differences in a possible planting season should be remembered when comparing the drivers influencing business buying behaviour.

When growers were asked whether an increased future crop price of 20% would result in changing agro-chemical spend, both Hungarian (70%) and South African (82%) growers indicated similar behaviour in that they would maintain the same agro-chemical programme (Table 9). In a different scenario with future crop prices expected to decline by 20%, both samples (Hungary – 48% and South Africa – 64%) again indicated, although with lower response rates, that the most likely impact towards agro-chemical spend would have been no change (Table 10).

Within the South African sample only one grower indicated the need to review their agro-chemical programme more than three times per year (Table 11). One third of Hungarian growers opted for more than

three times per year revisions of their agro-chemical programme. Both samples indicated changing disease and weed pressure and weather to be the most likely drivers to cause revisions to their agro-chemical programme (Table 12). The only real difference from the data in Table 12 was that no South African grower indicated that a change in commodity price would result in the previously agreed agro-chemical programme being revised. Ten (14%) Hungarian growers did indicate that they would revise based on changes to crop prices.

Table 13, which highlights the determinants that influence the planned spend, indicated that the availability of funds/credits (59%), negotiation with sales representatives (55%) and previous season agro-chemical costs (45%) received the most responses from Hungarian growers. The South African sample had the same top two determinants - availability of funds/credits (46%) and negotiation with sales representative (57%), but indicated the current commodity price (29%) as their third most rated determinant with regard to agro-chemical spend. Interesting also is that on average the South African growers indicated 2.1 determinants versus the Hungarian average of 2.6 determinants to agro-chemical spend.

Graphs 5 and 6 indicated that Hungarian growers were more likely to change suppliers compared to South African growers, should agro-chemical suppliers increase prices. Graphs 7 and 8 showed similar behaviours between Hungarian and South African samples in terms of agro-chemical response when suppliers decreased prices, with most indicating no change in their agro-chemical spend.

All three different commodity prices were considered by all growers during input decision making. Hungarian growers (Graph 9) did slightly favour the current commodity price when compared to South African growers (Graph 10), who had a preference for considering the

future expected harvest crop price. However the two pie-charts show more similarities than differences between the two samples.

A further difference existed between the two samples, with only 31% of Hungarian growers (Table 16) using future crop price hedging versus 79% of South African growers. Both samples' respondents who did sell through hedging, did however assess the value gained from futures trading (Table 17), as being price security and covering inputs.

Most South African growers (61%) used only one sales representative (Graph 14), whereas Hungarian growers (48%) indicated two sales representatives were generally used (Graph 13). Both sets of growers would generally change suppliers for the same reasons (Graph 15), however they did differ somewhat towards what they viewed as most valuable in their agro-chemical representatives.

Hungarian growers mentioned agro-chemical product availability (40%), good credit terms and funding (71%) as being important, with no South African corn grower indicating these attributes within their top three responses. 32% of South African growers recorded on-farm presence during product application as being important however this elicited not one response from any Hungarian grower. The most frequent listed attributes also differed between the two samples (refer section 6.4)

Previous research indicated that even though governments do influence the business environment, there generally existed more similarities than differences between countries' business buying behaviours (Banting et al., 1991).

The data from the two samples indicated most variances existed for past buying behaviours, such as what influenced past year-on-year agro-chemical spend. When growers were asked to respond to future

behavioural questions, such as which price do they consider during input decisions or when would they consider changing suppliers, the differences were fewer than the similarities. Finally taking into account the starting point of the two samples (Hungarian growers having had a less positive business environment), which most likely motivates most of the differences, it would be fair to state the data supports the findings of Bantings et al. (1991).

7. CONCLUSION

7.1. Conclusions & recommendations

Commodity price fluctuations will influence corn growers' profit, cash flow and their buying behaviour towards agro-chemicals. The survey data indicated that the corn crop price will however, not be the most influential driver growers consider when determining the volume or level of cost spent on agro-chemicals.

Agro-chemicals clearly have a derived demand, which is influenced more by changes in weather and disease and weed pressures, or when product applications did not deliver sufficient control of weeds or pests. The crop price might impact indirectly on additional derived demand for agro-chemicals, with growers changing their crop areas to adjust to the revised market price being available (McKenzie & Lee, 2006 and Mahmood et al., 2007).

Price elasticity, which was assessed at a high-level in two scenarios, appeared to be relatively low for pesticides products. Most growers indicated no planned change towards their agro-chemicals when suppliers adjusted their prices. South African growers, who had generally a more positive year-on-year corn price, indicated that they were more likely not to change their agro-chemical spray programme if agro-chemical prices changed. The added services and knowledge valued in sales representatives most likely adds differentiating value and increases complexity when comparing prices with competing suppliers (Morris & Joyce, 1988).

For agro-chemical suppliers it would be beneficial to ensure they appreciate and understand the growers' previous season crop price, as this determines their profit and cash flow available for future input investments. To ensure maximum return is obtained by selling at the

best possible prices, agro-chemical suppliers should focus on market based pricing (Morris & Joyce, 1988).

This pricing approach focuses the marketing efforts on increasing the perceived value of the product offerings with the grower. Through highlighting the benefits of agro-chemicals (Oerke, 2005) and utilising sales representatives with good crop knowledge and a high level of customer service delivery, suppliers would increase their chances of introducing price increases without too many negative consequences. The best timing for price increases would be most likely after a season which saw improved crop prices. For Hungarian growers the current crop price also seems to be more relevant during decision making, and for South African growers the future harvest price should be considered during pricing strategies.

The use of securing a future crop price to reduce price uncertainties is used more by South African growers, who also tend to market their crop more frequently and utilise more than one marketing platform. Suppliers could benefit in the long-term by getting more Hungarian growers to appreciate the value of utilising hedging and securing good future prices, to market their crop through more than one channel as well to split the sale and spread their corn price risks. When growers are most profitable, their cash flow should allow for greater funds to reinvest into inputs.

Hungarian and South African growers both support the theory of low turnover of suppliers in industrial markets (Hakansson & Snehota, 2002). Even if growers do experience changes in supplier prices and fluctuating commodity prices, the data showed that most intended to maintain the same supplier relationship and agro-chemical spray programme.

Supplier relationships with corn growers were also perceived to be more than just agro-chemical product suppliers. Based on what

growers valued in their sales representatives, Hungarian growers tended to appreciate more the transactional components of the relationship, namely cost competitiveness, product availability and credit terms. These components are fairly easy for competing sales representatives to replicate and offer very little unique competitiveness.

Hungarian agro-chemical suppliers should focus on building stronger relationships with their growers where crop knowledge, recommendations and on farm presence are offered as an added value, rather than price, product availability and terms as their only differentiating attributes to their total agro-chemical offer. South African sales representatives should maintain offering a high-level of knowledge, service and competitive prices to ensure grower loyalty with the South African corn growers.

The differences between Hungarian and South African growers' corn responses could be a result of many factors, including lower year-on-year crop prices, subsidy support versus no government support, different levels of disease and weed pressures and more severe weather to name but a few. From the limited data available, it seems that even though business buying behaviour might generally have more similarities than differences across countries (Banting et al., 1991), each market will have to be assessed individually as well as continuously when making strategic decisions to ensure that the constant changes in the business environment are taken into consideration.

7.2. Future research ideas

The research study delivered various insights but created just as many unanswered questions, the answers to which would be of value in order to understand grower buying behaviour in more clarity. Some possible future suggestions could be:

- With most corn growers applying a limited number of applications to their corn crop, they would generally apply pre-plant herbicide and seed treatments, followed by a combined post-emergence herbicide and insecticide spray. Potato growers in comparison apply almost weekly agro-chemical sprays and most Western European wheat growers would at times have up to five agro-chemical applications. It then raises the question whether crop growers who apply more frequent agro-chemical applications are more influenced by the commodity price when deciding on their agro-chemical inputs?
- Do growers utilise an economic model to assist them during plant and input decision making? Are growers using economic decision making tools more successfully than those growers following less sophisticated methods?
- Which growers have more success; those that do not plant all their farmland but strive for maximum yield on a limited area, or growers who plant the maximum area with lesser quality inputs?
- Does farm profitability increase when growers utilise more than one marketing tool, as well as the number of times it trades corn?

- Do sales representatives consider fluctuating crop prices in their sales product offering and do agro-chemical offerings for the same crop differ significantly across countries?
- Why do suppliers of seeds and fertiliser products seemingly have more success with price increases than agro-chemical suppliers (refer Table 2), when all three inputs are industrial products with seemingly inelastic prices and are being purchased by the corn grower at more or less the same time?

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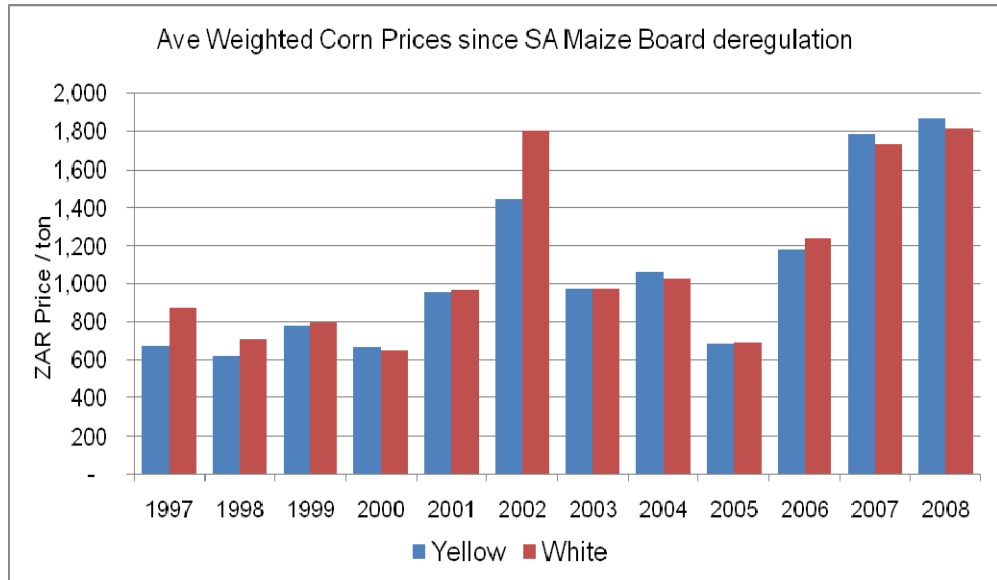
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9. APPENDICES

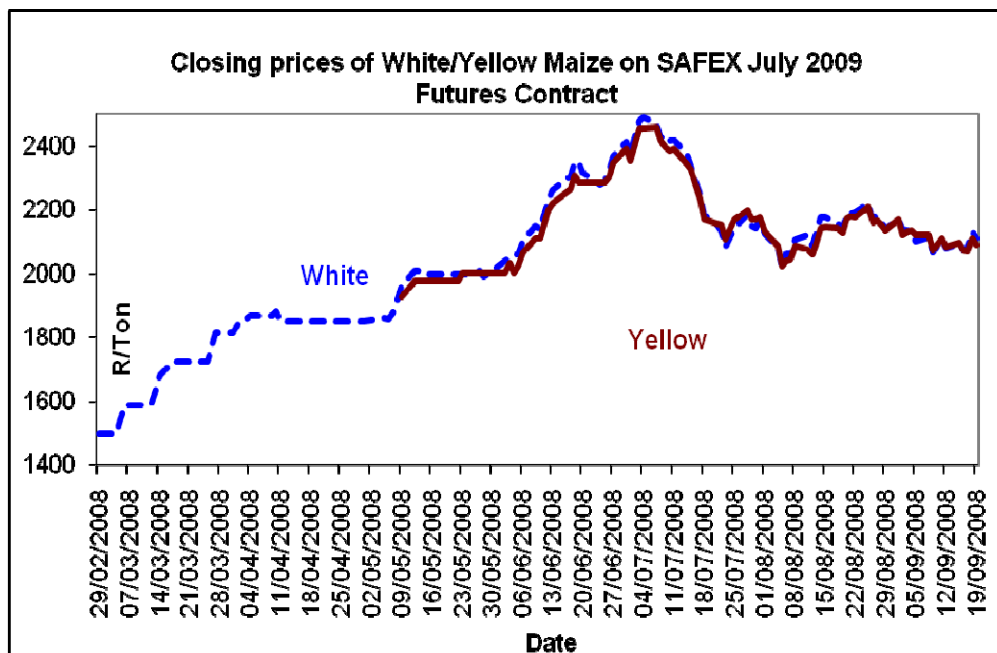
9.1. South African weighted corn commodity prices



Source: Grain South Africa, The daily nearby month SAFEX yellow and white maize contract prices since deregulation.

Extracted from <http://www.grainsa.co.za/marketstat.asp> (accessed 30/05/08).

9.2. South African futures corn price for delivery July 2009



Source: SAFEX Historical Grain Prices.

Extracted from http://www.safex.co.za/ap/market_price_historic.asp (accessed 27 October 2008).

9.3. MBA Questionnaires –South Africa (English)

MBA South Africa Corn Price & Buying Behaviour English

1. Welcome & Instructions

Dear respondent,

Thanks for taking time to complete the survey below about commodity prices and agro-chemical demand. The objective of the research is to assist with my MBA Research Project with the University of Pretoria(GIBS), and your valuable input will help me to determine the impact commodity price changes have on agricultural chemicals (crop protection) demand.

Your response is totally confidential and no names or electronic addresses will be kept or used during the survey. Participation is voluntary and you can exit the survey at any time.

Should you have any questions or concerns regarding the survey, kindly contact me (Abraham Vermeulen) via e-mail at abraham.vermeulen@bluewin.ch or my research supervisor Mike Holland via his e-mail at mholland@pricemetrics.co.za

1. I confirm that I participate free of will in the following academic research and I am aware of the fact that I can exit the survey at any given point

Yes

No

2.

1. Do you currently farm with corn?

Yes

No

3. Demographics

**1. How many years have you been farming with corn?
(please enter number only example 10 and not ten)**

2. Where do you farm?

Eastern Cape

Free state

Gauteng

Kwazulu Natal

Limpopo

Mpumalanga

North West

Northern Cape

Western Cape



MBA South Africa Corn Price & Buying Behaviour English

3. Please indicate the average corn hectares you have planted the last 3 years.

- 100ha
- 101ha - 300ha
- 301ha - 500ha
- 501ha - 1,000ha
- 1,001ha & more

4. Please indicate your age.

- 25 years and younger
- 26 - 35 years
- 36 - 49 years
- 50 years and older

4. Corn Commodity Price & Buying Behaviour

Before proceeding with the survey, please take note of the following key words which will assist you in completing the survey.

Keywords:

AGRO-CHEMICALS refer to the seed treatment, herbicides, insecticides and fungicides you use during your corn production. Also commonly referred to as pesticides or crop protection.

WEATHER is assumed to be normal (no extreme wet or dry years) and not considered due to its unpredictability, unless referred to by a specific question.

FUTURES/HEDGING refers to an agreement to make or take future delivery of a commodity (corn) at a price agreed today

Please answer the following questions by selecting the choice that best describes your farming practice:

1. How did your corn market price of your 2007/8 season compare to the corn price the previous season (2006/7)?

- Higher
- Almost the same
- Lower

2. During the 2007/8 season your agro-chemical spend compared to the previous season(2006/7) was.

- Higher
- Almost the same
- Lower



MBA South Africa Corn Price & Buying Behaviour English

3. The main reason for the year-on-year change (or no change) in your agro-chemical spend was driven by which factors (select the 3 most influential factors)

- Corn commodity price outlook
- Change in weather
- External influencers such as agronomist, community farmers
- Shift in risk management strategies
- Switched to different agro-chemical product brands
- Past season stock levels
- Shift in your yield objectives
- Capital/Cash availability
- Resistance management planning
- Change in fungus, insect and weed presence
- Change in product being available (new products or old product deregistration/phase-outs)
- Supplier marketing & product demonstrations
- Used different quantity of agro-chemicals (different dosage, different number of applications)

4. Assume you obtained a corn price of R2,000 per ton of corn during your last harvest. If the corn price outlook for the forthcoming season is higher at R2,400 per ton, how would this impact on your agro-chemical spend?

- Will increase spend and buy more volume (increased dosage and/or number of applications)
- Will increase agro-chemical spend by changing to more expensive products
- Will increase agro-chemical spend through both volume increase and purchase more expensive products
- Maintain same agro-chemical program
- Reduce spend and buy less volumes (reduced rates and less applications)
- Reduce spend and change to cheaper alternative brands
- Reduce spend in both volume and price

5. Assume you obtained a corn price of R2,000 per ton of corn during your last harvest. If the corn price outlook for the forthcoming season is lower at R1,600 per ton, how would this impact on your agro-chemical spend?

- Will increase spend and buy more volume (increased dosage and/or number of applications)
- Will increase agro-chemical spend by changing to more expensive products
- Will increase agro-chemical spend through both volume increase and purchase more expensive products
- Maintain same agro-chemical program
- Reduce spend and buy less volumes (reduced rates and less applications)
- Reduce spend and change to cheaper alternative brands
- Reduce spend in both volume and price



MBA South Africa Corn Price & Buying Behaviour English

6. How often do you assess the corn commodity price?

- Almost daily
- Once a week
- One or two times a month
- Prior to plant and close to harvest
- Each time I need to make crop input decisions
- No fixed frequency

7. How many times per year on average do you sell your corn crop?

- Once only
- 2 - 3 times
- More than 3 times

5. Corn marketing & selling

1. Which marketing tool(agency) do you use to sell your corn crop? (Multiple answers allowed)

- SAFEX via Broker
- Myself
- Commercial Bank
- Co-op
- Other

2. Do you make use of brokers or the futures market (SAFEX) to sell part of your corn crop?

- No
- Yes, but less than 25% of total crop
- Yes, between 26% and 50% of total crop
- Yes, between 51% and 75% of total crop
- Yes, 76% and more

3. What is your biggest value gained when selling your crop through brokers or the futures market (SAFEX)?

- Allows for improved overall planning
- Maximise corn profit
- Cover input costs
- Secure price and reduce price uncertainty



MBA South Africa Corn Price & Buying Behaviour English

4. How often do you revise your agro-chemical program per year?

- Once only
- Between 1 - 3 times
- More than 3 times

5. When you plan your agro-chemical program for the plant season, do you? (Multiple answers allowed)

- Plan once off prior to season start and leave unchanged
- Adjust for weather
- Adjust for insect-, fungus and weed pressure
- Adjust as commodity prices fluctuate
- Adjust for lack of control performance
- Adjust based on sales representative or advisor recommendation

6. What influences the amount spent on your agro-chemical program? (Select a maximum of 3 influences)

- Current commodity price
- Negotiation with chemical sales representative
- Previous season agro-chemical cost
- Futures harvest commodity price
- Past season realised commodity price
- Availability of funds/credit
- Inflation

7. When deciding on how much you spend on inputs, do you consider any of the following 3 corn commodity prices? (Please tick each price you consider and indicate whether the price carries a low, medium or high consideration)

	Low	Medium	High
Past season realised price	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Current corn price available (price today)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Future corn harvest price	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Commodity prices and agro-chemical price sensitivity

Kindly review the following scenarios and select the option that would best describe how you would react under each scenario.



MBA South Africa Corn Price & Buying Behaviour English

1. Assume the commodity price remains unchanged at R2,000/ton from last season - if your current supplier increases their agro-chemical price by 10%, how would you react in terms of agro-chemical purchase change?

- No change
- Same supplier, less product
- Same supplier, different products
- Different supplier, same products
- Different supplier, different product

2. Assume the commodity price decreases to R1,600/ton from last season's R2,000/ton - if your current supplier increases their agro-chemical price by 10%, how would you react in terms of agro-chemical usage?

- No change
- Same supplier, less product
- Same supplier, different products
- Different supplier, same products
- Different supplier, different product

3. Assume the commodity price increases to R2,400/ton from last season's R2,000/ton - if your current supplier increases their agro-chemical price by 10%, how would you react in terms of agro-chemical usage?

- No change
- Same supplier, less product
- Same supplier, different products
- Different supplier, same products
- Different supplier, different product

4. Assume the commodity price increases to R2,400/ton from last season's R2,000/ton - if your current supplier decreases their agro-chemical price by 10%, how would you react in terms of agro-chemical usage?

- No change
- Same supplier, less product
- Same supplier, different products
- Different supplier, same products
- Different supplier, different product



MBA South Africa Corn Price & Buying Behaviour English

5. Assume the commodity price remains unchanged from last season at R2,000/ton - if your current supplier decreases their agro-chemical price by 10%, how would you react in terms of agro-chemical usage?

- No change
- Same supplier, less product
- Same supplier, different products
- Different supplier, same products
- Different supplier, different product

6. Assume the commodity price decreases to R1,600/ton from last season's R2,000/ton - if your current supplier decreases their agro-chemical price by 10%, how would you react in terms of agro-chemical usage?

- No change
- Same supplier, less product
- Same supplier, different products
- Different supplier, same products
- Different supplier, different product

7. Buyer and supplier relationship

1. How many sales representatives/suppliers do you currently buy agro-chemicals from during a single planting season?

- 1
- 2
- 3
- 4 and more

2. What do you value most in a agrochemical sales representative? (Please select a maximum of 3 attributes)

- Agro-chemical knowledge and recommendations
- General market and crop knowledge
- On-farm presence during product application
- Service and reliable delivery
- Offer full range of services and products (seeds, fertilizer, agro-chemicals, etc).
- Competitive prices
- Offer marketing mechanism to sell my corn
- Good credit terms & funding
- Agro-chemical product availability



MBA South Africa Corn Price & Buying Behaviour English

3. When do you switch between agrochemical sales representatives? (Please select a maximum of 3 reasons)

- Not full product range
- Bad customer service
- Not cost competitive
- Changes to corn crop prices and need for different products
- Insufficient credit offering
- Insufficient product supply/stock-outs
- Lack of crop knowledge

4. How would you rate the relationship with your main agro-chemical distributor?

- Input supplier only of crop protection (agro-chemicals)
- Input supplier and service agent (assist with calibration & recommendations)
- Fully integrated business partner of farm operations
- Supplier who adds value through knowledge, advise and recommendations

8. Thank You

Thank you for your valuable time to complete this survey. Your assistance is truly appreciated.

9.4. MBA Questionnaires – Hungary

MBA KUTATÁS SI PROJEKT KÉRDŐÍV RÖVIDÍTÉS

1. Bevezetés

Kedves Válaszadó!

Köszönöm, hogy kitölti az alábbi kérdőívet a terményárakkal és a növényvédőszerrel kapcsolatos kereslettel kapcsolatban.

A felmérést az MBA tudományos kutatásomhoz használok fel, amit a dél-afrikai Pretoria (GIBS) egyetemmel együttműködve készítek.

Az Ön értékes véleménye nagyban hozzájárul ahhoz, hogy megértsük, a terményárak változása milyen hatással van az növényvédőszerrel kapcsolatos kereslet alakulására.

Válaszait bizalmasan kezeljük, és sem a neve sem az e-mail címe nem kerül felhasználásra a későbbiekben semmilyen más célra. A részvétel önkéntes és bármikor megszakíthatja a válaszadást, kiléphet a kérdőívből.

Ha bármilyen kérdése vagy észrevétele van a kérdőívvel kapcsolatban, kérem keressen a következő e-mail címen: abraham.vermeulen@bluewin.ch vagy fordulhat a kutatási témavezetőmhöz, Mike Hollandhoz, akit a következő e-mail címen érhet el: mholland@pricemetrics.co.za

1. 1. rész: Hozzájárulás:

Kijelentem, hogy szabad akaratomból veszek részt a következő tudományos kutatásban, és tudatában vagyok annak, hogy a kérdőív bármelyik pontján megszakíthatom a válaszadást, kiléphetek a kérdőívből.

- Igen <a kérdőív folytatása>
 Nem <a kérdőív lezárása>

2.

1. Termeszt jelenleg kukoricát?

- Igen
 Nem

3. Demográfia

* 1. Hány éve termeszt kukoricát?



MBA KUTATÁS SI PROJEKT RDO;V

* 2. Melyik megyében gazdálkodik?

- Bács-Kiskun
- BaranyaBékés
- Borsod-Abaúj-Zemplén
- Csongrád
- Fejér
- Győr-Moson-Sopron
- Hajdú-Bihar
- Heves
- Jász-Nagykun-Szolnok
- Komárom-Esztergom
- Nógrád
- Pest
- Somogy
- Szabolcs-Szatmár-Bereg
- Tolna
- Vas
- Veszprém
- Zala
- Egyéb

* 3. Kérem jelölje meg hány hektár területen termesztett kukoricát átlagosan az elmúlt három évben:

- 100ha
- 101ha - 300ha
- 301ha - 500ha
- 501ha - 1000ha
- vagy 1001ha-nál nagyobb

* 4. Kérem jelölje meg, hány éves most Ön.

- 25 éves vagy ennél fiatalabb
- 26 - 35 év között
- 36 - 49 év között
- 50 vagy ennél idősebb

4. Kukorica terményár és vásárlási szokások

Kérem válaszoljon az alábbi kérdésekre kiválasztva a valósághoz legközelebb álló válaszlehetőséget:



MBA KUTATÁS SI PROJEKT RDO V

*** 1. Hogy változott a 2008-as kukorica terményár az előző évi (2007-es) árhoz képest?**

- Magasabb lett
- Nagyjából ugyanannyi
- Alacsonyabb lett

*** 2. A 2008-as szezonban mennyit fordított növényvédőszerre az előző szezonhoz képest?**

- Többet
- Nagyjából ugyanannyit
- Kevesebbet

*** 3. Mely tényezők miatt költött többet/kevesebbet/ugyanannyit idén növényvédőszerre? (kérem jelölje meg a 3 legfontosabb tényezőt)**

- Gyártói/kereskedői marketing tevékenység, termékajánlások, promóciók
- Rezisztencia kialakulásának elkerülése miatt
- Változás az elérhető növényvédőszer körében (új termék jelent meg vagy a régi terméket kivonták)
- Eltérő időjárás
- Tőke/készpénz elérhetőség
- Áttérés más növényvédőszer márkára/termékre
- Külső befolyásolók, úgy mint agrárszakemberek, vezető gazdálkodók
- Változás a hozamcélokban
- Növényvédőszer készletek az előző évről
- Kukorica terményár klátások
- Eltérő számú kezelést alkalmazott
- A gomba-, rovar- és gyomfertőzöttség változása
- Változás a kockázatkezelési stratégiában



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*** 4. Tételezzük fel, hogy 30 000Ft-os tonnánkénti árat kapott a kukoricára az idei betakarításnál. Ha a következő szezonban előreláthatólag magasabb lesz a kukorica ára, 36 000 Ft tonnánként, hogyan befolyásolná ez a növényvédőszerre fordított összeget a következő szezonban?**

- Növelném a ráfordítást és több növényvédőszerrel vásárolnék
- Növelném a ráfordítást, drágább növényvédőszerrel vennék
- Növelném a ráfordítást, több és drágább növényvédőszerrel vásárolnék
- Nem változtatnék a növényvédelmi programon
- Csökkenteném a ráfordítást és kevesebb növényvédőszerrel vásárolnék
- Csökkenteném a ráfordítást, olcsóbb termékeket vásárolnék
- Csökkenteném a ráfordítást mennyiségben és olcsóbb termékeket vásárolnék

*** 5. Tételezzük fel, hogy 30 000Ft-os tonnánkénti árat kapott a kukoricára az idei betakarításnál. Ha a következő szezonban előreláthatólag alacsonyabb lesz a kukorica ára, 24 000 Ft tonnánként, hogyan befolyásolná ez a növényvédőszerre fordított összeget a következő szezonban?**

- Növelném a ráfordítást és több növényvédőszerrel vásárolnék
- Növelném a ráfordítást, drágább növényvédőszerrel vennék
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- Csökkenteném a ráfordítást, olcsóbb termékeket vásárolnék
- Csökkenteném a ráfordítást mennyiségben és olcsóbb termékeket vásárolnék

*** 6. Milyen gyakorisággal követi nyomon a terményárakat?**

- Szinte naponta
- Hetente egyszer
- Havonta egyszer-kétszer
- A vetést megelőzően és a betakarítás előtt
- Minden egyes alkalommal, amikor input (növényvédőszer, műtrágya, vetőmag stb.) felhasználásról döntök
- Alkalmasszerűen (nem rendszeresen)

*** 7. Átlagosan hányszor (hány részletben) adja el a megtermelt kukoricát?**

- Egyszerre az egészet
- 2-3 részletben évente
- Több mint három alkalommal évente

5. Kukorica értékesítés



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*** 1. Milyen értékesítési csatornán keresztül adja el a kukoricáját?**

(*Határidős ügylet: megállapodás a termény egy későbbi szállításáról a megállapodásban rögzített áron és feltételekkel.)

- Egyéb
- Integrátor
- Közvetlenül a feldolgozóknak
- Szövetkezet (TÉSZ)
- Terménykereskedő
- Tőzsde (határidős ügylet*)

*** 2. Eladja-e a terményét részben vagy egészben integrátorok segítségével vagy tőzsdei határidős piacon (BÉT)?**

- Nem
- Igen, de a termény kevesebb mint 25%-át
- Igen, a termény 26-50%-át
- Igen, a termény 51%-75%-át
- Igen, a termény legalább 76%-át

*** 3. Mi a legnagyobb előnye az Ön számára az integrátoroknak, illetve a tőzsdei határidős piacokon való értékesítésnek?**

- Fedezi az input költségeket
- Nem használom ezeket a csatornákat a terményértékesítésnél
- Profit maximalizálás
- Biztos ár és az ár bizonytalanság csökkentése
- Megkönnyíti a tervezést

*** 4. Milyen gyakran vizsgálja felül a növényvédelmi terveit évente?**

- Több mint háromszor évente
- Csak egyszer
- 1-3 alkalommal évente



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* 5. Amikor a növénytermesztési szezon növényvédelmi programját tervezi, akkor (Több válasz is lehetséges.)

- Egyszerre végzi el a tervezést a szezon kezdete előtt, és később nem változtat rajta
- Az időjárási viszonyoknak megfelelően változtat még rajta
- A kórokozók/kártevők és gyomok fertőzöttségének megfelelően változtat még rajta
- A terményárak alakulásának megfelelően változtat még rajta
- A kezelések eredményességének függvényében változtat még rajta
- Az értékesítési képviselők, tanácsadók tanácsai alapján változtat még rajta

* 6. Mi befolyásolja a növényvédőszerre fordított költségeket a növényvédelmi programjában? A három legfontosabb tényezőt jelölje meg.

- A jelenlegi terményárak
- A betakarításkor várható terményárak
- Az előző szezon terményára (amilyen áron eladta a kukoricát)
- Pénzkészlet/hitelek elérhetősége
- A növényvédőszer forgalmazók területi képviselőivel folytatott tárgyalások
- Infláció
- Az előző szezon növényvédőszer költségei

* 7. Amikor az input ráfordításokról dönt, mennyire veszi figyelembe a következő terményárakat:

Kérem jelölje, melyik árakat veszi figyelembe, és értékelje aszerint is, hogy milyen mértékben (jobban, azonos mértékben vagy kevésbé)

	jobban	azonos mértékben	kevésbé
Az előző szezonban realizált terményárak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A jelenlegi kukorica terményárak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A következő betakarításkori várható kukorica árak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Terményárak és árérzékenység

Kérem olvassa el a lenti lehetséges forgatókönyveket, és jelölje meg mindegyiknél azt a válaszlehetőséget, ami leginkább kifejezi, hogy mit tenne adott körülmények között.



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*** 1. Tételezzük fel, hogy a terményárak nem változnak az előző szezonhoz képest, és 30 000 Ft/t szinten maradnak. Ha a jelenlegi kereskedője 10%-kal megemeli a növényvédőszer árát, hogyan hatna ez az Ön növényvédőszer beszerzéseire?**

- Nem változtatna rajta
- Ugyanannál a kereskedőnél maradna, és kevesebb terméket vásárolna
- Ugyanannál a kereskedőnél maradna, de más termékeket vásárolna
- Kereskedőt váltana, de ugyanazokat a termékeket vásárolná
- Kereskedőt váltana, és más terméket vásárolna

*** 2. Tételezzük fel, hogy a terményárak csökkennek az előző szezonhoz képest 24 000 Ft/t szintre. Ha a jelenlegi kereskedője 10%-kal megemeli a növényvédőszer árát, hogyan hatna ez az Ön növényvédőszer beszerzéseire?**

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*** 5. Tételezzük fel, hogy a terményárak nem változnak az előző szezonhoz képest, és 30 000 Ft/t szinten maradnak. Ha a jelenlegi kereskedője 10%-kal csökkenti a növényvédőszer árát, hogyan hatna ez az Ön növényvédőszer beszerzéseire?**

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7. Kapcsolat a kereskedőkkel

*** 1. Hány kereskedőtől vásárol növényvédő szereket egy szezonon belül?**

- 1
- 2
- 3
- 4 vagy több

*** 2. Mit értékel leginkább a kereskedők területi képviselőinél?
(Kérem a három legfontosabb jellemzőt jelölje meg)**

- Szolgáltatások és megbízható szállítás
- Növényvédőszer elérhetősége
- Versenyképes árak
- Növényvédőszer ismeret és tanácsadás
- A növényvédőszer felhasználásánál jelen van
- Általános piaci növénytermesztési ismeretek
- Marketing módszereket ajánl a termény eladásához
- Kedvező fizetési feltételek
- Teljeskörű szolgáltatást és széles termékkört kínál (vetőmag, műtrágya, növényvédőszer)



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* 3. Milyen esetekben váltana/vált kereskedőt?

(Kérem a három legfontosabb jellemzőt jelölje meg)

- Nem versenyképes árak
- Hiányos termékválaszték
- Változás a kukorica terményárakban és eltérő növényvédőszer szükségletek
- Rossz ügyfélszolgálat
- Növénytermesztési/növényvédelmi szaktudás hiánya
- Kedvezőtlen hitel feltételek
- Nem megfelelő termékelérhetőség/készlethiányok

* 4. Hogy értékelné/kategorizálná a kapcsolatát a növényvédőszer kereskedőjével?

- Csak növényvédőszer beszállító
- Beszállító és szolgáltató (segít a beállításokban, javaslatokat tesz)
- Teljes értékű partner a gazdálkodás során
- Szállító, aki hozzáadott értéként megosztja velünk a tudását, tanácsot és javaslatokat ad

8. Köszönet

Köszönöm, hogy időt szánt a kérdőív kitöltésére! A véleménye nagyban hozzájárul a munkám sikeréhez.

A kérdőívet bármelyik kukoricatermesztő gazdálkodó kitöltheti; ha ismer olyat, akit érdekelne, kérem továbbítsa a linket vagy az elérési útvonalat számára.