

SOUTH AFRICAN GRAIN FARMERS IN DIRE STRAITS: SCENARIOS FOR SUSTAINABLE FARMING

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ABSTRACT

Traditionally, the South African farmer has always been an entrepreneur, running his/her farming activities as a business to support lifestyle, provide a future for the children (as successors to the family farm or by providing education for a career) and to provide for comfortable retirement one day. However, a number of climatic- and economic environmental issues has resulted in severe constraints to farmers as entrepreneurs, creating a situation where farming are on the brink of collapse and maize farmers are struggling to survive. The production years 2005/6 and 2006/7 are critical.

This paper focuses specifically on the summer grain production areas in South Africa where, in addition to the main crop maize, they also plant crops such as sunflower, peanuts, dry beans, sorghum and grazing for livestock). The objective of this paper is to report on the viability of possible scenarios that could assist the farming entrepreneur to sustain his/her farming activities beyond the following two years.

A number of specific constraints impact on the grain farmer, namely the overproduction of almost all grain types, the free market system of pricing grain internationally, the Rand/Dollar exchange rate, the capital investment trap and the current government assistance policy, to name but a few. All of these constraints have resulted in a situation where it is no longer viable for farmers to produce the main crop (in excess of 80% of farming activities) namely maize. This situation calls for drastic intervention in entrepreneurial decision-making, and farmers must consider other viable options to service debt and to maintain a positive cash-flow.

The analyses show that, ultimately (and most unfortunately), no favourable solution is at hand. From the possible scenarios evaluated in the paper, it is evident that maize farmers should discontinue production of maize on a large scale for the immediate future until the market environment improves. The farming community is faced with a situation of minimising losses and not with any real positive solution pertaining to the scenarios evaluated.

The final conclusion is that current economic situations for maize production are unfavourable and the resulting recommendation is that farmers should not plant maize in the 2005/6 production year, that they should ride out the market and then revisit the production decision for the production year 2006/7.

PROLOGUE

Since the earliest times, South Africa has developed as an agricultural country, adding industry later in its development cycle. Currently, South Africa still has a strong agricultural focus and the country is able to feed its population from own production. Agriculture is well-organised in farmer unions and organisations which serves the cause of agriculture loyally and passionately. Farming activities reside with entrepreneurs, and governmental farming is virtually non-existing. Farms are mostly privately owned and agri-business is conducted as part of the normal entrepreneurial activities of the country. As such land ownership varies from very large estates to small farms, with subsistence farming playing a minor role in organised agriculture.

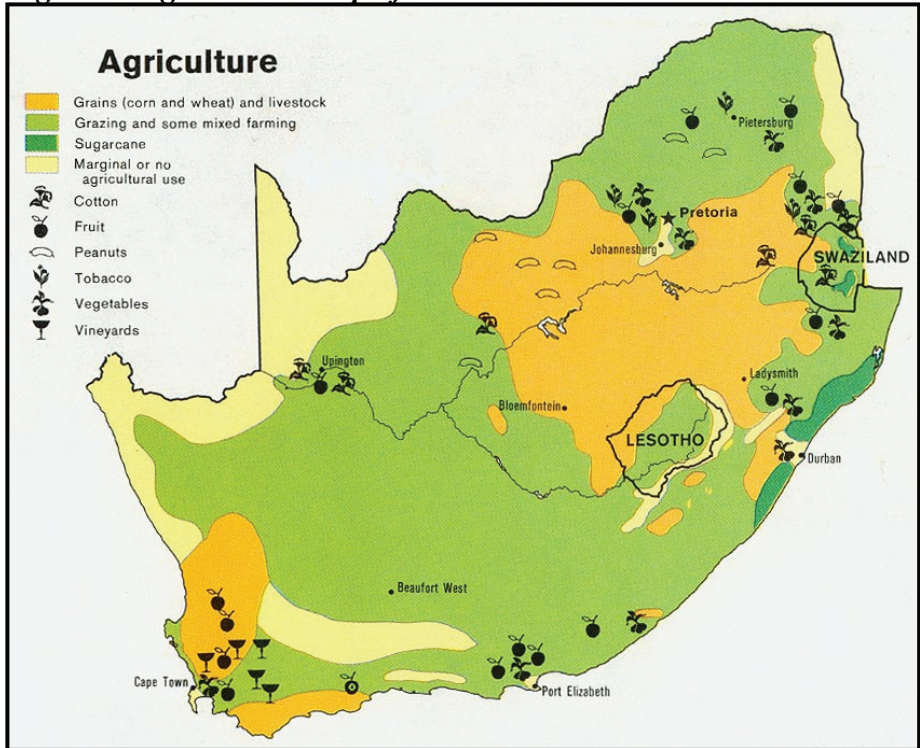
By large, the country is suitable for summer rain, and therefore, maize serves to be the

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dominant crop in the regions Free State, Northwest and Mpumalanga. Planting season commences in October and harvesting from May annually. The Northern regions, and also central South Africa are better suited for livestock farming. Wool, mutton, beef, ostrich and mohair are doing well in this region. The Cape region is a winter rain area and is world-renowned for its wine and export fruits, while wheat is also produced in the Western Cape regions (see Figure 1: Agricultural map of South Africa).

Figure 1: Agricultural map of the RSA



Source: University of Texas, USA (2005)

Up to the early 90's, all grain marketing activities were regulated by institutional boards (such as the Maize-, Oilseeds- and Wheat Boards). These boards made use of equalisation funds where prices were more stable because of the ability of the boards to retain funds in good grain priced years and then to redistribute these funds in low-priced years. The farmer as entrepreneur focused mainly on efficiency and effectiveness in the production process. Hence a strong focus on input cost management and obtaining high yields.

However, in the past 10 years, marketing activities have deregulated and farming commodities have been trading on the international markets, bringing about a new set of entrepreneurial decision-making requirements, namely not only to produce products, but also to market these products in a free market system.

INTRODUCTION

Traditionally, the South African farmer has always been an entrepreneur, running his/her farming activities as a business to support lifestyle, provide a future for the children (as successors to the family farm or by providing education for a career) and to provide for comfortable retirement one day. However, a number of climatic- and economic environmental issues has

resulted in severe constraints to farmers as entrepreneurs, creating a situation where farming are on the brink of collapse and maize farmers are struggling to survive. The production years 2005/6 and 2006/7 are critical.

This paper focuses specifically on the summer grain production areas where, in addition to the main crop maize, farmers also plant crops such as sunflower, peanuts, dry beans, sorghum and grazing for livestock). The research use figures of the Northwest Province of South Africa to demonstrate financial implications and problems in maize production. The other grain production areas are subjected to similar constraints. (Refer to Figure 1 for the Northwest region of the RSA).

The specific constraints impacting on the grain farmer are mainly the overproduction of almost all grain types, the free market system of pricing grain internationally, the Rand/Dollar exchange rate, the capital investment trap and the current government assistance policy, to name but a few. All of these constraints have resulted in a farming situation where it is no longer viable for farmers to produce the main crop (in excess of 80% of farming activities), namely maize. This situation calls for drastic intervention in entrepreneurial decision-making, and farmers must consider other viable options to service debt and maintain a positive cash-flow.

PROBLEM STATEMENT

The major problem is that the South African farmer as entrepreneur has to make a decision on planting crops in September-December 2005 for the production year of 2005/6. The dominant crop maize (which accounts for approximately 80-90% of total farming income) is no longer economically viable at current prices of R500-R560 per ton at yields that is obtainable in South Africa. Break-even yields (at a price of R500 per ton of maize is approximately 4 tons per hectare) are exceeding actual yields per hectare (long-term average of 2,5 to 3 tons per hectare), implying that even with normal yields, every hectare planted with maize results in a production loss. Consequently, farmers face a situation where every hectare they plant increases their losses, but not planting maize results in no income at all. Ultimately, the problem is whether farmers should risk losses in the hope of a better maize price in the future, or embark on a strategic plan to minimize losses and risk for an interim period.

Hypotheses

This research sets the following hypotheses:

- H0: An economically viable alternative scenario to maize production exists for farmers;
- H1: Alternative crops are an economically viable scenario to maize production;
- H2: Livestock is an economically viable scenario to maize;
- H3: Minimise losses in maize production is a viable scenario.

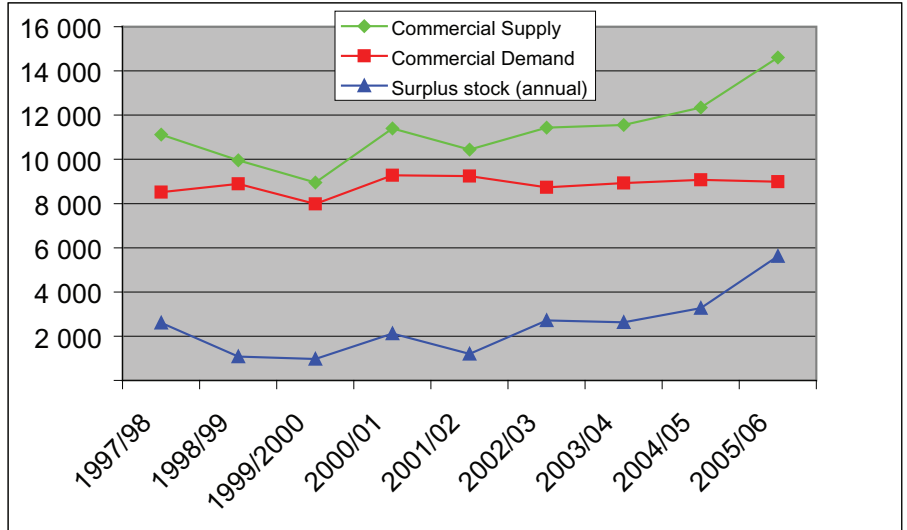
Objectives

The objectives of this paper are to:

- Analyse the macro-environment in which the South African grain farmer operates and to identify the specific constraints relevant to his/her decision-making as entrepreneur; and to
- Report on the viability of the possible scenarios that could assist the farming entrepreneur to sustain his/her farming activities beyond the following two years and to, once again, be able to focus on his/her personal objectives as mentioned above.



FIGURE 2: RSA SUPPLY & DEMAND (TOTAL MAIZE) IN '000 TONS



Source: Grain SA (2005)

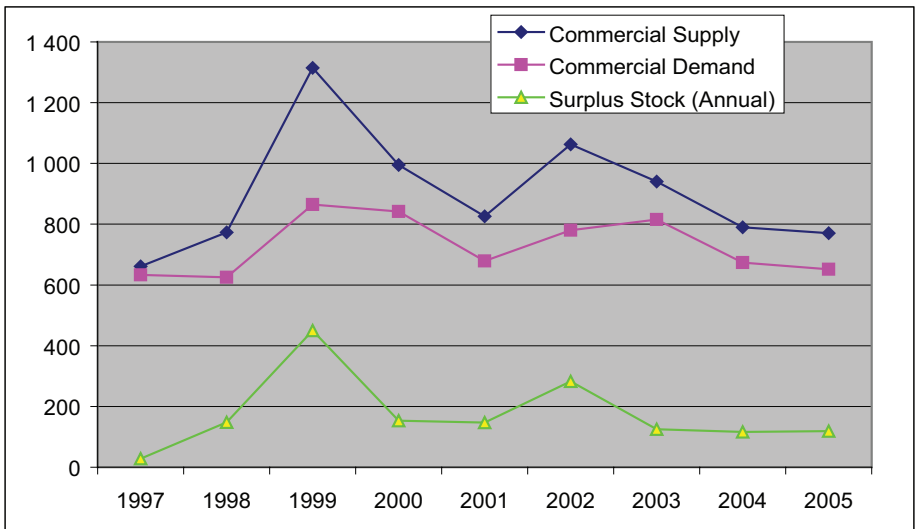
Constraints in Maize Production

The constraints facing maize farmers in the RSA are:

Constraint 1: Surplus maize and grain stocks (supply and demand)

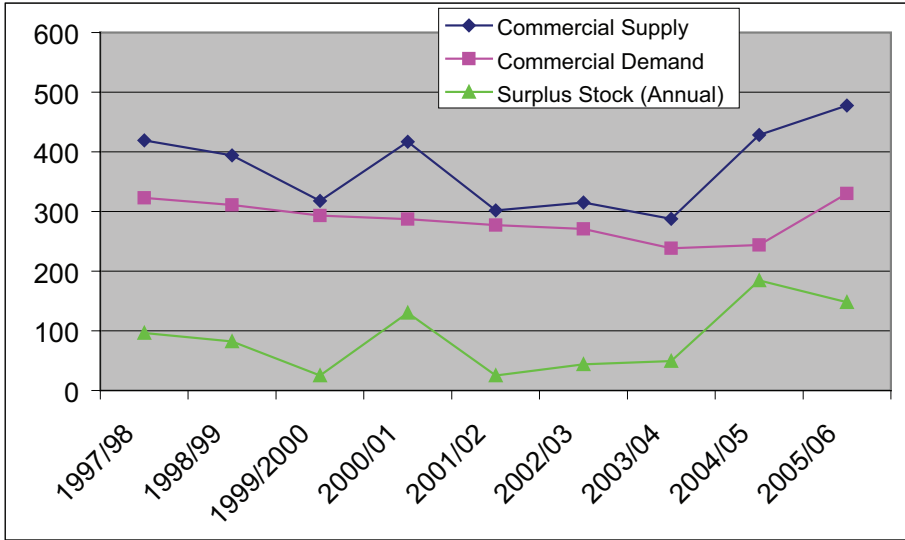
Currently in storage are 3.3 million tons of maize (maize refers to both yellow and white unless otherwise stated) while sorghum and oilseeds account for another 148 000 tons and 119 000 tons respectively. Harvesting commences in May. Therefore, the majority of this grain stock is surplus grain from the production year 2004/05. Figure 2 shows the maize consumption, production and surplus situation in South Africa from 1997/8 up to the projection at the end of the current production year. (In figure 2 the year 2005/06 refers to an estimation of

FIGURE 3: RSA OILSEEDS SUPPLY & DEMAND (IN '000 TON)



Source: Grain SA (2005)

FIGURE 4: RSA GRAIN SORGHUM SUPPLY & DEMAND (IN '000 TON)



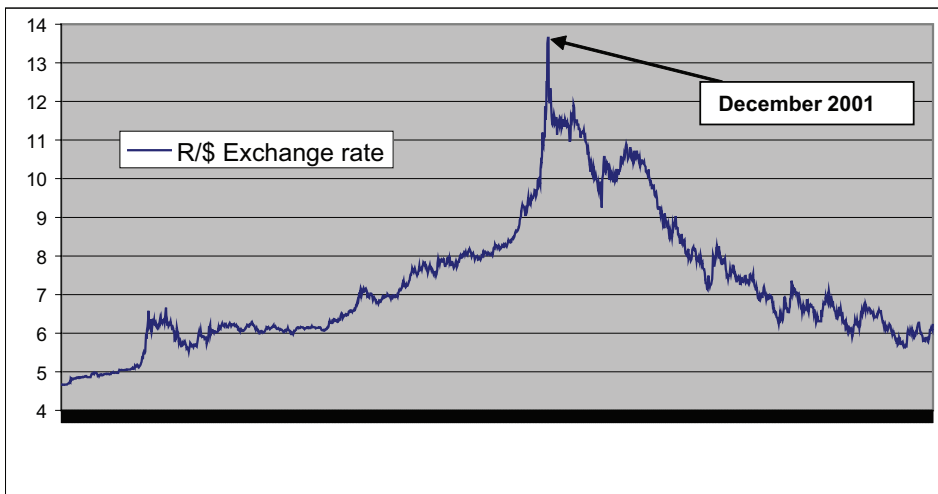
Source: Grain SA (2005)

maize to be harvested as from May).

From Figure 2 it is clear that the supply continues to exceed demand and that surplus stocks carried over annually are worsening the supply/demand ration adversely. Effectively, the surplus is projected to increase to 5.6 mil tons in this production year (after harvesting crops on the field). Bearing in mind that annual domestic demand of 8,2 million tons, South Africa would only require a white maize crop of approximately 1,8 million tons and yellow maize crops of 2,4 million tons in the next production year, signifying a decrease in production of 69% and 37% respectively (Van Rooyen, 2005:8).

This obvious constraint of market absence to deal with full production leads to the possibil-

FIGURE 5: R/\$ EXCHANGE RATE (October 1998 - March 2005)



Source: Statistics SA (2005)



ity to identify alternative crops. Figures 3 and 4 reflect the situation for oilseeds (sunflower & soy) and sorghum. From these figures it is evident that the:

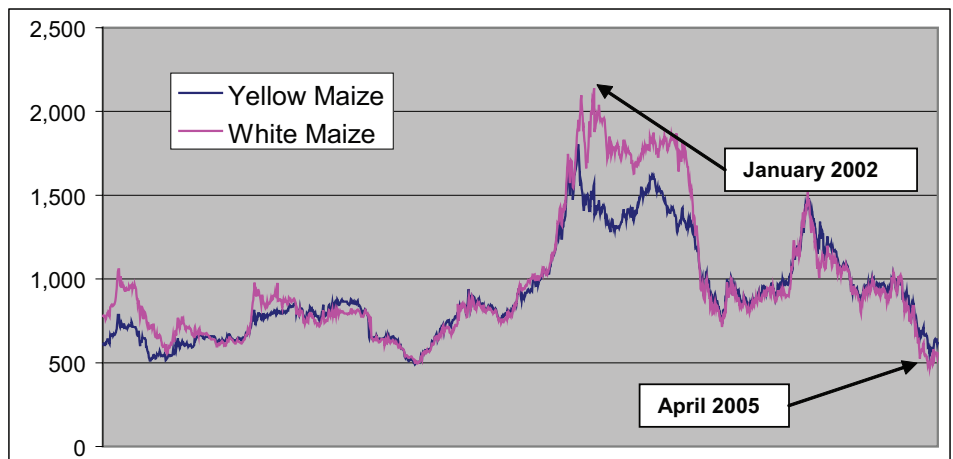
- Same tendency follows where supply exceeds demand, and that in neither of these crops scope exist to increase production. Increased production would also cause a situation of over-supply with the resultant plunging of prices.
- Tonnage of demand is insignificant and even a small shift in production would not be accommodated by these markets.

From figure 3 it is clear that the oilseed market supply exceeds demand by 119 000 tons. However, the surplus stock are well within boundaries and do not pose to be a problem in the market.

Constraints 2 & 3: Free market system of pricing grain internationally and the Rand/Dollar exchange rate

Prices of RSA grain are determined by international prices such as on the Chicago Board of Trade (CBOT), USA. The exchange rate therefore plays an important role in the Rand price that farmers receive. The Rand has strongly recovered (32,8% between October 2002 and

FIGURE 6: MAIZE PRICE (October 1998 - March 2005)



Source: SA Grain Information System (2005)

October 2003) from record lows against the Dollar (R13,65 on 27th December 2001) to a rate in the region of R6/\$, which in effect, drastically reduced maize prices to farmers (Purchase, 2005:1). Figure 5 shows the R/\$ exchange rate since 1998.

It is evident from figure 6 that at the record lows of the R/\$, the white maize price boomed to

R1 625 per ton (27 December 2001) at the rate of R11,65 to the Dollar, maintaining the good price to reach the highest maize price yet in January 2002 at R1 805 per ton (SA Grain Information System, 2005). The yellow maize price exceeded the R2 000 per ton level at that stage.

Employing the indicators of the exchange rate and the free market pricing system, it is evident that (in conjunction with powers of supply and demand) prices for maize in the RSA will remain low and that the downward trend is expected to continue at normal rates of production. Continuous maize production is thus not an option at current price levels. (See Constraint 4 for clarification.)

TABLE 1: COST OF MAIZE PRODUCTION

TYPE OF COST	YIELD AT 4 TON/HECTARE	YIELD AT 3 TON/HECTARE
Total variable cost	R2 370	R1 865
Total fixed cost	788	788
Total cost	3 158	2 653
Required break even-yield at current price of R500/ton	6.32 ton/hectare	5.31 ton/hectare
Required break-even price	R790	R884
Profit/ (Loss) per hectare	(R1 158)	(R1 153)

Source: Adapted from NWK Limited (2005)

Constraint 4: Production cost at current prices

Concerning production cost, which is a significant constraint, farming activities in maize production is clearly not viable in the short term. A major role-player in the Northwest region is an agricultural company called Northwest Limited (previously known as Northwest Cooperative Ltd). In employing budgets from Northwest Limited (2005) and the SA Grain Information services (2005), it is evident that maize production in the region does not pass the test of being economically viable. Table 1 shows a summary of the cost of maize production.

Table 1 clearly shows that the break-even yields cannot be reached. Practically, soil potential and climate do not facilitate yields such as 6,32 ton/hectare for the region. The aimed yield is 4 ton/hectare (matching the appropriate quantity of fertiliser and number of plants per hectare in the budget). In addition, to actually achieve the aimed yield and to break even, a substantially higher price is needed (R780 for a 4 ton/hectare yield and R884 for a 3 ton/hectare yield). Speculatively, both these prices are unlikely to realise on current levels of maize production. The loss per hectare in both yield scenarios is self-explanatory. Referring to the budgets of Grain SA (2005) the same tendency is clear. Total cost of production (fixed- and variable cost) per hectare for the Northwest region relates to R2 458, which necessitates a yield of 4,92 ton/hectare to break even at the maize price of R500. At a yield of 3 ton/hectare, a loss of R958 per hectare. The yields required at the current price are not attainable, and farmers cannot continue to plant maize at such prices. Future prices also looks bleak. The contract prices of maize for March 2006 are R655 (white maize) and R705 (yellow maize), which is well below the production costs (Van Rooyen, 2005:8). Finally, the yields required at the current price are not attainable (due to climatic conditions and soil potential), and farmers cannot continue to plant maize at current prices. Yield can only marginally rectify low prices, and it is evident that continued planting practices at realistic yields will only negatively influence farmers financially.

Constraint 5: The capital investment trap

Maize farmers have capitalised substantially on their farming operations. The majority of farmers are highly mechanised, and as a result they are trapped in cultivation practises as method of farming. In addition, due to the strengthening of the Rand against the Dollar, capital equipment such as agricultural tractors and combines have decreased in price by an average of 6.8% annually since 2001 (Purchase, 2005:2). As a result, farmers owe more money on tractors bought in 2001/2 on hire-purchase agreements up to date than the price of a similar new tractor (Lotter, 2005). Therefore, no market for second hand tractors are in existence, and the situation will worsen as farmers start to dump second hand tractors on the market after harvesting their crops in 2005. It is foreseen that farmers will not be able to realise additional capital (if any) to



assist in the survival strategy by selling their capital equipment on the open market.

Constraint 6: Government assistance policy

Currently, government has not issued a formal policy regarding the collapse of the maize market. Since the 1990's government has followed an agricultural policy of reducing subsidies to the agriculture, and assistance to regulate or subsidise the maize market seems to be unlikely. However, government respects the free market system, and did not interfere when extra-ordinary high prices of maize realised in 2001, and it would be fair to reason that government is not going to do so now.

All of these constraints have resulted in a farming situation where it is no longer viable for farmers to produce the main crop (in excess of 80% of farming activities), namely maize in the short term. This situation calls for drastic intervention in entrepreneurial decision-making, and farmers must consider other viable options to service debt and maintain positive cash-flow.

SCENARIOS AVAILABLE TO ENTREPRENEURIAL FARMERS

Given the number of constraints mentioned above, some possible scenarios for farmers do exist. These scenarios are stated as the hypotheses. Each scenario is evaluated according to country constraints in order to determine the viability of each as possible solution to the collapse of the maize market in the RSA.

**TABLE 2: EXPORT PARITY OF MAIZE FROM RANDBURG, SOU
APRIL 2005**

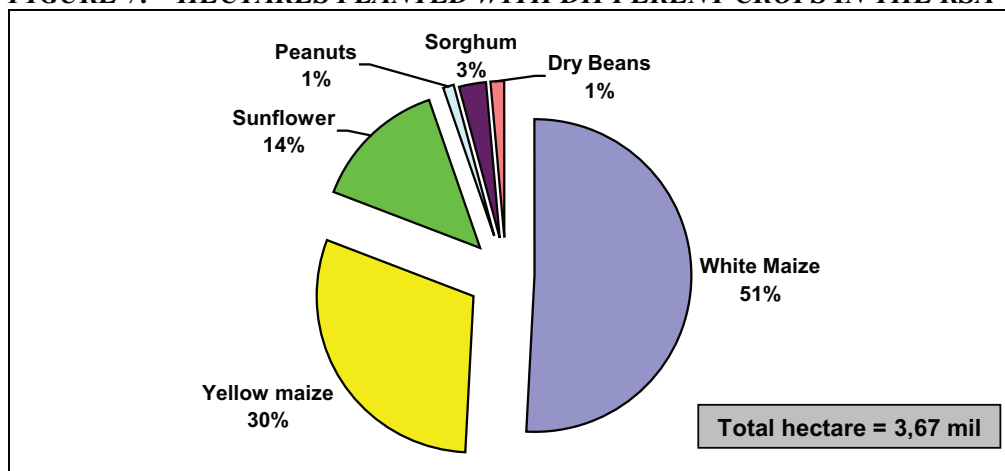
Futures prices (CBOT):	USA No3 Maize (Gulf) 2005/04/01
FOB Gulf value (\$/t)	97.87
Plus: US\$10 (\$/t)*	10.00
SA fob price (\$/t)	107.87
Exchange rate (1\$=) (2005/04/01)	6.2196
USA No3Y Maize (fob) Gulf (R/t)	670.91
Financing costs (11.00% - Prime rate) (R/t)	6.07
Transport costs: Randfontein to Durban (R/t)	172.00
Loading costs: Durban Harbour (R/t)	83.52
EXPORT REALISATION (R/t)	R409.32

Source: Adapted from SA Grain Information Services (2005)

Scenario 1: Continue production of the main crop maize and seek export markets

The domestic market is in over-supply (see constraint 2 & 3), and offers no remedy to the maize crises. Continued production necessitates alternative markets, namely to export either into Africa itself or to find markets in the global arena. Both alternatives are not viable, largely due to international maize prices and costs incurred. (See Table 2 below.)

It is evident from Table 2 that the realisation price of maize (exported from Randburg) of R409,32 per ton is not a viable price for continued maize production, and the price is substan-

FIGURE 7: HECTARES PLANTED WITH DIFFERENT CROPS IN THE RSA

Source: Adapted from SA Grain Information Services (2005) tially lower than the domestic price of R562 per ton on the same day (Safex, 2005). In addition, export market production would further increase yield pressures for economic maize production (as discussed within Constraint 4). Clearly the scenario to continue maize production for the export market is not a viable option for the maize farmers to pursue.

Scenario 2: Discontinue maize production and seek alternative crops such as sunflower, peanuts, dry beans, soy beans and sorghum

This scenario evaluates the possibilities of alternative crops to replace maize production. Climatically, a few crops are possibilities, namely sunflower, peanuts, sorghum and dry beans. Current plantings of these crops relative to maize are illustrated in Figure 7.

From Figure 7 it is evident that maize (white and yellow) is responsible for 81% of agricultural dry-land activities in the summer rain regions. Referring to Figures 3 & 4, it is evident that the market supply and demand of sunflower and sorghum clearly shows that internal demand does not have any capacity to absorb even a limited shift in production from maize. Regarding peanuts and dry beans, the supply and demand situation is similar to sunflower and sorghum, leaving those markets not open to increased production capacities. A shift in production is, therefore, not viable because no excess demand for these products exist to absorb the increase. Even a marginal production shift is going to result in over-supply, only to cause a similar collapse of these markets than in the case with maize. This scenario is thus also rejected as an option.

Scenario 3: Convert farming activities to livestock (beef; mutton and wool)

A possibility could be to convert marginal fields into grazing by planting feeds. This scenario needs to be implemented at a longer time frame, and also necessitates capital expenditure on livestock. The RSA are currently importing beef mainly from Argentina and Brazil, while mutton is also imported from these and other locations. Red meat prices are relatively high and possibilities exist to develop this market further as a good domestic demand exists for especially beef and mutton. However, a number of constraints also limit this option. Few farming entrepreneurs have the financial capacity to acquire additional cattle or sheep to implement a breeding stock. The costs are two-fold:

- Planting grazing requires some growing time before cattle or sheep can utilise the feeds, leaving the farmer with no income during that period of time; and



- Capital investment in proper breeding material is needed to set up a livestock unit.

Additionally, financial turn-around time of livestock is relatively slow after start-up, and farmers would have to be able to survive at least a year before any income would be derived from the livestock option. Although this option proves to be financially viable (at 80% calf/lamb percentages) with margins above cost of R1 170 per breeding cow and R109 per sheep ewe annually (respectively R672 and R588 per Large Stock Unit), this scenario is only open to farmers who are able to bridge the financial gap and those whom are able to make the capital investment (NWK, 2005). Furthermore, availability of quality livestock as breeding material are limited and only a few farmers would be able to exercise this option. This scenario is thus recommended to those entrepreneurs who have the financial means to diversify some of their farming activities to livestock. Ironically, this shift in production is already evident as astute entrepreneurs have already shifted some of their farming activities to livestock as part of their diversification plans in the past few years.

Scenario 4: Discontinue production of maize

The final scenario examines the possibilities of discontinuing to plant maize on small scale (thus reducing planting of fields by 10 to 15%), or to do so on large scale for the immediate future (50% or more). A final option is to discontinue maize production totally until the market environment improves.

Small-scale discontinuation is not an option. Referring to Figure 2 (domestic demand of maize and the surplus annual stock available), it is evident that South Africa would only require a maize crop of approximately 4-5 mil tons in the next production year to satisfy its domestic demand. This quantity requires approximately 50% of normal annual maize production. Even with such a lowered production capacity, the supply/demand ratio at 9 mil tons (production plus annual stock) would not set an acceptable producer price for maize. The final option thus is to produce less than 50% of normal production, or to refrain from producing maize at all. Although not producing any maize at all may be harsh scenario to accept, it is evident from the margins and production cost (see Table 2) that farmers would only increase losses by planting maize at current prices. The viable option, therefore, is not to attempt to increase income, but to minimise losses. By not planting maize, farmers would reduce production risks such as drought and irregular rain patterns, financial risk and market risk. Additionally, maize is currently cheaper to purchase than to produce. The cost of production per hectare amounts to R790 (see Table 2), while the selling price ranges in the R500-R550 band. It would, therefore, not make any sense to produce maize.

Acceptance/Rejection of Hypotheses

From the research, acceptance or rejection of the hypotheses follows:

H0: An economically viable alternative scenario to maize production exists for farmers - Rejected;

H1: Alternative crops are an economically viable scenario to maize production - Rejected;

H2: Livestock is an economically viable scenario to maize – Partially accepted due to small scale possibilities; and

H3: Minimise losses in maize production is a viable scenario - Accepted.

CONCLUSIONS

It is concluded that:

- Alternative crops such as sunflower, sorghum, peanuts and dry beans do not offer a solution to the farming entrepreneur as these markets are too small and sensitive to accommodate any shift in production. A shift will only result in the collapse of these markets as well.
- Exports of maize are not an option as export prices are even lower than domestic prices. Export production would only increase the losses to farming entrepreneurs.
- Livestock farming do offer a limited solution, but this is rather a long-term diversification option and not an immediate solution. The financial implications of such a shift in farming activities is substantial and only a limited number of farmers would be able to diversify.
- Limited reduction in maize production would only result in severe losses as production costs exceed income with resulting negative margins on maize production at normal production quantities. The annual maize stock available also necessitates that at most 63% (Yellow) and 31% (white) of maize should be produced to balance the domestic demand with supply.
- Farmers should severely limit maize production to rectify the maize stock levels in the RSA. Stock levels are regulated by supply and demand, and as mentioned, it is more costly to produce maize than to purchase maize at current price levels.

RECOMMENDATIONS

Regarding the analyses and conclusions, it is recommended:

Firstly, that farmers refrain from producing maize this coming production year (2005/06) as it would only increase their losses. Farmers should thus move towards a strategy to minimise losses rather than to seek alternative crops or export markets for their maize. Calculated costs show that this loss encountered by not planting maize would amount to R287 per hectare in contrast to losses of R1233, R633 and R33 at a maize price of R800, R1000, and R1200 respectively (Boshoff, 2005:1).

Secondly, that farmers in the current production year (2004/05) should not sell their maize at the low prices. Farmers should seek bridging capital to survive the interim period, and store their maize until prices increase to acceptable levels. As domestic demand erodes annual maize stocks, and limited maize is produced, stock levels will normalise and as a result, so will maize prices. Farmers should then be in a position to sell their maize at better prices, resulting in a better margin. By selling their maize at current prices, they would not be able to manage the situation, as they would immediately quantify and finalise their losses.

Thirdly, farmers as entrepreneurs should scrutinise their cost structures in their farming activities, reducing costs where possible and strategically plan for a survival strategy for the next year or two.

Finally, as all enterprises do, maize farming faces a tough challenge to survive. Farmers should additionally plan to diversify their activities to be less sensitive to any specific activity (not only maize) in their farming activities.

Some Final Comments

Unfortunate as it may seem, the maize industry in the RSA has reached a shakeout stage that is going to force a number of farming entrepreneurs out of business. Repeated years of good yields have resulted in a build-up of maize stock in silo's and, as was expected, the free-market system responded adversely to correct the situation. In addition, the over-supply specifically manifested within white maize as its production constantly grew (from 50% of total maize in 1993 to 65% in 2004) while yellow maize declined to 30-35% of total maize production in 2004 (Annual Report, 2004:12). Entrepreneurs (as in any other



industry) who anticipated conditions of business well and planned for a downturn (after the booming years of 2000 and 2001 when maize prices soared to R2 000 per ton), and those who diversified or made provision in their strategic planning, will survive. However, not all entrepreneurs did plan and provide, and as a result, the maize farming community will face a number of farmers going out of business. This will therefore also effect agricultural unemployment and other agricultural businesses (such as fertiliser- and seed merchants as well as to the suppliers of agricultural capital equipment). It is also foreseen that non-agricultural businesses in rural towns that are sensitive to the agricultural economic cycle will have to restructure for a decreased turnover in the next few years. They should also implement a long-term survival strategy to overcome cyclical movements of the maize industry. On the positive side, however, it is foreseen that the cycle will ride out in 2 to 3 years from where the situation should normalise to a more profitable maize production price. In the long-run ethanol production could utilise up to 30% of the RSA maize production (Bothma, 2005:1) and currently studies are underway to determine the viability of these plants (Hollis, 2005:2). This is, however, no consolation to the current crises in maize farming.

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