

A STRATEGIC MARKETING PLAN FOR AGRICOL FORAGE SORGHUM IN SOUTH AFRICA

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ABSTRACT

A STRATEGIC MARKETING PLAN FOR AGRICOL FORAGE SORGHUM IN SOUTH AFRICA

Agricol is a South African seed company that offers a wide range of seed products that includes sunflower, maize, pastures and turf grasses. The addition of a new sweet forage sorghum hybrid to the current forage sorghum product range prompted an investigation into the differentiation between the different forage sorghum groups, and their application in South Africa. A literature study was conducted to identify the characteristics of the different forage sorghum groups available, and their application in different production systems in South Africa. The study indicated that sweet sorghum is the most versatile forage sorghum available and that it can be used for grazing, silage and foggage in winter. A questionnaire was constructed to determine what farmers perceive as the most important characteristics of forage sorghum. The results indicate that high yield and quality are the most important characteristics when selecting a forage sorghum for silage. For grazing, the results indicated that frequent cutting and fast re-growth ability are the most important characteristics. The results also indicated what the most popular forage sorghum groups are. A need for the addition of a *Pennisetum glaucum* hybrid to the current product range was identified. A marketing plan for Agricol's forage sorghum product was compiled, using the market information available and the results of the literature and empirical studies. The marketing plan consists of market analysis, marketing strategy, financial analysis and control strategy. A five-year sales target was set. Conclusions and recommendation were made regarding the results of the study.

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CHAPTER 1

AN OVERVIEW OF THE STUDY

1.1 INTRODUCTION

Agricol is a seed company that was established in 1959. It is currently involved in various divisions of the seed business. Agricol sells its products through an extended network of branches and agents all over South Africa and the product list includes alternative crops like forage seed and agronomy crops like cereals, canola, maize and hybrid sunflower. Agricol is one of only two seed companies in South Africa that has a local sunflower breeding programme. One of Agricol's growing divisions is turf grasses where they are on the forefront of technology. Two additional divisions are birdseed and the confectionary trade.

Agricol recently took a decision to upgrade its current range of forage sorghum products, since the popularity and demand for improved forage sorghum hybrids increased. Forage sorghum is one of the most popular annual summer forage crops. Most varieties have the potential to produce a large body of feed under a wide range of soil and seasonal conditions. Forage sorghum is also relatively drought tolerant when compared to other crops, and have the potential to utilise sub-soil moisture reserves (Stuart, 2002:29). It is, therefore, well suited to the South African conditions. According to data from the South African National Seed Organisation (SANSOR, 2008), 2 757 tonnes of forage sorghum seed are sold in South Africa each year. Over the past decade a considerable amount of research went into improving forage sorghum hybrids worldwide, and a number of new hybrids with distinctive qualities were developed. Agricol imported new material from Australia to be tested and evaluated for adaptation to the South African environment.

1.2 PROBLEM STATEMENT

Various forage sorghum products are available on the market in South Africa. Each different variety has its own distinctive qualities and can be recommended for a wide range of different applications. *Pennisetum glaucum*, which is not a forage sorghum but a similar product, is also included in this group of annual summer forages. It has been difficult to position products and to distinguish them from each other. With the introduction of Agricol's new forage sorghum products a detailed marketing plan was required, which, could not be drafted without the necessary information.

1.3 OBJECTIVES

The primary objective of this dissertation was to investigate the different annual summer forage products available and their different qualities and applications, in order to finally compile a marketing plan for Agricol's forage sorghum products in South Africa.

The secondary objectives are:

- Analysing the forage sorghum market in South Africa
- Identifying possible shortcomings to Agricol's current product range
- Recommending additional research needed to improve marketing of Agricol's forage sorghum products.

1.4 LITERATURE STUDY

It is clear from the abovementioned, that an in-depth literature study on the different varieties of forage sorghums and other annual summer forages are needed. Several sources on the topics have, therefore, been consulted. The origin of forage sorghum was investigated through numerous scientific journal articles. New and improved hybrids that were developed over the past few years were studied and categorised

after consulting a number of publications from research institutions and seed companies. The literature study also summarises the possible uses of the forage sorghum products in the South African agricultural situation, and highlights the most important qualities a forage sorghum product should have to be a competitive product on the market.

1.5 EMPIRICAL STUDY

Empirical research was conducted amongst customers of Agricol, in order to determine what is perceived as the most important qualities annual summer forages should possess, when farmers are deciding on a variety to include in their fodder flow programme. A questionnaire was constructed to capture the data. The questionnaire was distributed to customers across South Africa, to be completed and returned. The questionnaire focused primarily on rating a list of different characteristics of forage sorghum products in accordance with their perceived importance.

1.6 MARKETING PLAN

A complete marketing plan was constructed using the guidelines in *The Marketing Plan Handbook* (Burkwood, 2005). Information gathered through the literature and empirical study was taken into consideration. A market summary was done using data of the South African National Seed Organisation (SANSOR), internal company data, and personal communication with experts. The summary included Agricol's product offering as well as those of the competition. The marketing strategy combines the overall objectives, marketing mix, and target market positioning. A complete financial layout, web-plan summary, and controls to manage the project complete the marketing plan.

1.7 LIMITATIONS OF THE STUDY

There is limited scientific literature available on the subject of different forage sorghum varieties, with specific relation to South African conditions. Most of the information used is from the United States of America or Australia. The results from the empirical study serve only as a general insight into the selecting behaviour of Agricol's customers, and could be more detailed in further research. Questionnaires were only distributed to Agricol's customers. Very little local market information on forage sorghums in South Africa exists, and the data available does not distinguish between different forage sorghum products.

1.8 LAYOUT OF THE STUDY

A literature study was needed to document the differentiation between forage sorghum hybrids available. An empirical study using a questionnaire was also required to determine the quality characteristics of forages most important to farmers, when selecting a forage sorghum product. Using the knowledge gained through the literature study and the results from the empirical study, a strategic marketing plan was drafted to effectively market Agricol forage sorghum products in South Africa.

1.9 SUMMARY

The approach that has been outlined in this chapter is followed in order to gather the appropriate information for constructing an effective marketing strategy that can be applied by Agricol to increase their sales of forage sorghum products in South Africa. The next chapter provides a literature review on the different groups of annual forage sorghum, and their potential use in South Africa.

CHAPTER 2

FORAGE SORGHUM DIFFERENTIATION AND UTILISATION IN SOUTH AFRICA

2.1 INTRODUCTION

South Africa has limited natural resources. The single most limiting factor to farming in general is the low and unpredictable annual rainfall. Approximately 65% of the country is arid or semi-arid, with only 28% of the country receiving more than 600 mm of rainfall per annum (Palmer & Ainslie, 2002). Furthermore, a large proportion of the land used for annual crop production in South Africa is marginal, resulting in low and variable yields. Such land is better suited for the establishment of planted pastures. Another great area of concern to the farmer today, is the ever increasing input costs and the weakening of the overall economy. The margin between input costs and product prices is declining placing continuously more strain on the already struggling agricultural economy. A report released by the Bureau for Food and Agricultural Policy (BFAP) states that input costs increased tremendously in the first quarter of 2008 on the back of already increasing input costs in 2006 and 2007. Prices of fertiliser, driven by high oil prices, have increased by as much as 400% since 2006. Combined input costs are projected to rise by 53% in 2008 and further in 2009 (Van Schalkwyk, 2008:1). Many farmers have over the past few years been forced to diversify their enterprise by introducing a so-called animal factor. Forage sorghum is, therefore, becoming an increasingly important forage crop, in many regions of the world because of its high productivity and ability to utilise water efficiently even under drought conditions (Sanchez et al., 2002:716).

2.2 ORIGIN OF FORAGE SORGHUM

Forage sorghums are a group of *sorghum* species and hybrids which have been bred for forage production and are commonly used as annual forage or hay crops

(Cameron, 2006:1). Forage sorghum is annual summer forages that plays an important role in the designing of fodder flow programmes and are frequently used in combination with perennial planted pastures. The development of a fodder flow is very important for livestock farmers, but can also be very difficult in some cases. Dairy farmers, in particular, battle with the autumn quality gap, a gap in the fodder flow that can be successfully filled by the forage sorghums. Forage sorghum is a member of the sorghum family and is closely related to grain sorghum, broomcorn, sorghum-sudangrass, and sudangrass (Roth & Harper, 1995). Some perennial forage sorghum varieties do occur, for example Silk, but is not as important as the annual forage sorghums. Sorghums originate from Africa and Asia, and were later imported to the United States of America. For many years, the sorghum plant was used in the manufacture of sugar and syrups, and was first used as animal feed at the start of the twentieth century. Since then, a great effort was put into breeding and improvement of forage sorghum for it to become the popular forage that it is today.

Forage sorghum is best adapted to warm regions and is particularly noted for its drought tolerance compared to maize. Forage sorghum has higher temperature requirements than maize. For example, the minimum temperature for sorghum growth is about 15°C and highest yields occur when the mean temperatures during the growing season are between 24°C and 27°C. It is frost sensitive, although some varieties do show an over-wintering ability (Stuart, 2002:98). Forage sorghum growth can range from 1.5m to 4.5m tall, depending on the hybrid. Hybrids can be fertile and produce grain yields comparable to grain sorghum, or they can be sterile and produce no grain. Forage sorghum silage is usually slightly lower in energy than maize silage and is similar in protein. Yields of forage sorghums are comparable to maize and can range from 30- to 90-tons per hectares depending on the soil, weather, and the hybrid (Roth & Harper, 1995).

Stuart (2002:29) points out the main categories of forage sorghum to be Sudan grass, sorghum x Sudan hybrids and sweet sorghum hybrids. The annual forage

species *Pennisetum glaucum*, although not a sorghum species, will also be included in the discussion of forage sorghum because of its similar characteristics and applications. The diagram in figure 2.1 illustrates the different categories of forage sorghums available with examples of the popular varieties of each group available in South Africa.

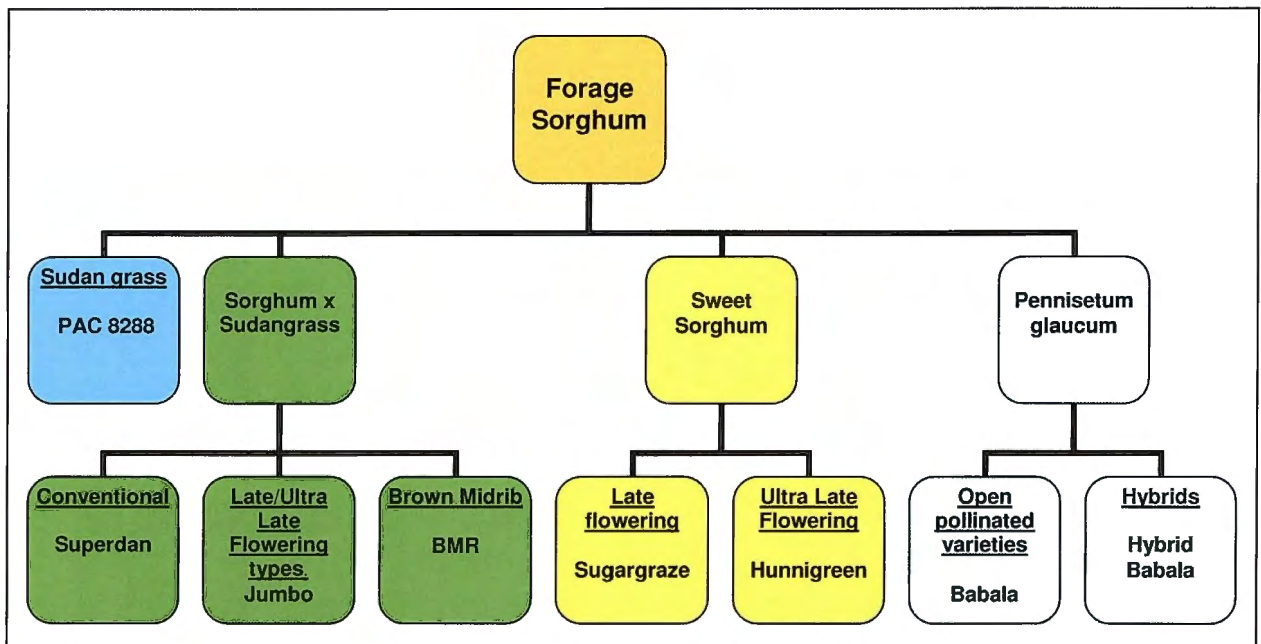


Figure 2.1: The main categories of annual summer forages

2.3 IMPORTANT TRAITS WHEN EVALUATING OR SELECTING FORAGE SORGHUM

Forage sorghum hybrids can vary considerably in yield potential, height, forage quality, grain content, and maturity. It is important to match the traits of the hybrid to the production situation and the desired use of the crop (Roth & Harper, 1995). When selecting a pasture grass species the main qualities desired are productivity, palatability, nutritive value, and adaptation to the local soil and climatic conditions (Roselt, 2005:3). The same principles can be applied to forage sorghums.

According to McIlroy (1972), the productivity, or yield, of a pasture species depends on the following characteristics:

- Persistence, or the ability to survive;
- Aggressiveness, or the ability to survive the competition of other associated species;
- The ability to recover from heavy grazing and trampling;
- Drought-resistance and tolerance to cold;
- Seasonal distribution of production;
- The capacity to produce a good yield of viable seed;
- Soil fertility (especially nitrogen level); and
- Climate.

The palatability of a pasture was defined by the Society of Range Management as the “relish with which a particular species or plant part is consumed by the animal” (Jacoby, 1989). This is very important to livestock farmers since they need to select a forage sorghum that is accepted and palatable to the animals and freely consumed. Another measure of forage quality when selecting a forage crop is nutritive value, which, describes the concentration of nutrients in a feed, and is assessed in terms of the protein content, energy availability, minerals and vitamins, and the absence of toxins (Humphreys, 1982). The most important factor determining animal output is the amount of forage ingested, and the proportion digested by an animal. If no deficiencies of minerals or protein exist and they are in adequate supply, the animal performance will depend on the energy level of the forage (Humphreys, 1982). Intake can vary considerably between species and between cultivars.

To expand the utility of sorghum as a forage crop, breeders have primarily focused on traits that are likely to affect the yield and nutritive quality of the forage. Yield is a reflection of the plant’s potential to accumulate high dry matter (DM) content in its organs and an additionally criterion is the plant’s resistance to lodging under irrigation. Castle and Watson (1973) suggested a minimum DM content of 247 g/kg

to ensure a margin of safety against production of effluent. Ensiling sorghum biomass with DM content below this level may result in high chance of spoilage and dry matter loss during ensilage (Savoie & Jofriet, 2003).

The major selection criteria for improving forage nutritional value are increases *in vitro* dry matter digestibility (IVDMD) and reduced lignin content (Casler, 2000:52). Digestibility is defined by Tainton (2000:322) as the proportion of a feed that has the potential to be ingested by animals. Breeders therefore, focus on material that has a lower lignin content. When a forage sorghum plant has a reduced lignin content, which is the indigestible portion of plant tissue, the forage is more digestible to the animals (Stuart, 2002:59). Rosenow (1977) also identified resistance to lodging as a trait that had become an important target to breeders. There has to be a balance between the increased digestibility due to reduced lignin content, and the amount of lignin needed for the structural stature of the plant. Considerable losses of yield occur during commercial harvest because of lodging that might appear mainly in tall and mature plants, in response to excess irrigation (Reddy et al., 1999; Bean et al., 2002) or to wind (Bilbro et al., 1991).

2.4 HYBRID DIFFERENTIATION

2.4.1 Forage sorghum (*Sorghum bicolor*)

Sorghum is a coarse, upright annual growing grass that is used for both grain and forage production. Grain sorghum is shorter and has been bred for higher grain yields. Forage sorghum grows from 180 - 450 cm tall and produces more vegetative growth and less grain.



Figure 2.2: Grain sorghum (*sorghum bicolor*)

Silage yields from forage sorghum are similar to those of maize, although sorghum is slightly less palatable and digestible than maize silage (Teutsch, 2002:1). Pasturing is the cheapest method of harvesting forage sorghum, even though efficient utilisation of fast growing summer annuals demands considerable attention. Due to the ability of animals to graze selectively, they may produce more milk or meat than when fed the whole plant. However, grazing leads to waste by trampling or fouling by excreta (Fribourg & Waller, 2001). For this reason it is always better to sow forage sorghum in rows, rather than the broadcast method. Forage sorghum can be divided into several different groups, each having distinctive characteristics making it useful to a specific situation and feeding practice. New cultivars are released constantly as the interest in improved material grows, and technology and breeding techniques improve.

2.4.2 Sudan grass

Sudan grass is a tall, leafy annual grass belonging to the sorghum family. Sudan grass has been used extensively in the past, but has declined in popularity with the development of Sorghum x Sudan grass hybrids.



Figure 2.3: True Sudan grass (left), and Sudan grass x Sudan grass hybrid cv. PAC 8288 (right)

True Sudan grass possesses fine stems and regrows rapidly after grazing. Sudan grass is adapted to practically all soils except those, which are very wet and poorly drained, or those that are extremely alkaline or sandy. The soils generally favourable to Sudan grass are similar to those favourable to other sorghums. Sudan grass is best used for pasture or in multiple cut systems (McKinlay & Wheeler 1998). Late flowering Sudan x Sudan grass hybrids have also been developed. These hybrids are fine stemmed, quick growing, easily managed with low prussic acid levels. The dry matter production of these hybrids is similar to the traditional forage sorghums and superior to other Sudan grass varieties, particularly under irrigation (Stuart, 2002:68). The difference in feed quality between Sudan grass hybrids and sorghum x Sudan grass hybrids is not great but the small differences, together with the finer stems of pure Sudan grass hybrids, give it an advantage for making hay. These hybrids are therefore, ideally suited for hay production, green chop and as a grazing for both sheep and cattle.

2.4.3 Sorghum x Sudan grass hybrids

These cultivars were developed by crossing a male Sudan grass parent plant with a female sorghum plant. The idea was to combine the positive characteristics of both parent plants, and to have the benefit of increased dry matter production of a hybrid.

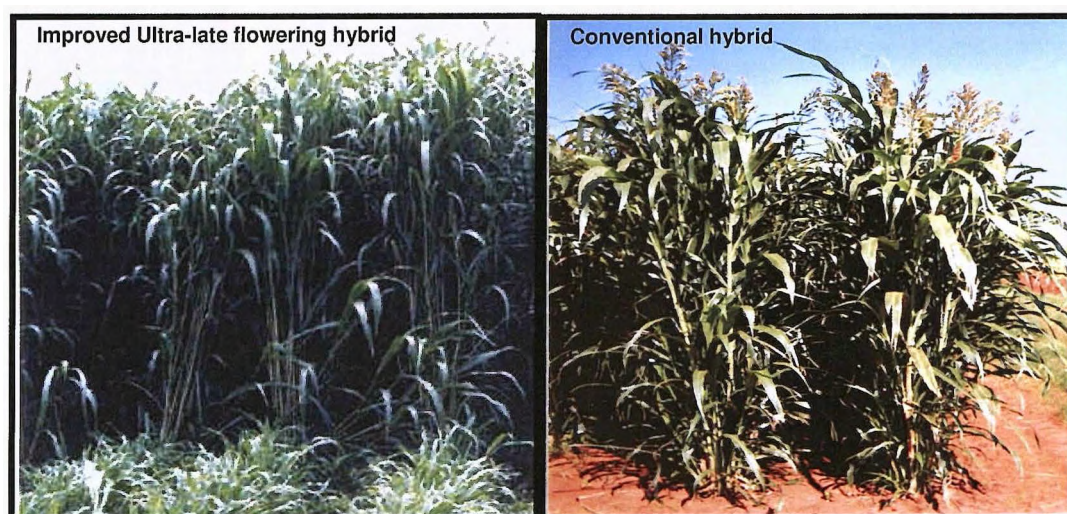


Figure 2.4: Sorghum x Sudan grass hybrids. A conventional hybrid (right) and an ultra-late flowering hybrid (left)

Crossing sorghum with true Sudan grass develops sorghum x Sudan grass hybrids (figure 2.4). The result is a tall-growing annual grass that resembles Sudan grass, but has coarser stems, taller growth habit, and higher yields. Like Sudan grass, hybrids will re-grow after grazing if growth is not limited by environmental factors. sorghum x Sudan grass hybrids like Sudan grass is best adapted to well-drained, fertile soils. These grasses do not tolerate low pH and require liming when grown on acid soils. Hybrids are excellent choices for either green chop or silage, but can be grazed as well (Coblentz & Phillips, 2000). The two groups that can be distinguished in this category are the conventional type sorghum x Sudan grass hybrids, and the Late/Ultra-late flowering sorghum x Sudan grass hybrids. Conventional hybrids are very productive and can provide rapid growth rates and

quick recovery after grazing or cutting. A typical characteristic in early flowering forage sorghums is the decline in feed quality with age. Timely grazing or cutting of these varieties to achieve maximum feed quality and quantity, and to prevent the plants from flowering, is therefore important. Stuart (2002:54) describes the Ultra-late flowering hybrid, Jumbo, as one of the most popular forage sorghums in Australia. It combines good productivity with ease of management, resulting in more useable feed and less wastage. Under favourable growing conditions it can be grazed or cut many times and the number of grazings/cuttings will depend on the availability of soil moisture, soil nutrients and suitable temperature. According to Stuart (2002:55) Ultra-late flowering hybrids provide the following benefits over early flowering hybrids:

- More late summer – autumn feed, due to its later flowering habit and better leaf production.
- Continuous new leaf production and high leaf to stem ratio means higher feed quality for stock and a greater availability of useable feed.
- If left un-grazed early sown Ultra-late flowering hybrids may flower in 90 days. This is still some four to six weeks later than an early-flowering forage sorghum sown at the same time.

2.4.4 Sweet sorghum

Sweet forage sorghum has proven to be more versatile and productive than any other summer forage. Sweet sorghum cultivars have been bred by crossing two sorghum cultivars possessing genes for higher sugar content. Sweet sorghum x sorghum hybrids are also available, where only one of the parent lines have genes for higher sugar-content. The latter is usually not as versatile and productive than the true Sweet sorghum cultivars. Sweet sorghum usually has thicker stems than that of sorghum x Sudan grass hybrids, and their recovery after defoliation or cutting are not as quick. The thicker stems, however, is soft and palatable and has no negative impact on the free intake by animals.



Figure 2.5: Milk cows grazing a sweet sorghum x sweet sorghum hybrid

The excellent production potential, palatability and high sugar content, makes sweet sorghum hybrids suitable for a variety of different forage application. Sweet sorghum is especially suited to be utilised as forage during late autumn and early winter. Very good quality silage can be produced from sweet sorghums, with comparable feeding values to maize silage. Cultivars with late flowering characteristics enable them to be productive till later in the growing season, usually resulting in higher production. Sweet sorghums can be regarded as the most versatile forage sorghum because of the fact that it can adapt to any management system, and be used for so many different feeding/forage situations. The sugar-content in sweet sorghums rises as the plant matures, which means that quality and palatability of the forage is still high when utilised as forage during winter. This characteristic ensures that no wastage occurs due to having too much feed at any given time (Stuart, 2002:76).

Recently the production of ethanol from sweet sorghum has received renewed interest due to a global increase in the price of fuels. The high sugar-content in sweet sorghum makes it very suitable for the manufacture of ethanol. The idea of integrating sweet sorghum with the sugarcane industry to produce bio-energy,

particularly ethanol, has gained momentum over recent years (Ferraris, 1988; Woods, 2000). According to Webster et al. (2003), this can be achieved through construction of an ethanol distillery adjacent to the sugar mill and using molasses supplemented with sweet sorghum fermentables as feedstock. It has been supposed the processing of sweet sorghum could utilise existing sugar mill equipment with potential advantages in increased efficiency of production, land, personnel and other resources by lengthening the crushing season (Woods, 2000).

Dalgliesh and Webster (2003) concluded the following from their research findings:

- 1 000 kg of in crop TFS (Total Fermentable Sugars) will produce 350 kg (or 444 litres) of ethanol.
- Therefore, an 80t/ha crop of Sweet sorghum @ 12.5% TFS = 10t TFS will yield 4,440 litres of ethanol/ha. A 100t/ha crop at 14% TFS will yield 5,772 litres of ethanol/ha.

2.4.5 Babala (*Pennisetum glaucum*)



Figure 2.6: Conventional Babala (left), and hybrid Babala (right)

Babala (figure 2.6) is another annual warm-season grass that exhibits growth characteristics similar to Sudan-grasses and Sorghum-Sudan grass hybrids, although it technically belongs to a different genus. Babala has smaller stems and

tends to be leafier than forage sorghum, Sudan grass, and Sorghum-Sudan grass hybrids. It typically ranges from 90 - 240 cm in height. A primary benefit of Babala is that it does not contain prussic acid (Teutsch, 2002), a feature in all Sorghum cultivars. Babala is also better adapted to more acid soils and soils with a lower water holding capacity than Sorghum, Sudan grass or Sorghum-Sudan grass hybrids. Babala is, however, more sensitive to cold stress than Sorghum and may be killed by low temperatures in early spring when Sorghum is not. It should be planted when the soil temperatures have reached at least 20°C (Teutsch, 2002). Babala grows rapidly and will provide grazing in as little as 45 to 60 days. Babala can be cut for hay, ensiled, used for green-chop, or grazed. Grazing can be initiated when plant height reaches 30 - 45 cm. It can be harvested for hay when it reaches 60 - 120 cm. Babala can be direct ensiled when the grain has reached the soft dough stage (Teutsch, 2002).

Through improved breeding and selection methods, crosses of Babala have been made and improved hybrid Babala cultivars were developed. These hybrids show evidence of higher production capabilities, palatability, recovery after defoliation, and a larger leaf to stem ration.

2.4.6 Brown Midrib hybrids

The result of researchers' desire for improved digestibility and palatability has led to the development of the Brown Midrib forage sorghum cultivars. BMR (Brown Midrib) forage sorghum is the latest generation forage sorghums with lower lignin content. Lignin is the natural indigestible fraction of the plant. Lower lignin means that the forage is more digestible and palatable. A characteristic of the BMR cultivars is the visible brown stems and the brown midrib of the leaf, caused by the brown midrib genes (Figure 2.7).

BMR cultivars are excellent feed for milk cows, where rapid digestion with high energy levels is a prerequisite for economic and sustainable competitive milk

production (Stuart, 2002:59). Bean et al. (2002) confirm that forage, especially of BMR varieties, may have high nutritive value, which might be comparable to that of corn (Bean et al., 2002; Hanna et al., 1981).

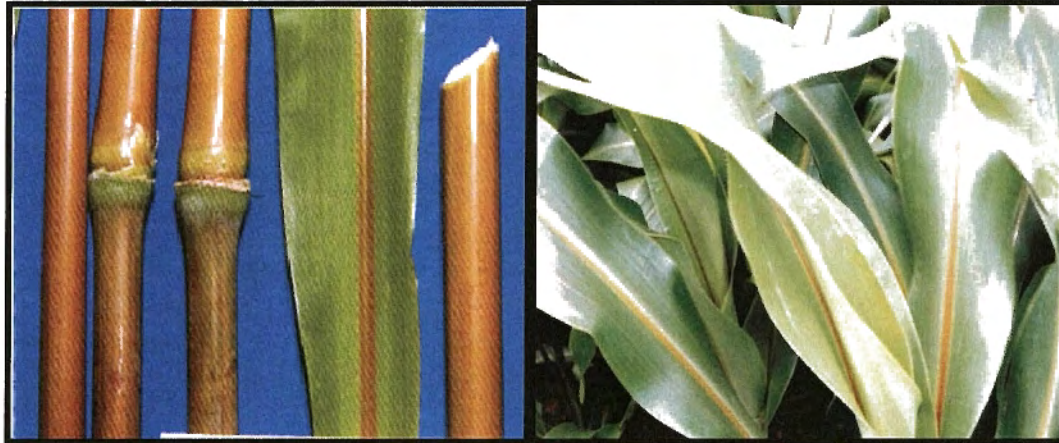


Figure 2.7: Brown Midrib forage sorghum

2.5 USES FOR FORAGE SORGHUM

In South Africa the most commonly grown annual subtropical grasses are *Eragrostis tef*, *Pennisetum glaucum*, and *Sorghum spp.* (Dannhauser, 1985:4). The main purposes of these crops are the production of hay and silage, although they could also be incorporated into grazing systems. These grasses can provide high yields of good quality forage in a relatively short period. Perennial subtropical grasses in South Africa, which are responsible for most of the summer grazing, have their peak production during mid summer. During spring and fall feed shortages could still, therefore, occur.

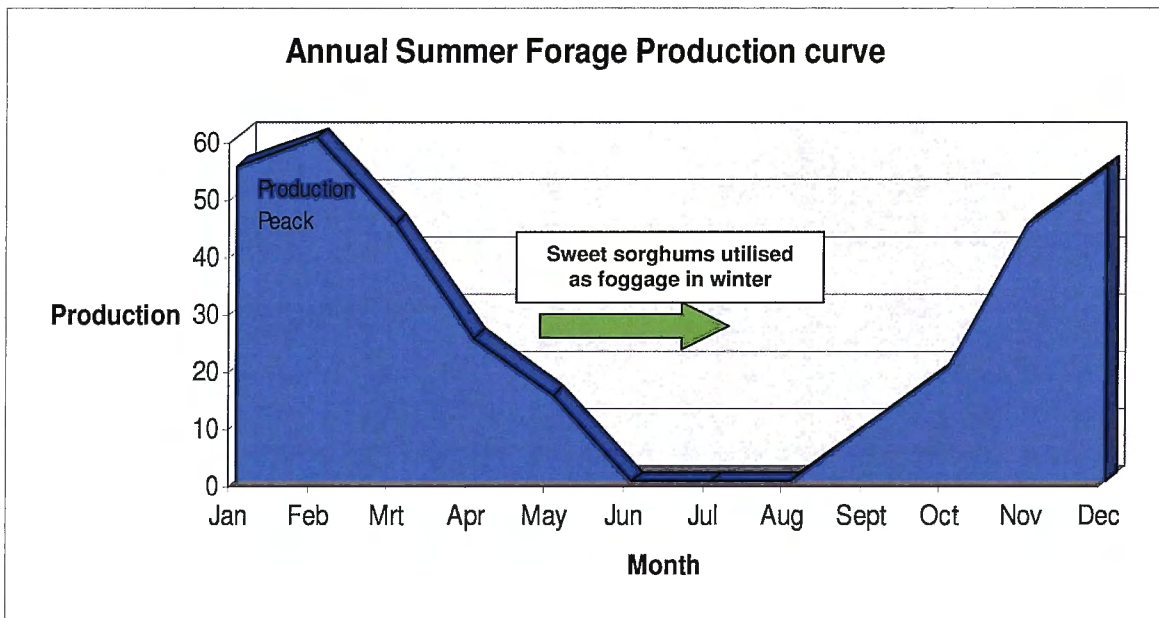


Figure 2.8: Annual summer forage production curve, showing the potential of using sweet sorghums for foggage

Tainton (2000:313) explains that after winter, in the summer rainfall area, the tropical perennial species only start to make a real contribution to the fodder flow from about early November. He further describes that during late summer-autumn the tropical pastures will have matured, resulting in a decline in growth rates and the average quality of material on offer decreases. Supplementing production from perennial pastures with annual forages are also common in the United States, where according to Dorsett and Warrick (2000), annual summer grasses often form part of the total forage programme for many livestock producers in Texas, and are used to provide high-quality forage for grazing in mid-summer when perennial grasses are low in yield and/or quality. Annual summer grasses can, therefore, provide high quality forage at a time when it often cannot be supplied any other way, and for this reason should be part of the total forage programme (Dorsett & Warrick, 2000). Figure 2.9 identifies the critical periods in a fodder flow where annual summer forages can be used to fill gaps, or supplement the production of perennial pastures.

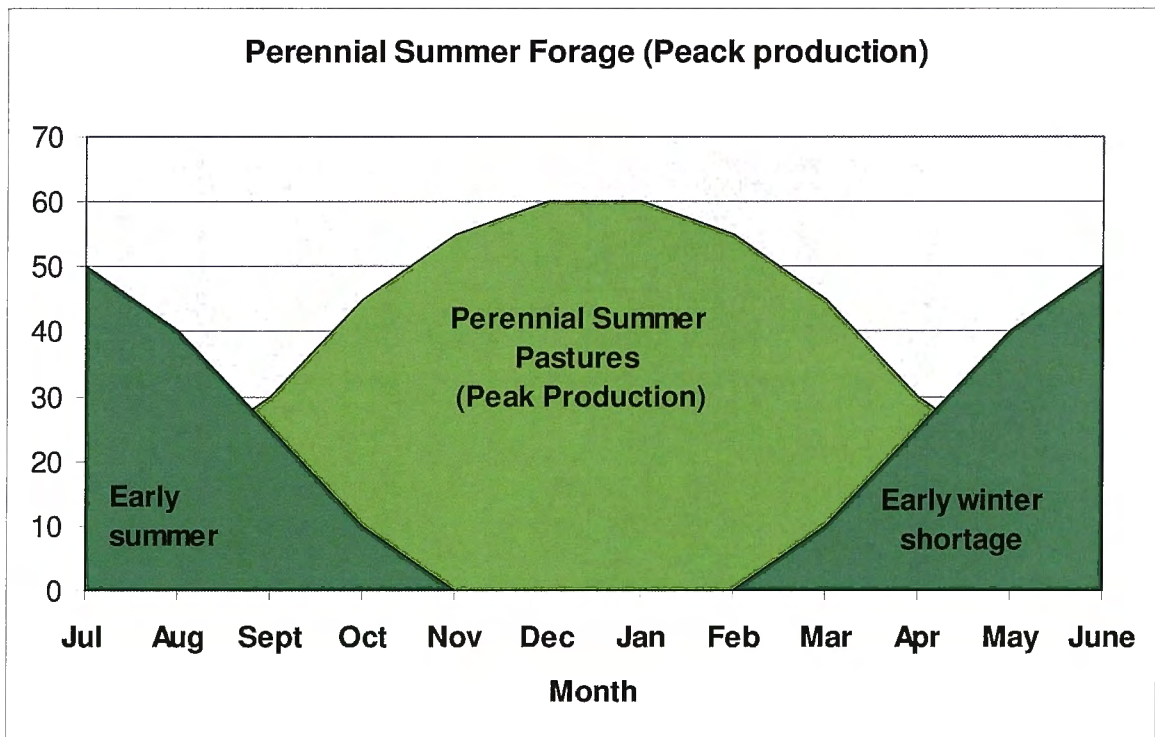


Figure 2.9: Peak production period of perennial tropical pastures, and the early summer/early winter period of shortages

The most difficult periods of the year for livestock in the semi-arid summer rainfall areas are late winter, spring and early summer. During this period crop residues will generally already have been fed to the livestock and land preparation for spring planting will have commenced. In the non-cropping areas forage accumulated during the previous season will often have been fully utilised during winter. Fodder conservation during the growing season is, therefore, of utmost importance to carry over animals from winter to when ample fodder is again available in summer. Tainton (2000) also advised that it is essential that hay be available at all times to buffer the forage system, as the extremely variable summer-growing conditions in South Africa cause pasture growth rates to vary considerable over the season. In the sour veld areas there is often a deficiency of pasture with good quality in the autumn / early winter period, when crop residues are not yet available. The provision of foggage from sown pastures would seem to be the most cost-effective means of bridging this feeding period on most farms, as it eliminates the need for

mechanical harvesting (Tainton, 2000). Tainton further stated that planted pastures are unlikely to be able to support viable livestock production systems on their own in the semi-arid regions because of their relatively high cost and their unreliable seasonal production, but their main value generally lies in their ability to provide forage during strategic periods of the year. There are, therefore, definite periods of time in a feeding programme, where annual subtropical grasses can be used to supply the needed supplemental fodder. Pannar Seed (Pty) Ltd. explains in their Forage sorghum production guide series that forage sorghum is an excellent feed for dairy, beef cattle and sheep in South Africa. In a good season it is possible to obtain one green feed or grazing crop, a hay crop as well as a silage crop. Forage sorghum can therefore meet the requirements of the stock farmer virtually the whole year round, namely as grazing or green feed from mid-December to April, and as hay or silage during the winter months and early spring.

2.5.1 Grazing / cutting

All forage sorghums can be grazed by cattle and sheep, but are not suited for grazing by horses. The best stage to start grazing is when the plants are approximately 60-120 cm high. At this stage the plants have established themselves, are very palatable and have a high nutritive value with a protein content of approximately 18%. Forage sorghum can recover rapidly after grazing, and a 30cm growth per week may be obtained under good conditions. For the best re-growth results, plants should not be grazed shorter than 15-20 cm. This will prevent the depletion of stored carbohydrate reserves needed for growth after defoliation or cutting and the plants will be ready for a second grazing or cutting after three weeks. High quality green chop can be obtained from a well-fertilised forage sorghum crop. Maximum feed quality and re-growth will be obtained by harvesting the crop when 1-1.5 m in height. A variety capable of rapid re-growth should be chosen (Cameron, 2006:3). Stuart (2002:105) highlights the difference between managing quick flowering and late flowering cultivars. Traditional quick flowering hybrids need to be intensively managed to prevent the crop going to head. Once the crop does go to

head, feed quality will decline and a lot of feed will be trampled and wasted. If this does occur, slashing the uneaten stalks (to 20 cm height) will promote better regrowth. This problem does not occur to the same extent with hybrids which have been developed to be later flowering.

Table 2.1: A guideline for choosing the best forage sorghum, for the intended use, from hybrids available in South Africa

Intended use	Type of forage sorghum	Hybrids available in South Africa
Extensive grazing	Ultra late flowering	Jumbo, Hunnigreen
Intensive grazing	Good regrowth potential	Jumbo, Superdan
Silage	High sugar content	Sugargraze, Hunnigreen
Green chop	Very rapid regrowth	Superdan, Jumbo
Hay	Fine stems, late flowering	PAC 8288, sorghum x sudan

Source: Adapted from Cameron (2006:3)

2.5.2 Hay

Palatable hay can be made from forage sorghums. The fine stemmed Sudan grass types make good hay. If sorghum x Sudan hybrids or sweet sorghums is cut for hay, a mower conditioner is essential because of the thicker stems. The optimum cutting time is early flowering, striking a balance between forage quality and the likelihood of rain damage. With good rains and fertilisation several cuts can be achieved throughout the season. Up to 20 t/ha dry matter can be harvested from good stands of the later maturing varieties (Cameron, 2006:3).

Stuart (2002:172) notes the following as important when choosing a forage sorghum hybrid with the primary aim of making hay:

- The potential yield and quality required;
- Rapid dry-down (avoid crops with very thick stems);
- Good crop re-growth if required; and

- Flexibility in time of cutting without rapid quality deterioration. Later flowering varieties give such flexibility.

The choice of crop variety sets a limit on the hay quality that can be achieved, as the hay can only be as good as the forage from which it is produced.

2.5.3 Silage

While all forage sorghums can be cut for silage, sweet sorghums with their high sugar content are best. The big benefit sweet sorghums like Hunnigreen and Sugargraze have over other forages is its very high sugar content. Sweet sorghum has been tested at 35% sugar on a dry matter basis by NSW Department of Agriculture (Stuart, 2002:188). The high sugar content improves digestibility, feed quality and increases palatability. The sugar levels in the plant increase as the plant matures with the highest levels occurring after flowering, during the seed set stage. The slow decline in the digestibility percentage (as would be expected) is reversed and actually improves as the sugar levels rise. As feed energy level is closely linked to digestibility, the feed value remains good, apart from the falling protein level. Forage sorghum should be cut for silage at the early dough stage – i.e. 30-40% moisture. An additional advantage that sweet sorghum holds over the use of maize is, the wide chopping window of some 50 days compared to 10 - 12 days for maize and grain sorghum.

2.5.4 Foggage

Engelbrecht (2002:4) indicates in his study that species to be used for the production of foggage, have to fulfil certain requirements, which include yield, leaf to stem ration and the quality in terms of crude protein (%CP). He further states that the crude protein percentage should be no less than 7% for large farm animals and 6% for small farm animals. Sweet sorghum hybrids are ideally suited for the use of foggage. Due to their rising sugar levels after maturity, sweet sorghum stays

palatable with a high feeding value. The energy content for a sweet sorghum follows a different pattern from most other hybrids. The energy content declines until the crop reaches 2 m, but starts to rise again once flowering starts. Sweet sorghum will therefore, provide adequate energy in the form of foggage and providing some form of protein supplement to stock will improve livestock performance (Stuart, 2002:77).

2.6 SUMMARY

Forage sorghum has become an increasingly important forage crop in South Africa because of its high productivity and ability to utilise water efficiently even under drought conditions. The low risk high output characteristics of Forage sorghum makes it highly suite as alternative crop. The improvement of forage sorghum cultivars over the past few years has focused on higher yield and nutritive quality. The new improved cultivars available can fulfil almost every forage need, and includes products specifically suited for silage, hay, grazing/cutting and foggage. The next chapter is the empirical study. In this chapter data, captured through questionnaires, are discussed and recommendations made.

CHAPTER 3

EMPIRICAL STUDY

3.1 INTRODUCTION

Chapter 3 provides a discussion of the research approach, design and methods used for data gathering. Research is the process which involves the planning, gathering, and analyzing information relevant to a specific decision or problem. The main sources of this information include secondary data sources and primary data collection (Bevan, 2000:56). For the purpose of this study, secondary data and primary data were utilised.

The chosen research approach for this study is exploratory research using questionnaires with quantifiable responses to learn more about the nature of Agricol clients' needs regarding the most important characteristics of the different forage sorghum products available in South Africa. Bevan (2000:61) describes exploratory research as the type of study that is done to learn more about the nature and scope of a specific problem and to investigate the more likely solutions. Often the researcher will have no formal hypothesis and may be interested in studying a new phenomenon. The literature study in Chapter 2 created an introductory study of the subject of forage sorghum, which, will be used in conjunction with the results of the empirical study to compile a marketing plan for Agricol's forage sorghum products. The qualitative research involved the collection of primary data from a large number of individuals with the intention of projecting the results to a wider population. The aim is to generalise about a specific population, based on the results of a representative sample of that population (Martin et al., 1996:125). Secondary or existing data like internal company records, data from the South African National Seed Organisation (SANSOR), and other company data were also used in Chapter 4 to compile the marketing plan.

3.2 RESEARCH METHODOLOGY

3.2.1 Sampling technique

The sampling technique that was used in this study is one of non-probability, namely convenience sampling. Convenience sampling is when respondents are selected on the basis of convenience or availability. The convenience sample is a useful tool in exploratory research projects, in which, ideas and insight are more important than scientific objectivity (Martin et al., 1996:253). All farmers on Agricol's farmer database with e-mail addresses formed part of the sample. In non-probability sampling the probability that a farmer will be chosen is not known. The obvious disadvantage of this technique is that the researcher cannot claim that the sample is representative of the larger population. This greatly limits the researcher's ability to generalise the findings beyond the specific sample studied. The final number of farmers correctly completing and returning the questionnaire was 71. A total of 780 questionnaires were sent out via e-mail. A response rate of 9.1% was calculated.

3.2.2 Questionnaire development

The purpose of the empirical research was to determine what is perceived as the most important qualities annual summer forages should possess, when farmers are deciding on a forage sorghum variety to include in their fodder flow programme. The aim also was to identify popular forage sorghum groups. A questionnaire was constructed to capture the data. The questionnaires were distributed via e-mailing to all listed farmers on Agricol's farmer database.

The following aspects were adhered to in the development of the questionnaire:

- The questionnaire was pre-tested among Agricol employees. The employees' feedback was used to correct mistakes and unclear questions.

- The questionnaire was prepared only in Afrikaans because it was believed that Agricol's farmer database consists mainly of Afrikaans-speaking individuals, or individuals that can understand the language well.

The questionnaire consisted of three sections. Section A was designed to determine the most important characteristic of forage sorghum varieties. Section A consisted of four questions of which the first three questions were closed-ended, and question 4 that was open-ended. Section B was designed to determine the popularity of each product group relative to the total forage sorghum market. Section B consisted of two closed-ended questions. Section C determined the demographic profile of the sample group and consisted of four closed-ended questions.

3.2.3 Data analyses

The results of the questionnaires were captured and analyzed by the statistical consulting service of the North-West University. Descriptive statistics and frequency tables were drawn up and were used to make conclusions. A total sample of 71 questionnaires was received back. The open-ended question 4 of section A was analyzed separately.

3.3 RESULTS AND DISCUSSION

3.3.1 Questionnaire Section A

The results of Section A, question 1 indicates the most important characteristics of forage sorghum products when they are planted for silage. Respondents were asked to consider a list of forage sorghum characteristics and rate them in order of perceived importance. The descriptive statistics in table 3.1 shows the mean values of the respondents to the different characteristics. The average standard deviation from the mean is also shown. In the questionnaire, the following scale was used to rate 8 different characteristics:

- 1 = Not important
- 2 = less important
- 3 = Important
- 4 = Very important
- 5 = Most important

Table 3.1: Descriptive statistics for Section A, Question 1.

Descriptive statistics					
Characteristics important for silage production	N	Minimum	Maximum	Mean	Std. Deviation
High sugar content	71	1	5	3.72	.814
High silage yield	71	1	5	4.34	.774
Long period of cutting	70	1	5	3.46	1.125
High energy content	71	3	5	4.30	.705
High protein and mineral content	70	2	5	3.90	.903
Re-growth after cutting for silage	71	1	5	3.30	1.314
Drought tolerance	71	1	5	3.32	1.118
High palatability	71	3	5	4.00	.676

When the results in table 3.1 are sorted in order of importance, it is evident that the three most important characteristics for silage production is high silage yield, high energy content and high palatability. The two characteristics that proved not to be very important to farmers when deciding on a silage cultivar, is re-growth after cutting for silage, and drought tolerance. Figure 3.1 illustrate these results graphically.

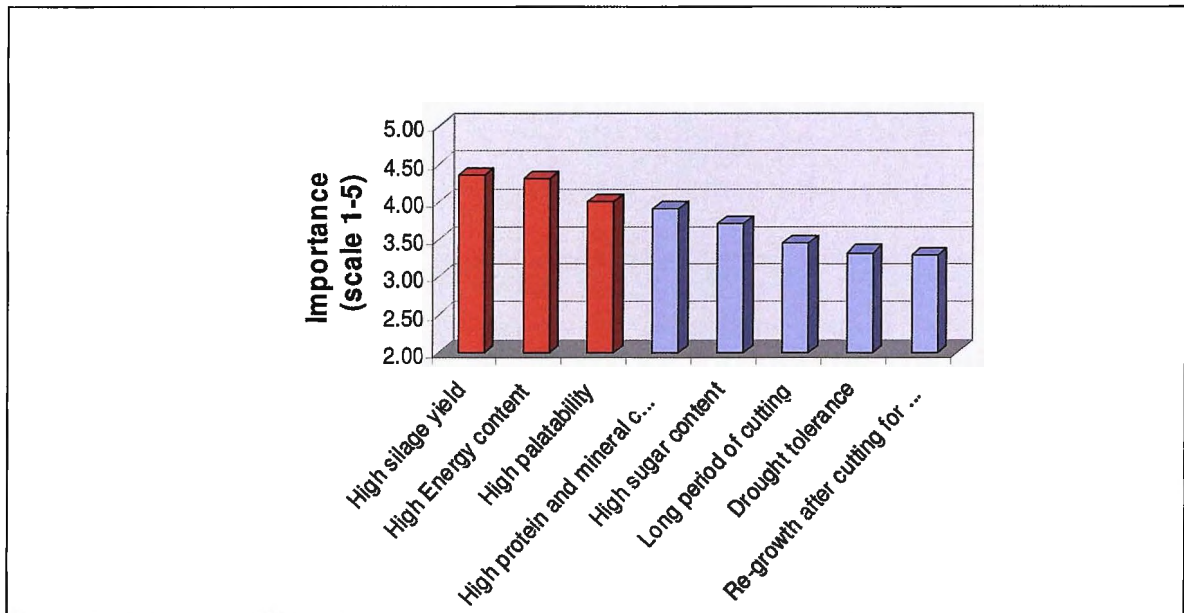


Figure 3.1: Most important forage sorghum characteristics for silage production

Question 2 of section A determined the most important characteristics of a forage sorghum that will be used for grazing. Respondents were asked to consider a list of forage sorghum characteristics and rate them according to their perceived importance. The same scale as in question 1 were used where 1 = not important, and 5 = most important. Table 3.2 shows the descriptive statistics.

Table 3.2: Descriptive statistics for Section A, Question 2

Descriptive statistics					
Important characteristic of forage sorghum when grazed	N	Minimum	Maximum	Mean	Std. Deviation
Frequent grazing/cutting	71	3	5	4.37	.741
Fast re-growth after grazing	71	3	5	4.23	.453
High total yield	70	3	5	4.16	.605
High protein and energy content	71	2	5	4.21	.715
Simplified management	71	1	5	3.56	1.024
Use as foggage in winter	67	1	5	3.36	1.484
Low/no prussic acid danger	71	1	5	3.77	1.149
High sugar content	71	2	5	3.75	.806
Suitability for cattle and sheep	71	2	5	3.75	1.105
Suitability for making hay	71	1	5	2.56	1.180
Valid N (listwise)	65				

The results indicate frequent grazing as the most important characteristic and the suitability for making hay as the least important. In figure 3.2 the results for Question 2 of Section A are sorted according to importance and the three most important characteristics are highlighted in red.

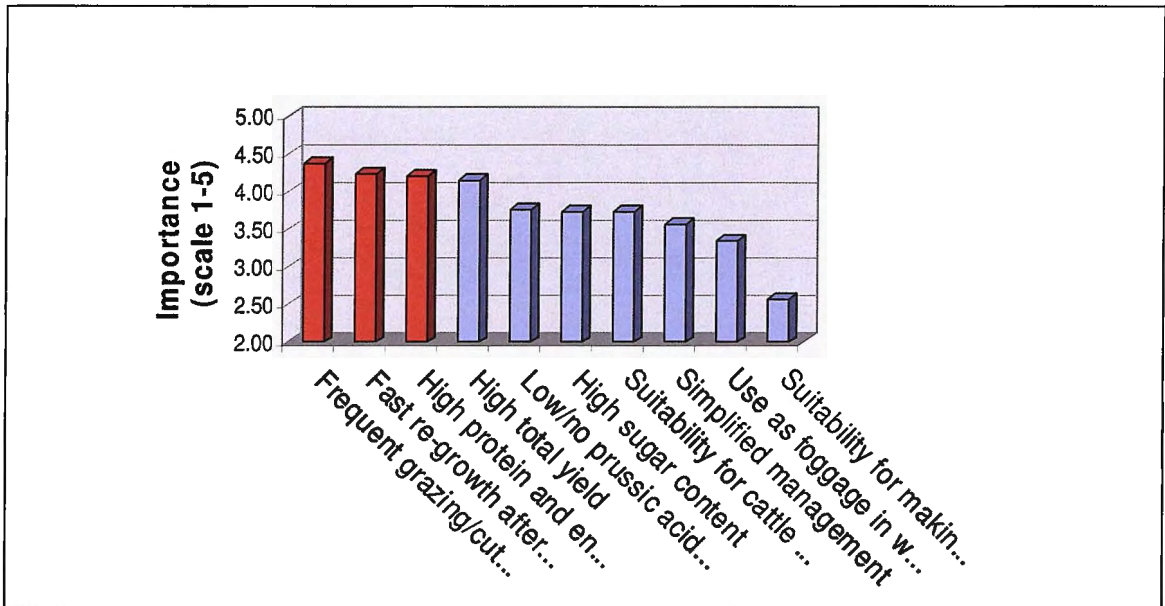


Figure 3.2: Most important forage sorghum characteristics when grazed

A frequency table was drawn for the results of question 3 of section A. The table indicates the percentages of each option selected in the question. Three of the 71 questionnaires had missing values. Respondents were asked to choose one option from 5 possibilities. The choice of the respondents indicated in what manner they utilise forage sorghum in their production system.

Table 3.3: Frequency table for Section A, Question 3

Frequency table		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Silage cultivar	4	5.6	5.9	5.9
	Grazing cultivar	22	31.0	32.4	38.2
	Cultivar that can be used as foggage	9	12.7	13.2	51.5
	Cultivar for making hay		.0	.0	.0
	Combination of above	33	46.5	48.5	100.0
	Total	68	95.8	100.0	
Missing	System	3	4.2		
Total		71	100.0		

A pie-diagram (Figure 3.3) is used to illustrate the percentages of each option in question 3. It shows that 48,5% of the sample group would prefer a forage sorghum cultivar that is a combination of a silage, grazing, foggage or hay cultivar. Only 32,4% of respondents prefer a grazing cultivar, and there were no respondents preferring a cultivar that is specifically suited for making hay alone.

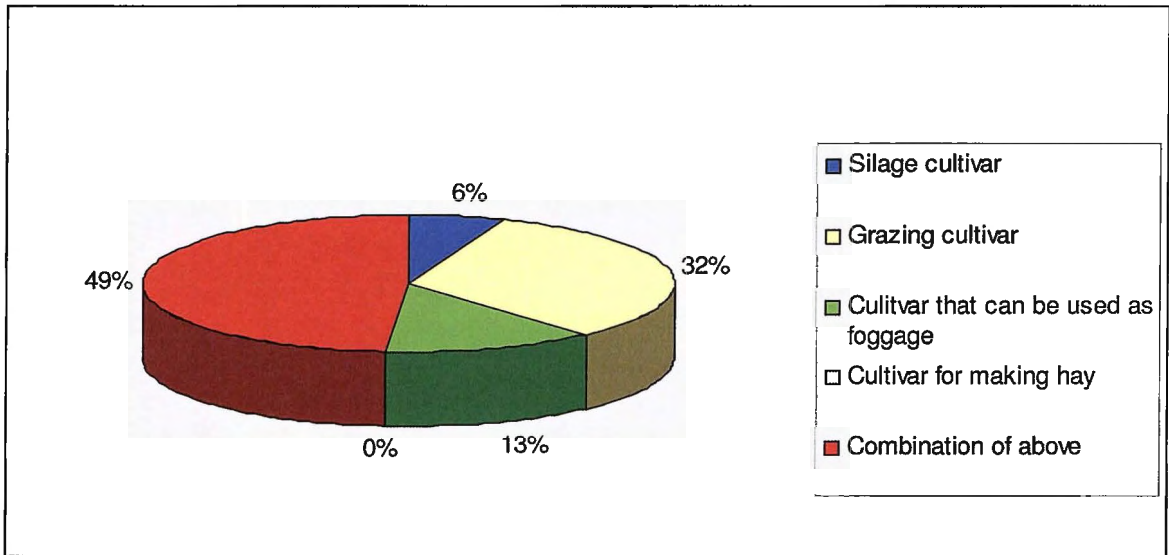


Figure 3.3: An illustration of the frequencies obtained for the different options in Section A, Question 3

Section A, Question 4, which is an open-ended question, gave an indication to the time of year that farmers usually experience a feed shortage. The results have not been analyzed statistically, but it indicated in general that three critical periods stood out, depending on the area and farming practice. The three critical feeding periods are: late summer, winter, and early summer or spring.

3.3.2 Questionnaire Section B

The results for question 1 of section B is summarised in table 3.4. The frequency table signifies the mean percentages of forage sorghum planted for the specific purpose indicated. It shows that 68% of respondents devote less than 25% of their total forage sorghum planting to make silage. Less than 7% of respondents do not plant forage sorghum for the purpose of dry land grazing. A total of 88.4% of respondents plant less than 25% of their forage sorghum plantings under irrigation. The results also show that of all respondents, only 24% do not utilise their forage

sorghum in the form of foggage in winter. This means that 76% of respondents do have some use for a forage sorghum that can be used as foggage.

Table 3.4: Frequency table for the results of Section B, Question 1

Frequency Table: Section B, Question 1					
Percentage forage sorghum planted for silage					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not for silage	24	33.8	33.8	33.8
	Less than 25% for silage	24	33.8	33.8	67.6
	26% to 50% for silage	10	14.1	14.1	81.7
	51% to 75% for silage	9	12.7	12.7	94.4
	More than 75% for silage	4	5.6	5.6	100.0
	Total	71	100.0	100.0	
Percentage forage sorghum planted for dryland grazing					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not for dry land grazing	5	7.0	7.0	7.0
	Less than 25% dry land grazing	12	16.9	16.9	23.9
	26% to 50% dry land grazing	23	32.4	32.4	56.3
	51% to 75% dry land grazing	2	2.8	2.8	59.2
	More than 75% dry land grazing	16	22.5	22.5	81.7
	100% dry land grazing	13	18.3	18.3	100.0
	Total	71	100.0	100.0	
Irrigation-intensive grazing or green chop					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not for irrigation	35	49.3	50.7	50.7
	Less than 25% irrigation	26	36.6	37.7	88.4
	26% to 50% irrigation	2	2.8	2.9	91.3
	More than 75% irrigation	1	1.4	1.4	92.8
	100% irrigation	5	7.0	7.2	100.0
	Total	69	97.2	100.0	
Missing	System	2	2.8		
Total		71	100.0		

Grazing in summer and foggage in winter					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not for foggage	16	22.5	23.9	23.9
	Less than 25% for foggage	21	29.6	31.3	55.2
	26% to 50% for foggage	15	21.1	22.4	77.6
	51% to 75% for foggage	7	9.9	10.4	88.1
	100% for foggage	8	11.3	11.9	100.0
	Total	67	94.4	100.0	
Missing	System	4	5.6		
Total		71	100.0		

The results for question 2 of section B indicates that the most commonly planted forage sorghums is firstly conventional forage sorghum varieties like Sentop or Superdan, and secondly, sweet sorghum hybrids like Sugargraze and Hunnigreen. Babala-type forages like Nutrifeed, Babala and Milkstar is the third largest group of forages according to the sample group, and comprises almost 14% of their total forage sorghum plantings. The other forage groups, Late flowering forage sorghum, Brown-Midrib hybrids and Sudan grass hybrids comprises only 4.7%, 2.7% and 1.7% respectively of the total forage sorghum plantings of the sample group.

Table 3.5: Descriptive statistics for the results of Section B, Question 2

Descriptive statistics					
Forage group	N	Minimum	Maximum	Mean	Std. Deviation
Conventional forage sorghum	66	0	100	39.24	36.24
Sweet sorghum hybrids	66	0	100	37.50	33.70
Brown-Midrib hybrids	66	0	10	2.65	4.20
Late flowering forage sorghum	66	0	80	4.73	15.21
Babala type <i>Pennisetum glaucum</i>	66	0	100	13.70	21.09
Sudangrass hybrids	66	0	75	1.73	9.74
Valid N (listwise)	66				

Table 3.6: Age classification of the sample group

		Age			
Age of respondent		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Younger than 25	1	1.4	1.4	1.4
	25 - 34	11	15.5	15.5	16.9
	35 - 44	22	31.0	31.0	47.9
	45 - 54	18	25.4	25.4	73.2
	55 - 64	12	16.9	16.9	90.1
	65 - 74	3	4.2	4.2	94.4
	Above 74	4	5.6	5.6	100.0
	Total	71	100.0	100.0	

In table 3.7 the results of question 2, which indicate the amount of male or female respondents, are shown. Only one female respondent were among the sample group. Table 3.8 indicates that most respondents (84%) are Afrikaans speaking, and only 5,7% English speaking. A total of 8,6% of the sample group speaks both English and Afrikaans.

Table 3.7: Gender of sample group

		Gender			
Gender of respondent		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	69	97.2	98.6	98.6
	Female	1	1.4	1.4	100.0
	Total	70	98.6	100.0	
Missing	System	1	1.4		
Total		71	100.0		

Table 3.8: Language of sample group

Language					
Language		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	English	4	5.6	5.7	5.7
	Afrikaans	59	83.1	84.3	90.0
	Both English and Afrikaans	6	8.5	8.6	98.6
	Other	1	1.4	1.4	100.0
	Total	70	98.6	100.0	
Missing	System	1	1.4		
Total		71	100.0		

Question 4 of Section C indicated that the sample group has been farming for an average of 20 years, which is high. The average total hectares cultivated annually are 286 ha. The average hectares for irrigation, veld grazing and planted pastures are 29 ha, 330 ha, and 89 ha respectively.

Table 3.9: Descriptive statistics for Section C, Question 4

Descriptive statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Years farming?	71	2	54	20.18	12.804
Ha cultivated/year?	71	40	1500	286.07	292.019
Ha under irrigation?	61		160	29.26	42.940
Ha veld grazing?	71	12	2400	330.24	461.760
Ha planted pastures?	71		1000	89.13	142.096
Valid N (listwise)	61				

3.4 SUMMARY

The results obtained proved to be very helpful in forming a strategy for the marketing plan in chapter 4. It gave a good indication of what farmers expect when they purchase forage sorghum seed. High silage yield and quality is the most important factor when farmers chose a forage sorghum for silage. When choosing a forage sorghum for grazing, the ability to be grazed repeatedly showed to be the most important consideration. It can also be concluded that most respondents need a cultivar that are versatile and can be used for silage, grazing and foggage. The three most popular forage sorghum groups according to the study are conventional forage sorghum, sweet sorghum and babala-type *Pennisetum*'s. Chapter 4 consists of a marketing plan for Agricol's forage sorghum products. Insight gained from the literature study in chapter 2 and the results of chapter 3 are incorporated and used in the strategies and predictions made in the marketing plan.

CHAPTER 4

MARKETING PLAN: AGRICOL FORAGE SORGHUM

4.1 SITUATION ANALYSIS

Agricol offers a wide range of seed products, catering for the farmer's every need. Agricol's product range includes sunflower, maize, pastures crops, and turf grasses. Two hybrid forage sorghum cultivars are currently being marketed. These cultivars are suited to produce high quality forage across South Africa in the dry land summer rainfall areas, as well as in the Eastern and Western Cape areas. A new sweet sorghum cultivar, Hunnigreen, is also now available and has the added advantage of being suited to be used as winter forage with excellent silage qualities. Previously, it was difficult for Agricol to penetrate the hybrid forage sorghum market effectively due to its competitor K₂Agri, being the only suppliers of sweet sorghum cultivars until recently. K₂Agri have gained a considerable market share and are now renowned for their high quality forage sorghum hybrids. To target this market segment management decided to include two new Australian sweet forage sorghum cultivars, with similar characteristics than the competitor's, in their research and development screening trial. These cultivars were tested and evaluated thoroughly. The better of the two new cultivars, Hunnigreen, proved to be an excellent candidate to penetrate the sweet forage sorghum niche and management decided to include it into Agricol's product range. Agricol can now directly compete for market share of the sweet sorghum niche, and will also attract a renewed interest in the current available forage sorghum products. The two main competitors in the forage sorghum market are K₂Agri and Pannar. To date, only K₂Agri has successfully released a Sweet sorghum hybrid. Agricol will, therefore, be the first to effectively attack the monopoly that K₂Agri has created. This will be done through a variety of media including the Internet, catalogue distribution, farmers' day promotions and the more effective use of sales agents. The strategy will be to

make Agricol's forage sorghum product information readily available to those seeking quality cultivars.

4.1.1 Market summary

Agricol's existing conventional forage sorghum, Superdan, is marketed in the summer rainfall areas of South Africa including certain parts of the Eastern and Western Cape. The new sweet sorghum hybrids will be marketed in the same existing market. It will be offered as a specialist forage product to all livestock farmers. A distinction will be made between the two products, Hunnigreen and Superdan, on the grounds of the specific intended use of the product. The growth of the sweet sorghum market will depend on how quickly farmers realise the benefits that the new hybrid (Hunnigreen) offers and its superiority over the current market leader (Sugargraze, a K₂Agri product).

Limited information on the market size of forage sorghums is available. The South African National Seed Organisation, SANSOR, currently compile figures of the total forage sorghum market. The total annual forage sorghum market is expressed as the total mass seed sold each season in South Africa. No distinction is being made between the different groups of forage sorghums available. The market is fairly constant in size, but varies according to environmental conditions and to a large extent to commodity prices. The market fluctuated between 2 500 t and 3 500 t the past five years. Agricol's predictions are based on the total annual forage sorghum market for the 2007/2008 season, which is 2 757 mt seed. This total market includes all forage sorghum products. Figure 4.1 illustrates the potential of each province as a percentage of this total forage sorghum market. These percentages were derived from the forage sorghum sales data of Agricol forage sorghum products, over the past 3 years. Agricol has established a relatively good market share over the past 3 years with its conventional forage sorghum products. In 2008 Agricol holds a 25.8% market share of the total forage sorghum market excluding the potential market of sweet sorghum products.

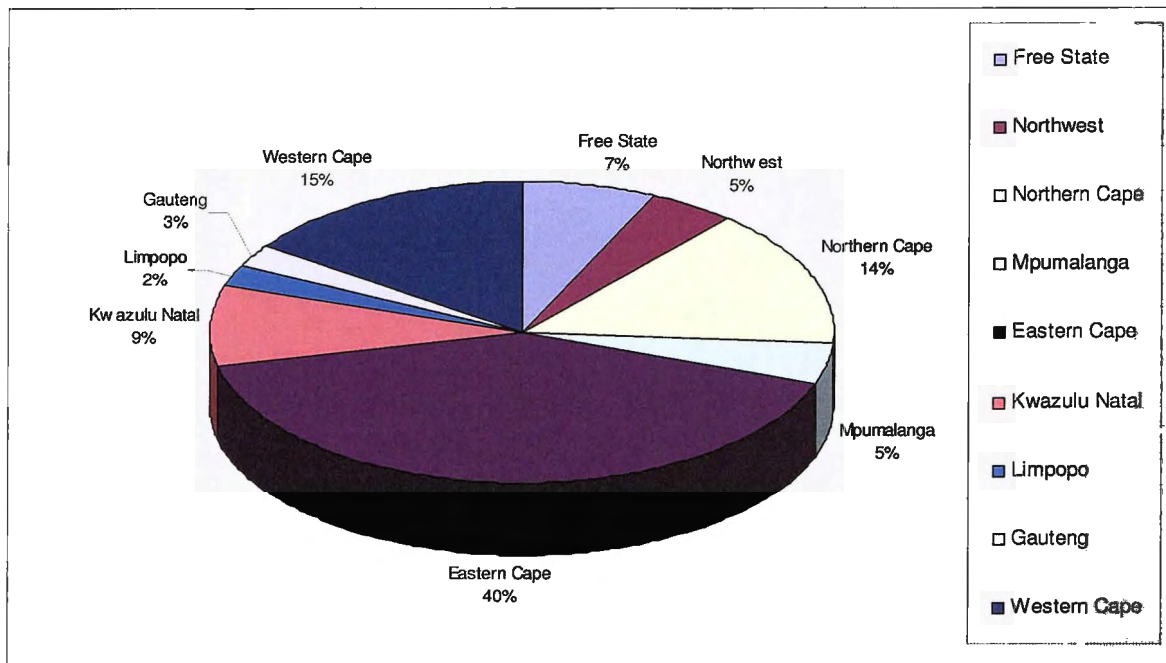


Figure 4.1: Provincial forage sorghum market potential, as a percentage of the total forage sorghum market

The sweet sorghum market targeted is predicted to be 575 mt. The sweet sorghum market is expected to make up 20.8% of the total forage sorghum market. This new market is not yet well-known, and a lot of estimations will have to be made. Existing seed distribution channels will be used, with an intensified focus on promotional activities through the media, farmers' days, Agricol's website and electronic marketing.

To make reliable sales forecasts in terms of sweet forage sorghum sales, the potential sales distribution per province in South Africa has to be determined. The provincial potential distribution for forage sorghum in figure 4.1, could not be used directly due to some variation between the products and their application in each region. A new distribution, specifically for sweet sorghum was prepared by taking the following into consideration:

- Size of the area;
- Rainfall (summer/winter) and climate;
- Farming practices in area;
- Demand for sweet sorghum in area; and
- Predictions by area sales managers.

With no historical data available, this distribution is only an estimate that will be adapted each year as more information becomes available. Figure 4.2 illustrates the potential of each province as a percentage of the total sweet forage sorghum market.

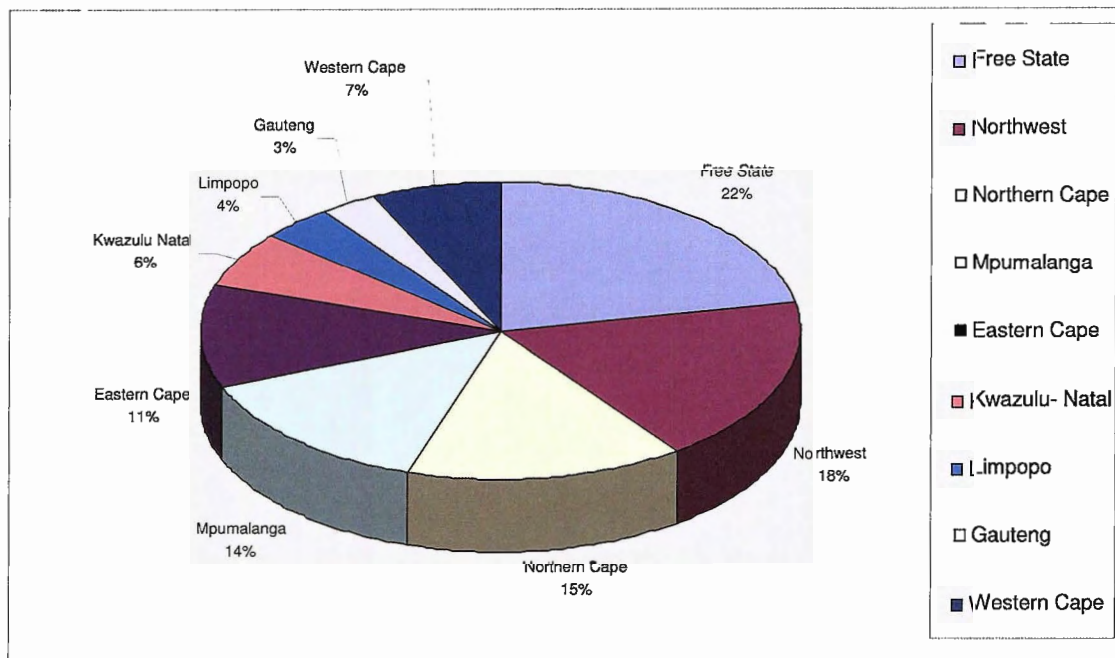


Figure 4.2: Provincial sweet sorghum market potential, as a percentage of the total estimated sweet forage sorghum market

4.1.2 Market demographics

Agricol should focus their marketing on three types of customers:

➤ **Farmers requiring a cheap source of quality forage**

This will include farmers not as interested in quality forage, but more in quantity. This will probably be mostly extensive animal production practices. Input costs are important to this group of farmers.

➤ **Technological advanced farmers looking for high quality, high producing products**

This includes semi-intensive to intensive animal production systems. Farmers who need high quality high producing crops to fulfil a specific need in their fodder flow programmes. High quality forage for high producing animals (e.g. Milk production) will fall in this category. This will typically include the more successful farmer, eager to test and implement new ideas.

➤ **Farmers requiring a product to be used as foggage and silage**

Marketing of the sweet sorghum will be focussed on this group. This group includes a wide range of farmers. Intensive and extensive production systems fall in this category. They need a product that is versatile, and can be used for grazing, cutting, silage and foggage.

4.1.3 Market needs

Results of the empirical study indicated the following characteristics of forage sorghum to be most important:

- High feeding quality;
- High yielding;
- Strong re-growth;
- Late flowering;
- Palatability;

- Safe to animals; and
- Suitable for foggage and silage.

The empirical study also indicated that the two most important characteristics when making silage is total yield and quality. Frequent grazing and re-growth potential are the most important characteristics when forage sorghum is grazed. Sheep farmers also indicated the need for forage better suited for sheep production. Forage with no prussic acid risk can be grazed when it is only 50cm tall.

4.1.4 Market trends

The predictions for the coming season are very optimistic for all forage crops. Meat prices have risen sharply over the past few months. High grain prices also force the farmers to look again at alternative energy sources, which might have a positive effect on forage sorghum seed sales. Another factor, to also keep in mind is the current interest to manufacture ethanol from sweet sorghum. A lot of research is currently being done, and the Agricultural Research Council (Potchefstroom) included Agricol's cultivars in their trials for 2008.

4.1.5 Market growth

The market for forage sorghum seed is represented as tonnes of seed sold each year, and not clients (farmers). According to statistics from SANSOR, the seed sales of forage sorghum are fairly constant over the past years, with slight variations due to environmental conditions (static market). Market growth in size (total forage sorghum seed sold) is, therefore not as relevant as growth by taking away market share from competitors. Agricol's target for growth must, therefore, be to take away market share from their competitors and become the major shareholder for forage sorghum sales over the next five years. The market for sweet sorghum within the total forage sorghum market, however, is expected to grow according to the

estimated percentages in Table 4.1. The growth rates will be influenced by how effective the new product, Hunnigreen, will be promoted in the market.

Table 4.1: Estimated sweet sorghum market growth

Sweet sorghum market:						
5year growth estimate			Percentage growth rate			
Province	Market Potential (kg seed)	As per 08/09 budget	50%	40%	30%	25%
			growth	growth	growth	growth
			2009/2010	2010/2011	2011/2012	2012/2013
Free State	126500	17,500 (13.8%)	26,250 (21%)	36,750 (29%)	47,775 (38%)	59,719 (47%)
Mpumalanga	80500	8,500 (11%)	12,750 (16%)	17,850 (22%)	23,205 (29%)	29,006 (36%)
Northwest	103500	9,800 (9%)	14,700 (14%)	20,580 (20%)	26,754 (26%)	33,443 (32%)
Northern Cape	86250	20,000 (23%)	30,000 (35%)	42,000 (49%)	54,600 (63%)	68,250 (79%)
Kwazulu-Natal	34500	2,000 (6%)	3,000 (9%)	4,200 (12%)	5,460 (16%)	6,825 (20%)
Eastern Cape	63250	5,000 (8%)	7,500 (12%)	10,500 (17%)	13,650 (22%)	17,063 (27%)
Limpopo	23000	1,000 (4%)	1,500 (7%)	2,100 (9%)	2,730 (12%)	3,413 (15%)
Gauteng	17250	1,200 (7%)	1,800 (10%)	2,520 (15%)	3,276 (19%)	4,095 (24%)
Western Cape	40250	15,000 (37%)	22,500 (56%)	31,500 (78%)	40,950 (102%)	51,188 (127%)
Total	575,000	80,000 (14%)	120,000 (21%)	168,000 (29%)	218,400 (38%)	273,000 (47%)

4.2 SWOT ANALYSIS

Agricol is on the brink of major opportunity. They have the strength of combined expertise in technologically advanced products, and the opportunity of being the first to break the monopoly in the current sweet sorghum market.

4.2.1 Strengths

- Well-tested, high yielding, quality cultivars;
- Good access to sources of new material;
- Excellent technological back-up and support structures; and
- Good sales network.

4.2.2 Weaknesses

- Small market share;
- Some sales agents also sell competitors' products; and
- Low customer loyalty.

4.2.3 Opportunities

- First company to attack K₂Agri's monopoly with sweet sorghum hybrids in South Africa;
- The potential of ethanol production from sweet sorghum;
- To target Sugargraze customers to test Hunnigreen;
- To also stimulate sales of conventional hybrids by promoting the new hybrids; and
- To gain market share quickly through the new products.

4.2.4 Threats

- The high dependence on environmental conditions;
- Strong counter action by competitors;
- Resistance from customers to new products; and
- High costs of importing seed from Australia.

4.3 COMPETITION

The three main competitors in the forage sorghum market are Agricol, Pannar and K₂Agri. Through research and development done by Agricol each year, all new forage sorghum hybrids are compared and tested. It appears that Agricol's new sweet sorghum hybrid, Hunnigreen, out-yields the products of the other role-players by a small fraction. Hunnigreen also have an added advantage of being an ultra-late flowering hybrid compared to K₂Agri's Sugargraze that is late flowering. This makes managing the crop less intensive, and could mean higher yields if planted early. K₂Agri's Sugargraze has high brand awareness, and is well-known in the market. They successfully created the perception that their cultivars are the best in the market, by the distribution of favourable trial results and success stories from commercial producers, but mainly because Sugargraze was the only true sweet sorghum hybrid available in South Africa to date. K₂Agri does not have a good sales network, and it will not be difficult for Agricol to convince the Sugargraze clients to test the new product Hunnigreen. Pannar is Agricol's second largest competitor. They do not currently offer a superior product, but have the edge of being a large role-player in the maize market. Pannar generates a lot of sales through their maize seed customers. They also have aggressive marketing and promotional activities, and are visible and accessible to the customer. Pannar has many representatives in the field, and is very visible and accessible to the client. They are also a large role-player amongst the agricultural cooperatives. Pannar has not yet released a true sweet sorghum hybrid like Hunnigreen and Sugargraze.

Agricol will, therefore, be the first to attack K₂Agri's monopoly in the sweet sorghum niche market.

The combination of the new sweet sorghum hybrid and the current well-performing conventional sorghum hybrids will enable Agricol to increase market share through their new marketing strategy.

4.4 PRODUCT OFFERING

Agricol currently offers a high quality, high yielding conventional forage sorghum cultivar. Superdan is a sorghum x Sudan grass type. Superdan has good disease tolerances and good adaptability to different environmental conditions. Seed are sold in 25 kg bags at R150.00/25 kg. The new sweet sorghum hybrid, Hunnigreen, will exhibit the following characteristics and advantages:

- The same high quality, adaptability and stability of Agricol's conventional forage sorghum hybrid Superdan;
- Excellent silage characteristics;
- Produce the best foggage available;
- Hunnigreen is an ultra-late flowering hybrid, which will only go to seed when day length shortens to 12 hours and 20 minutes; and
- Hunnigreen will be sold in 25 kg bags at R585.00/25 kg.

4.5 KEYS TO SUCCESS

Agricol's success has historically been in providing the farmer the widest range of products in South Africa. Their guaranteed high quality products show stability over a wide range of environmental conditions. Along these lines of proven success, Agricol will implement strict quality measures in their evaluation programme, and in the production phase.

- Uncompromising commitment to the quality of the product: establishment, performance, purity;

- Successful niche marketing: Agricol needs to find the right customers, and they need to make sure that customers can find them; and
- Reliable seed growers – for the production of high quality, well-managed seed.

4.6 CRITICAL ISSUES

The critical issues for Agricol would in the first instance be the:

- Training of sales agents to supply correct information to clients;
- Effectively promote the new sweet sorghum hybrid so that clients will realise the products management advantages;
- Ensure good coverage of the market, and improve visibility; and
- Attacking the Sugargraze clients aggressively.

4.7 MARKETING STRATEGY

In line with Agricol's mission statement, they will aim to maintain their position as countrywide leader in forage crops. Their main focus for the marketing strategy will be to create awareness in the market of the new sweet sorghum hybrid available, and how it will simplify fodder flow planning and forage management practices. Agricol will aim to grow their current market share, by targeting the niche market interested in a more versatile forage crop like sweet forage sorghum. This means a five-year sales target of at least 273 mt of sweet sorghum seed is set.

4.7.1 Mission

Agricol's mission is based of the following three pillars:

- To maintain its position as countrywide leader in the supply of seed for forage crops and to be perceived as such by customers, agricultural institutions and the entire seed industry;

- To become, and become known as, the company with the widest variety of seed on the continent; and
- As a market-driven organisation, it aims through service excellence, value-added products and pro-active research, to achieve consistent customer satisfaction.

4.7.2 Marketing objectives

- Create awareness of the new sweet sorghum product;
- Prove the quality and superiority of the product through promotional activities;
- Effectively targeting the niche market; and
- Achieving the five-year sales target and grow current market share.

4.7.3 Financial objectives

- To successfully enter the sweet forage sorghum market, by establishing a 14% market share in the first season. To grow seed sales of Hunnigreen to 273 000 kg (R 10,046,400) after five years. Also maintaining their current Superdan market share, and increase the sales of Superdan steadily at 6% annually;
- To decrease our sales and marketing expenses as a percent of sales: from 15.49% (2009) to 15.21% (2013); and
- To increase contribution margin from 19.50% to 20.94% over five years.

4.7.4 Target markets positioning

The conventional forage sorghum products cater for the needs of farmers utilising forage sorghum as annual summer forage for grazing, silage or making hay. Thereby, they are forming an important part of their fodder flow planning in summer. Agricol's niche market for sweet sorghum, however, will focus on those clients who place more emphasis on quality, quantity, simplified management, and also

utilisation of the crop as foggage in winter – specifically, farmers looking for high quality silage or forage; for example, milk producers. This market will also include intensive to semi-intensive farming systems where more production and a longer utilisation period for grazing and cutting are required. Extensive production systems where wastage often occur due to too much fodder at certain periods of time will also benefit by using sweet sorghum, that can be left for winter grazing. This is not to say that the rest of the forage sorghum market will not be interested in the new sweet sorghum product, but that Agricol will firstly target situations where a definite need for the new hybrid exists.

4.7.5 Strategies

Agricol's strategy will be to become the major market shareholders for annual forage sorghum seed in South Africa over the next five years. The short-term target will be to successfully enter the sweet sorghum niche market by gaining a 14% market share after the first season. Three tactics will be employed to achieve the strategic objectives.

The first tactic will be to ensure that all involved in the sales network has had proper product training, and are confident in the technical information of the product. To achieve the first tactic the following programmes will be implemented:

- The compilation of a complete technical product guide and production manual for the new sweet sorghum hybrid and current conventional hybrid, to be used in training. This information should also be available on the website;
- Product training workshops presented at every distribution point, and to every sales agent; and
- The distribution and discussion of trial results and forage quality analyses, to enable agents to actively promote the hybrids and to back up their claims with facts.

The second tactic will be to take the products and information to the clients (farmers) through the following programmes:

- Internet - updating of website information, with more emphasis on the availability of technical information and promotional articles;
- Farmers' days at trial/demonstration sites in each region, where the benefits of the new hybrid will be highlighted, and trial results explained to the farmers; and
- Promotional material and technical articles will be sent to farmers through the use of Agricol's farmer database. Regular articles written by agronomists should be published in the major agricultural magazines.

The third tactic will be to make sure that the sales network completely covers the market, and to ensure visibility and accessibility of the new product in the field.

- Appoint new agents if necessary to ensure good coverage of the total target area. Identify weak/passive agents and motivate them or in extreme cases it might be necessary to replace them;
- Ensure on time delivery; and
- Establish demonstration sites next to tar roads in as many areas as possible, where promotional material like banners and permanent display boards attract attention-creating brand awareness.

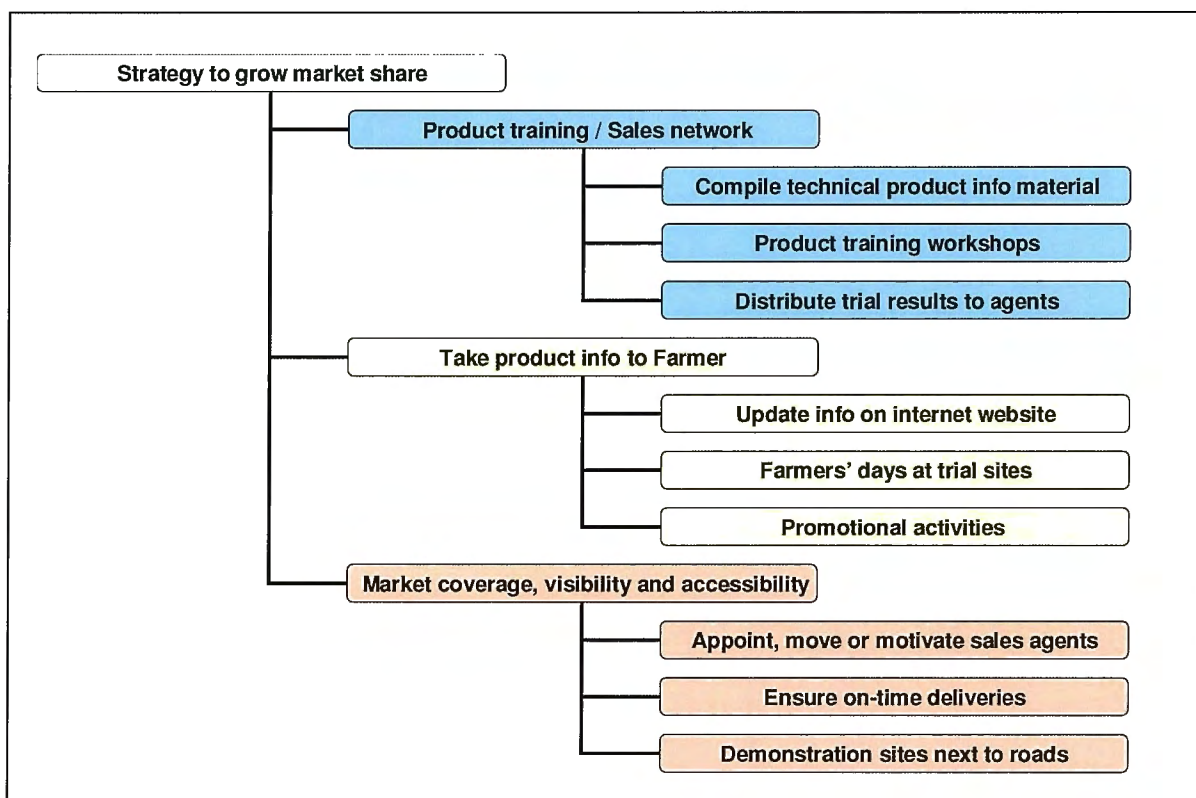


Figure 4.3: Strategic tactics needed to achieve the set target growth

4.7.6 Marketing mix

Product – Agricol will continue to market its current conventional forage sorghum hybrid, Superdan. The new addition to the forage sorghum product range is a sweet sorghum hybrid, Hunnigreen. Hunnigreen will be the first product in South Africa to compete with Sugargraze, a K₂Agri seed product, for sweet sorghum market share.

Place – The current sales network including agents, dealers, and co-operatives will be better equipped with technological information and backup to sell the product. A

better market coverage will also be achieved by adding/moving agents where necessary.

Price – Superdan is the cheaper forage sorghum product that sells at a competitive price of R150/25 kg. Hunnigreen will be sold for R 585/25 kg, and is fairly priced in comparison to its competitor, Sugargraze, that sells for R580/25 kg.

Promotion – With the aid of Agricol’s website, direct e-mailing through Agricol’s farmers’ database, and bigger emphasis on farmers’ days in each region, promotion of forage sorghums will be much more effective than in the past.

4.7.7 Marketing research

The reaction of farmers to the new hybrid compared to Sugargraze will be assessed, to determine if any resistance to the new products exists in the market. This will be done by getting feedback from the sales team, and farmers. No additional formal market research will be needed for the time being.

4.8 WEB-PLAN SUMMARY

The Agricol website will be the virtual business card and portfolio for the company. It will contain all details for clients to get in touch with their nearest seed agent, or crop specialist.

The site showcases the products, with all technical detail available in downloadable format. This information will be available in the resources area, offering articles, research and newsletters to interested parties.

4.8.1 Website marketing strategy

Agricol's internet marketing activities will be focused on product information distribution and direct e-mailing of customers. Through the use of Agricol's farmer database it is possible to send promotional information to farmers at virtually no cost by e-mailing them directly. This tool, in addition to the website, will be used extensively to distribute information to clients. Agricol has a nationwide system of dealers/agents who provide sales and service for its products. They have no desire to sell directly to customers, but rather, will use their website to direct customers to the dealer/agent nearest to them.

4.8.2 Development requirements

Agricol's existing website, www.agricol.co.za will be used and updated to focus on the supply of technical information on all products. The website is currently up and running, but additional information on forage sorghum needs to be added. The technical information on the website will be easy accessible and downloadable. The website will contain the contact details of all sales agents, to easily put a potential client in contact with the sales agent closest to him.

4.9 FINANCIALS

4.9.1 Sales forecast

Limited stock of Hunnigreen is available for the 2008/09 season. The forecast shows, however, a steep increase in sales (50%) for 2009/2010. The growth rate should decrease slightly thereafter, as it becomes more difficult to gain market share. A growth rate in sales of 40%, 30% en 20% will be expected for seasons 2010/2011, 2011/2012 and 2012/2013 respectively. The sales of conventional forage sorghum should increase steadily with 6% annually. The following table indicates the expected sales figures for the next five years (Table 4.2).

Table 4.2 : Five-year sales forecast for forage sorghum

Sales forecast					
Sales	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
Hunnigreen	R 1,872,000	R 3,144,000	R 4,939,200	R 7,185,360	R 10,046,400
Superdan	R 3,762,000	R 4,466,246	R 5,304,862	R 6,295,246	R 7,472,449
Total sales	R 5,634,000	R 7,610,246	R 10,244,062	R 13,480,606	R 17,518,849
Direct cost of sales					
Direct cost of sales	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
Hunnigreen	R 1,154,464	R 1,939,200	R 3,040,800	R 4,427,842	R 6,199,066
Superdan	R 2,508,000	R 2,977,498	R 3,533,757	R 4,196,831	R 4,986,910
Subtotal direct cost of sales	R 3,662,464	R 4,916,698	R 6,574,557	R 8,624,673	R 11,185,976

4.9.2 Expense forecast

Although it is difficult to allocate expenses to specific products rather than groups, variable expenses attributed to the sales of forage sorghums are forecasted in table 4.3. The commission payable will stay constant at 15%.

Table 4.3: Five-year expense forecast for forage sorghum

Expense forecast					
Marketing expense budget	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
Advertising	R 17,800	R 19,580	R 21,538	R 23,692	R 26,061
Web	R 10,000	R 10,000	R 10,000	R 10,000	R 10,000
Commissions	R 845,100	R 1,141,537	R 1,536,609	R 2,022,091	R 2,627,827
Total sales and marketing expense	R 872,900	R 1,171,117	R 1,568,147	R 2,055,783	R 2,663,888
Percent of sales	15.49%	15.39%	15.31%	15.25%	15.21%
Contribution margin	R 1,098,636	R 1,522,431	R 2,101,358	R 2,800,150	R 3,668,985
Contribution margin/sales	19.50%	20.01%	20.51%	20.77%	20.94%

4.10 CONTROLS

There needs to be a control mechanism to track the development of the project, and the results. The overall responsibility lies with the area sales managers (as discussed under marketing organisation), who all reports to the General Manager. Riaan Roselt will coordinate the programme and will ensure that all programmes are carried out correctly according to plan, and in time. The implementation plan that follows discusses each department's responsibility.

4.10.1 Implementation

The budget for implementation indicates some low values. Product training for instance, will be done on all Agricol's products. Only a small percentage of the total training costs are therefore allocated to forage sorghum.

Table 4.4: Implementation programme of the forage sorghum marketing strategy

Milestone	Start Date	End Date	Budget	Manager	Department
Development of production manual	2008/01/05	2008/01/07	R 800	R Roselt	Marketing
Product training to sales network	2008/01/04	2008/01/10	R 1,700	Sales managers	Marketing
Distribution of trial results	15/9/2007	15/10/2007	R 0	A Wessels	R&D
Internet website information update	2007/01/07	2007/01/09	R 0	J Kellerman	Marketing
Farmers' days at trial sites (area:North)	2009/15/01	2009/15/02	R 1,000	Sales managers	Marketing
Farmers' days at trial sites (area:South)	2008/01/01	2008/01/03	R 1,000	Sales managers	Marketing
Publication of promotion/technical articles	2008/01/08	2009/01/02	R 9,600	L Wille	Head office
Restructuring of sales network	2008/01/02	2008/01/03	R 0	Sales managers	Marketing
On-time delivery of produced products	2008/01/09	ongoing	R 0	Sales managers	Marketing
Demonstration sites next to roads	2009/01/01	2009/01/06	R 2,400	Sales managers	R&D/Marketing
Totals			R 16,500		

4.10.2 Marketing organisation

The regional General Managers are responsible for overall business management. They will be responsible for the on-time ordering and import of Hunnigreen from Australia. The production department will be responsible for the local production of the required quantities of Superdan seed. Agricol's Research Manager oversees all

product research and development activities and will make sure that new improved products are available. Management of the sales team is done by the Regional Sales Managers, who will make sure that the sales team is equipped with all the necessary aids to sell seed. Agricol's team of crop specialists are responsible for all technical support to the sales team, and handling of enquiries and complaints. The coordination of the forage sorghum project will be done by Riaan Roselt, who will ensure that the set targets are achieved in due time and will report back to the Managing Director on the progress made.

4.10.3 Contingency planning

It is expected that a small degree of resistance, due to a lack of information, will exist towards the new sweet sorghum hybrid. Many farmers will not yet understand or realise the benefits or versatility of sweet sorghum hybrids. It is also expected that it would be difficult at first to convince Sugargraze enthusiasts that Hunnigreen is an equal quality product with additional benefits. The contingency plan will, therefore be to highlight these benefits and quality characteristics to the public. It may happen that the competition also gets access to sweet sorghum hybrids, or release new competitive products. It is therefore very important to have an effective research and development programme to constantly search for improved hybrids and technology. The actions of competitors will be closely monitored.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter outlines the conclusions and recommendations relating to the findings of Chapter 3, the literature study in Chapter 2 and the marketing plan in Chapter 4. Conclusions are made based on the data analysis that forms part of the research results, and knowledge gained through the literature study. The recommendations offered is a result of the conclusions drawn in the research. This chapter aims to specifically address the primary and secondary objectives set for the study in Chapter 1. The primary objective of this dissertation was to investigate the different annual summer forage products available and their different qualities and applications, to finally compile a marketing plan for Agricol's forage sorghum products in South Africa. The secondary objectives were to analyze the forage sorghum market in South Africa, and to identify possible shortcomings to Agricol's current product range. Recommending additional research needed to improve the marketing of Agricol's forage sorghum products also forms part of the secondary objectives.

5.2 CONCLUSIONS

The different forage sorghum groups were studied in detail in Chapter 2. The qualities and different applications of each group were identified and used in the compilation of the questionnaire in Chapter 3. The literature study also identified the potential uses for forage sorghum in South Africa, and specifically pointed out the advantages of sweet forage sorghum hybrids. The empirical study explored the factors of importance to the farmer when purchasing a forage sorghum product. The

study indicated which factors were important, and which were of less importance to the customer. The popularity of each forage sorghum group, according to the study sample, was also determined by the questionnaire. Chapter 4 was compiled by using all available market information and insight gained from Chapter 2 and 3. The marketing plan outlined the marketing strategy for Agricol's forage sorghum products.

In general, the following conclusions can therefore be made:

Conclusion 1:

Sweet forage sorghum is the most versatile forage sorghum product. This product can be used for grazing, cutting, silage or foggage. The popularity of sweet sorghum was also highlighted in the results of the questionnaire. Hunnigreen is definitely an excellent product, and its use will appeal to many farmers who plant annual forage sorghum.

Conclusion 2:

The most important characteristic of forage sorghum when used for silage is yield and quality. Hunnigreen has a higher silage yield potential than maize. It also makes silage of similar feeding quality, compared to maize. Hunnigreen should, therefore, be the forage sorghum recommended for silage.

Conclusion 3:

The empirical study showed that the most important characteristic of forage sorghum when used for grazing is its ability to be grazed repeatedly with rapid re-growth. The literature study indicated that the re-growth ability of conventional forage sorghum like Superdan is better than that of sweet forage sorghums. Agricol therefore currently have excellent hybrids to recommend for grazing conditions.

Conclusion 4:

Agricol's forage sorghum product range can be enhanced by including a *Pennisetum Glaucum* hybrid to better serve the needs of sheep farmers. The possibility for prussic acid poisoning from forage sorghum always frightens farmers when they have sheep. *Pennisetum glaucum* do not contain prussic acid, and can be grazed earlier with no risk of poisoning.

5.3 RECOMMENDATIONS

The following recommendations can be offered to the conclusions made above:

Recommendation 1:

Agricol is fortunate to have such a great performing sweet sorghum hybrid. Hunnigreen has to be offered to farmers as a competitive product to the well-known Sugargraze. The fact that Hunnigreen comes into flower later than Sugargraze does, has to be highlighted in marketing promotions. By targeting Sugargraze customers, farmers should be convinced to test Hunnigreen for themselves.

Recommendation 2:

Farmers making silage from maize should be targeted to plant Hunnigreen. These farmers should be informed about the advantages of using sweet forage sorghum to make silage. As much as possible information on making silage from sweet sorghum should be distributed to the farmers.

Recommendation 3:

Hunnigreen and Superdan are two excellent products to be used for grazing. In a grazing system where the crop will also be used as foggage, Hunnigreen should be recommended. When the only requirement from the crop is to be grazed, Superdan is a great alternative and should be recommended as such. Hunnigreen should however be offered as the more versatile product that is suited for intensive and extensive systems.

Recommendation 4:

Agricol needs to get a Hybrid Babala product for testing in South Africa. It needs to be performing better than the current Babala available. This product should cater for the needs of sheep and horse farmers, and any other high producing animal. The product should be prussic acid free, and suitable to be grazed from a height of 50cm.

5.4 FUTURE RESEARCH

The most important factor is to keep searching for better and improved technology. The needs of the South African forage sorghum market have been identified. The empirical study might be repeated after three years, to see if any of the identified needs have changed. Agricol will need to ensure that they stay on the forefront of new improved hybrids, as the competition for market share is great. The emphasis for the future will also be on getting more refined information for the market differentiation between the different forage sorghum products in South Africa.

5.5 SUMMARY

The knowledge gained from the literature and empirical study gave the author an excellent platform from which to compile an effective marketing plan for Agricol's forage sorghum products. The important characteristics for each group were studied, and the applications in different situations were compared. The results of the questionnaires portray the needs of farmers when they purchase their annual forage sorghum. In the marketing plan this information was used to find the best strategy to grow Agricol's forage sorghum sales optimally. A strategy and target were set that will be followed for the next five years.

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APPENDIX A: QUESTIONNAIRE

AGRICOL

**VOLTOOI ASB DIE VOLGENDE VRAE DEUR DIE BELANGRIKHEID VAN
SEKERE EIENSKAPPE VAN EENJARIGE VOERSORGHUM KULTIVARS
AAN TE DUI.**

Gebruik die volgende skaal: 1 = Nie belangrik

5 = Redelik belangrik

6 = Belangrik

7 = Baie belangrik

8 = Mees belangrikste

Voorbeeld:

1	'n hoë voedingswaarde	1	2	3	4	5
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Afdeling A. Watter kultivar eienskappe is belangrik tydens die keuse van 'n eenjarige voersorghum?

1. Kuilvoer – Indien u voersorghum plant met die doel om kuilvoer te maak, watter eienskap beskou u as die belangrikste?



(a)	Hoë suiker-inhoud	1	2	3	4	5
(b)	Hoë kuilvoer opbrengs	1	2	3	4	5
(c)	Lang snyperiode	1	2	3	4	5
(d)	Hoë energiewaarde	1	2	3	4	5
(e)	Hoë proteien- en mineraal inhoud	1	2	3	4	5
(f)	Hergroei na gesny vir kuilvoer	1	2	3	4	5

(g)	Droogteverdraagsaamheid	1	2	3	4	5
(h)	Hoë smaaklikheid	1	2	3	4	5

2. **Beweiding** – Wanneer voersorghum geplant word met beweiding as doel, watter eienskap beskou u as die belangrikste?



(a). Herhaalde benutting (3 tot 4 maal per seisoen)	1	2	3	4	5
(b). Vinnige hergroei na benutting	1	2	3	4	5
(c). Hoë totale opbrengspotensiaal	1	2	3	4	5
(d). Hoë protein- en energie-inhoud	1	2	3	4	5
(e). Maklike bestuur (lang vegetatiewe periode)	1	2	3	4	5
(f). Gebruik as staande hooi in winter	1	2	3	4	5
(g). Lae of geen blousuur gevaar	1	2	3	4	5
(h). Hoë suiker-inhoud	1	2	3	4	5
(i). Geskiktheid vir beeste en skape	1	2	3	4	5
(j). Geskiktheid vir hooi maak	1	2	3	4	5

3. Verkies u 'n voersorghum kultivar wat by uitstek 'n:
(merk met 'n kruisie slegs 1 keuse, in die toepaslike blokkie)

Voorbeeld:

(a). Besproeiings kultivars is.	X
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(a). Kuilvoer kultivar is.	
(b). Beweidingskultivar is.	
(c). Kultivar is wat ook in die winter as staande hooi benut kan word.	
(d). Geskik is vir hooimaak.	
(e). Kombinasie van bogenoemde.	

4. Gedurende watter maande van die jaar ervaar u gewoonlik voertekorte in u voervloei-beplanning? (Antwoord met kort sin.)

Afdeling B: Wat is die markverdeling tussen die verskillende tipes eenjarige voersorghum kultivars?

1. Wanneer u eenjarige voersorghum kultivars plant, watter persentasie van u totale voersorghum aanplantingsoppervlakte word gebruik vir die volgende doel?:

(merk met 'n kruisie slegs 1 keuse, in die toepaslike blokkie)

(a) Kuilvoer

Plant nie vir kuilvoer	
Minder as 25%	
Tussen 26% tot 50%	
Tussen 51% tot 75%	
Meer as 75%	
Plant slegs vir kuilvoer	

(b) Droëland beweiding

Plant nie vir droëland beweiding	
Minder as 25%	
Tussen 26% tot 50%	
Tussen 51% tot 75%	
Meer as 75%	
Plant slegs vir droëland beweiding	

(c) Besproeiing – Intensiewe beweidings van “green chop”

Plant nie onder besproeiing	
Minder as 25%	
Tussen 26% tot 50%	
Tussen 51% tot 75%	
Meer as 75%	
Plant slegs onder besproeiing	

(d). Beweidings in somer, en benut as staande hooi in winter

Plant nie vir bogenoemde doel	
Minder as 25%	
Tussen 26% tot 50%	
Tussen 51% tot 75%	
Meer as 75%	
100% vir bogenoemde doel	

2. Watter persentasie van die volgende groepe voersorghums plant u
huidiglik?

(Verskaf persentasies langs elke opsie wat u plant.)

(a) Konvensionele voersorghum (bv. Superdan, Sentop)

(b) Soetsorghum (bv. Sugargraze, Hunnigreen)

(c) "Brown-Midrib" -basters (bv. K₂Agri BMR)

(d) Laat-blom voersorghum (bv. Jumbo)

(e) Babala-tipe Pennisetums (bv. Nutrifeed, Babala, Milkstar)

(f) Suiwer Sudangrass baster (bv. Pac 8288)

Afdeling C. Biografiese Inligting

Voltooi die volgende vrae of merk die toepaslike blokkie met 'n "X".

1. Ouderdom: In watter ouderdomsgroep val u?

Onder 25	25-34	35-44	45-54	55-64	65-74	Bo 74
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2. Geslag:

Manlik	Vroulik
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3. Huistaal:

Engels	Afrikaans	Beide Afrikaans en Engels	Ander
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4. Boerdery inligting

Hoeveel jaar boer u al?	
Hoeveel hektaar bewerk u jaarliks in totaal?	
Indien enige, hoeveel hektaar is onder besproeiing?	
Hoeveel hektaar veldweiding het u?	
Hoeveel hektaar aangeplante weiding het u?	

BAIE DANKIE VIR U TYD!