GRAIN SA

SORGHUM TRUST TRIALS

REPORT OF GRAIN SA
1 OCTOBER 2004 – 30 SEPTEMBER 2005

30 September 05

INTRODUCTION.

It had come to the attention of the Sorghum Trust that in many areas where sorghum is grown, farmers were still planting the open pollinated varieties which have been planted for more than 100 years. These varieties have a very low yield and the grain does not comply with the minimum standards for malt and milling.

The intention of this project was to have trial plots in areas where sorghum is produced where the farmers could view modern farming methods relating to sorghum production, as well as the improved yields made possible by the new cultivars and varieties.

It was envisaged that if the farmers were exposed to the improved farming techniques as well as modern cultivars that this would eventually lead to improved food security and better utilisation of available land. This project would not attempt to prove any significant increase in household food security or improved land utilisation and was aimed only at exposing the farmers to the modern practices.

Furthermore, the project was to expose small holder and emergent farmers to new and improved sorghum cultivars and varieties which comply with the minimum standards regarding malting and milling standards.

Field trials were to be planted in four different areas – in Mpumalanga, Limpopo , North West and the Free State. The trials would include at least 7 cultivars that meet the requirements of malt and milling, as well as a control where two of the old open pollinated varieties would be planted. The trials would be managed according to modern farming practices which include proper soil preparation, fertilization, suitable plant populations as well as weed and pest control.

Farmers' Days were to be arranged for various groups of interested farmers during the growing season as well as near harvest so that the farmers could be given lectures on the modern farming techniques as well as see the differences in yield of the various old and new cultivars and varieties.

As a result of seasonal constraints, it was not possible to plant 4 trials. Three trials were planted:

1. KwaMhlangu in Mpumalanga – north of Bronkhorstspruit
2. GaMotlatla in North West - North West of Ventersdorp
3. Sekhukhune in Limpopo – North East of Grobblersdal / Nebo

Gamotlatla (North West).

The trial has been planted on Gamotlatla , which is communal land in the North West Province. Mr Reuben Makhutle is one of the farmers at GaMotlatla and he was responsible for maintaining the trial. He was assisted by Mr Hannes Smit who visits the trial regularly to give advice and support. When the trial was to be planted, the farmers were using their equipment to plant sunflowers, and they did not have the correct planter plates for sorghum. Mr Cois Harman, the manager of the GSA Farmer Development Programme at the time was kind enough to take his planter to the site so that the trial could be planted.

The GaMotlatla area is what was previously called a "tribal trust" and there are approximately 4000 people who live on the farm (they have access to a total of 4000

ha). There is considerable arable land that is not being used on the farm because the people do not have access to inputs, tractors and implements. Those who have land without the means to work it can allow others to use the land – there are no rental agreements because it is tribal land so it all works with a “gentleman’s agreement”. At this stage the farmers plant sunflowers and maize and very little sorghum is planted – that which is planted is really only for own use.

No soil samples were taken before planting because it was too late in the season to await the results of the sampling.

Soil preparation.

Plough	1 December 04
Seedbed preparation	9 December 04
Plant with fertilizer as below	14 December 04
Weed control	14 December 04
Insect control	14 December 04
First cultivation	18 February 05
Top dressing	21 January 05
Spray for lice and stem borer	18 February 05

Area.

4 X 90 cm rows X 200m per cultivar.
7 cultivars with 3 repeats

Fertilization.

Planted with	120 kg 3:2:1 + Zinc per ha
Top dressing	70 kg LAN per ha

The last repeat of the trial is without fertilizer so as to show the emergent farmers the benefit of fertilization.

Weed control

The seed was treated with Consep to prevent damage to the sorghum by the grass killer.
Tuff-enuff was sprayed the day after planting.

Insect control.

Decis was used to control cutworm, bollworm and stalk borer.
Metasystox will be used for the lice and stalk borer.

Seed.

The seed is treated with Gaucho before planting.
Varieties as follows:
PAN 8446
PAN 8564
PAN 8625
PAN 8816
PAN 8806
PAN 8609
DC 75

The trial looked good although unfortunately there was one planter row that did not plant correctly. There were some broad leafed weeds but these were being controlled mechanically. There were some strips where the herbicide did not work well (not good over- lap) and although this is not ideal, it was good for the farmers to see the effect of the herbicide, and the importance of ensuring correct spraying.

The trial at GaMotlatla

Poor germination in one row due to the planter error.

Leaf showing lice in the leaf

Below is a table of the yields (estimated) that were realized on the trial. It is to be understood that the purpose of the trial was not really to compare the various cultivars but rather to show the farmers what can be achieved by using modern farming methods and using hybrid seed.

Variety	Ist repeat kg harvested	2nd repeat kg harvested	Average kg harvested	Yield t/ha	Without fertilizer
PAN 8446	13.6	16	14.8	**2.96**	10.2
PAN 8625	12.5	13.6	13.05	**2.6**	10.8
PAN 8806	14.8	9.4	12.1	**2.4**	5.8
PAN 8609	11.5	11.5	11.5	**2.3**	12.8
DC 75	9.7	6.8	8.25	**1.65**	7.2
PAN 8816	6.9	8	7.45	**1.49**	13.8
PAN 8564	6.7	4.9	5.8	**1.16**	3.8

Four farmers days were held during the production season. Only one of the farmers days involved the hiring of transport for the visitors (on this occasion, both the Premier of North West as well as the MEC for Agriculture were present). The other days were attended by the local farmers and extension officers and the expenses for the catering etc were kept to a minimum.

At this stage, it is difficult to encourage the farmers in this region to consider planting sorghum as a viable option as they were able to produce a very good crop of sunflowers (over 1.2 t/ha) for which they had contracts @ R1860 / ton. It need probably not be mentioned that the profitability of crop farming is not conducive to sustainable commercial production and it is therefore also important that we position the developing farmers so that they have the knowledge and skills to be able to grow all the major crops. This will then enable them to take advantage of any marketing opportunities that may present themselves from time to time.

This area is plagued by birds and pigeons that do a considerable amount of damage to the ripe crops (both sunflower and sorghum). If, in the future, the farmers are able to produce sorghum for the production of ethanol, they could plant the bitter sorghum so as to minimise bird damage.

Kwamhlangu (Mpumalanga).
The trial was planted on a farm owned by Mr Chris Mhlangu North East of Grobblersdal (KwaMhlanga). No soil samples were taken before planting because it was too late in the season to await the results of the sampling.

Soil preparation.

Disc	15 November 04
Plough	1 December 04
Seedbed preparation	14 December 04
Plant with fertilizer as below	15 December 04
Weed control	16 December 04
Insect control	16 December 04
First cultivation	6 January 05
Top dressing	21 January 05
Second cultivation	24 January 05
Spray for lice and stem borer	17 February 05

Area.
4 X 90 cm rows X 200m per cultivar.
7 cultivars with 3 repeats

Fertilization.
Planted with 120 kg 3:2:1 + Zinc per ha
Top dressing 70 kg LAN per ha
The last repeat of the trial is without fertilizer so as to show the emergent farmers the benefit of fertilization.

Weed control
The seed was treated with Consep to prevent damage to the sorghum by the grass killer.
Tuff-enuff was sprayed the day after planting.

Insect control.
Decis was used to control cutworm, bollworm and stalk borer.
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PAN 8564
PAN 8625
PAN 8816
PAN 8806
PAN 8609
DC 75

There was much rain during the season and some of the areas were badly affected by water logging.

The trial at KwaMhlangu.

The table below indicates the yields that were achieved in this trial – it is interesting to note that if was different varieties that did well in this area (different from those that did well in Gamotlatla). During the growing season there were some very wet spells and there was some drowning out of the crop.

Variety	**Ist repeat**	**2nd repeat**	**Average**	**Without fertilizer**
PAN 8816	3.7	2	**2.85**	0.87
PAN 8625	1.4	3.1	**2.25**	0.675
PAN 8564	1.4	2.9	**2.15**	0.55
PAN 8806	1.1	2.9	**2**	0.87
DC 75	2.3	1.5	**1.9**	0.78
PAN 8609	2.1	1.6	**1.85**	0.585
PAN 8446	1.3	1.9	**1.6**	0.27

Sekhukhune (Limpopo).

The trial was planted on communal land in the Sekhukhuneland. The people in this area are very poor and basic food security is also a problem. There is a significant amount of sorghum planted in this area for food security and most , if not all, is open pollinated. The expected yields are low. There is a lot of interest from the farmers as well as the extension officers in this trial.

This trial was managed by Grain South Africa with the assistance of Dr Pieter Cronje of LIMPAST who is active in the area. Dr Cronje was assisted by Mr Paul Mailule who is an extension officer of the department of Agriculture.

Three very good farmers days were held at this site (photos attached) and there is a significant amount of interest in growing sorghum in the area. This area is comparatively dry and so the farmers need to be encouraged to grow sorghum rather than maize due to its improved drought resistance. The table below shows the yields that were approximately 1 ton /ha lower than the yields in the other two trials.

Claasen enjoying the product!

The tent was erected for one of the farmers days.

Mr

Farmers interested in the root development. at a farmers day.

A large pot of sorghum porridge

Variety	**Ist repeat**	**2nd repeat**	**Average**	**Without fertilizer**
M105 OPV	1.8	1.6	**1.7**	0.495
PAN 8564	1.8	1.5	**1.65**	1
PAN 8446	1.5	1.7	**1.6**	0.715
PAN 8625	1.9	1	**1.45**	0.33
PAN 8609	1.3	1.6	**1.45**	0.935
PAN 8806	1.1	1.7	**1.4**	0.88
PAN 8816	1.2	1.5	**1.35**	0.814
DC 75	1.2	0.935	**1.07**	0.44
M65 OPV	0.77	0.5	**0.635**	0.77

Proposed improvements for the next season.

- Identify suitable sites for the trials where the farmers can really consider growing sorghum instead of maize, and where sorghum can be included in a crop rotation with sunflowers.
- The trials should be planned for the drier areas where the drought resistance of the sorghum can be demonstrated.
- The trials should demonstrate the effect of fertilizer (compared with none) and weed control (compared with none).
- The trails should include maize and sunflowers so that the farmers can see how other crops compare under the same conditions.
- The farmers days should be planned to be as follows:
  1. One at planting so that the farmers can actually be present with the calibration of the planter etc
  2. One day during the growing season where the farmers can be shown the pest and weed control
  3. One at harvesting time so that the farmers can see the yield.

- There should be more trials planted nearer where the people are so that they are able to monitor the progress of the crop throughout the season.
- There should be a sorghum training manual developed which is at the correct level for the farmers.
- In the areas where the trials are planted, the farmers should attend an Introductory Sorghum Production Course where they can learn about all aspects of sorghum production from soil and climate, through cultivation, plant nutrient requirements, plant morphology, planting of the crop, pest and weed control, management and bookkeeping as well as marketing.
- Similar, although slightly more advanced courses should be offered to the extension officers who service these production areas so that they are in a position to assist the farmers who are growing the sorghum.

Conclusion.

Grain SA would like to express sincere appreciation for the support from the Sorghum Trust. The development of farmers is not a process that can be hurried as it involves the transfer of knowledge and the development of skills. We believe that we have benefited both the farmers and the objectives of the broader Sorghum industry with the current project and we look forward to continued, positive co-operation with the Trust in future.