

River of Life Westgate PVO

2009/10 Research and Development Annual Report

**River of Life Westgate
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1. Introduction

This report presents the River of Life Westgate agriculture research findings from the 2009/10 season. River of Life currently carries out research at two locations; Westgate and Ebenezer College in Kezi, near Bulawayo. Westgate is the main and longest running station and favourable rainfall meant that the station's research continued well in the 2009/10 season. Unfortunately, the Ebenezer College station received no rain for nearly two months at the beginning of 2010; therefore there was complete crop failure.

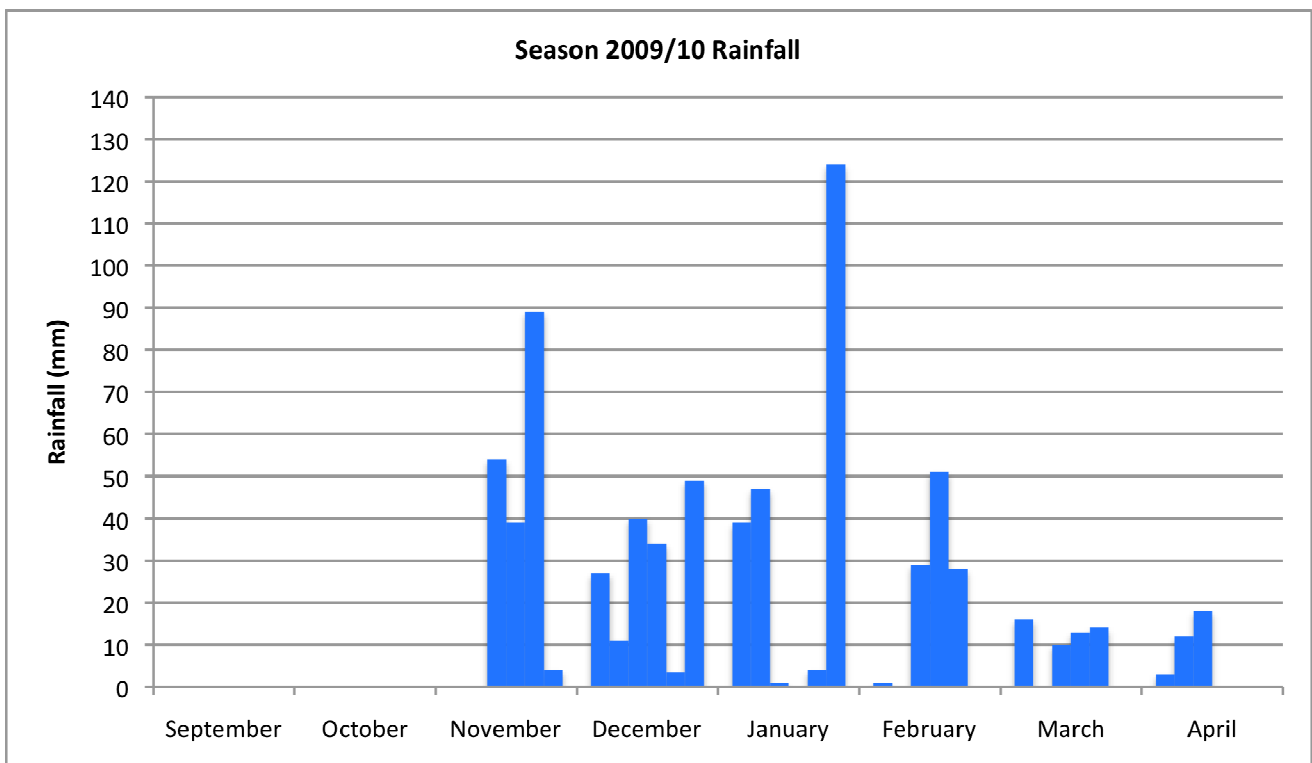
2. Westgate

The River of Life Westgate research centre is located on the Northwest outskirts of Harare. Agriculture has been carried out at this station since 2004 and is also a training centre for Conservation Agriculture, taught under the name of Foundations for Farming. The aim is to train trainers of trainers through a grassroots programme. Due to the great demand for training the apprenticeship course is much shorter than at Ebenezer. It is completed by accompanying experienced trainers in the field and then beginning to train after six months of induction. The grassroots apprentices are taught to train in the theory and most importantly the implementation of the very simple yet very effective technology of FfF. Followed by the equally effective and simple management system. Our main emphasis is on the character and heart attitude of the trainers and students.

Before River of Life Westgate owned the site it was a private plot growing various crops and grazing cattle. The soil is sandy loam with clay levels around 30%. When research first started at Westgate pH levels were low but they are now between 5.2 and 5.5. The site altitude is 1 459 m.

Rainfall

Total rainfall over the growing season was 804 mm. The chart below shows the rainfall grouped in 5-day periods.



2.2 Trial Reports

Alternative Fertility

Objective: To test the yield results for different levels of applied inorganic fertilizer and manure for maize and soya.

Description

In 2009 / 2010, a replicated fertility trial was established in what used to be the Model Farmer plot, in an attempt to get away from demonstrations with insufficient or no replication. There was maize and soya trial.

The abbreviations represent the following:

D - Compound D

(7%N; 14% P₂O₅; 7% K₂O)

AN - Ammonium Nitrate (34.5% N)

Co - Compost

VC - Vermi-compost

CT – Cumfrey Tea

CS – Chicken Soup

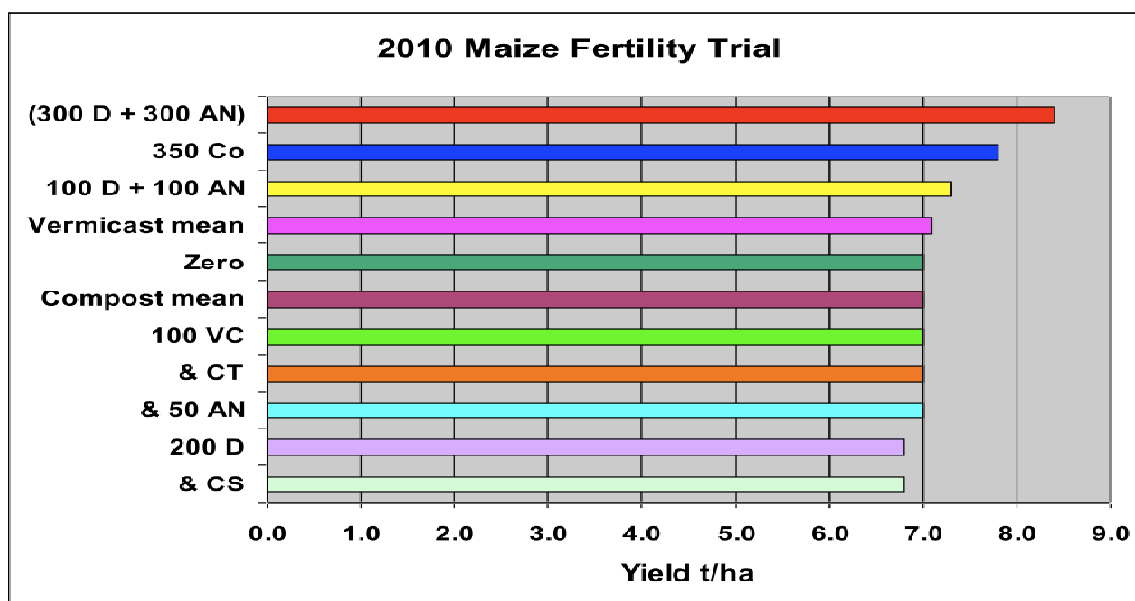
Measurements:

AN & D = kg/ha

350 Co = 350 ml/station

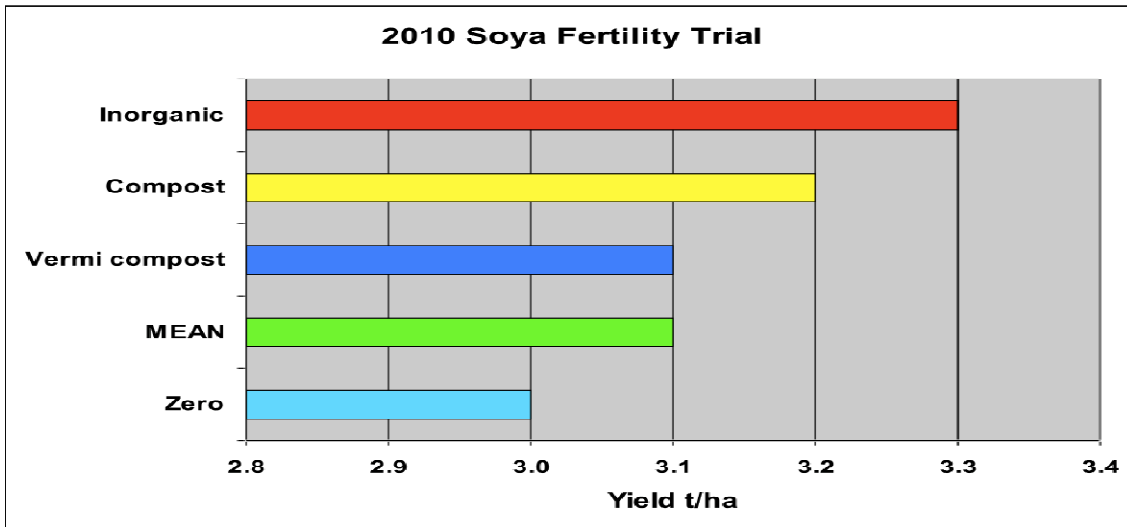
100 VC = 100 ml/station

2010 Results – Maize



A zero fertilizer treatment was used and this had a high yield of 7.0 t/ha due to the tight maize / soya rotation. There was no difference between the organic basal treatments and the zero treatment. The 300 kg/ha Compound D + 300 kg/ha AN did have a higher yield than the zero (8.3 t/ha), but not by much. Comfrey tea and Chicken soup were used as top-dressings, but neither was any better than the zero treatment.

2010 Results – Soya



There were no significant differences between the soya treatments, which were grouped and presented in the figure above.

2.3 Observational Reports

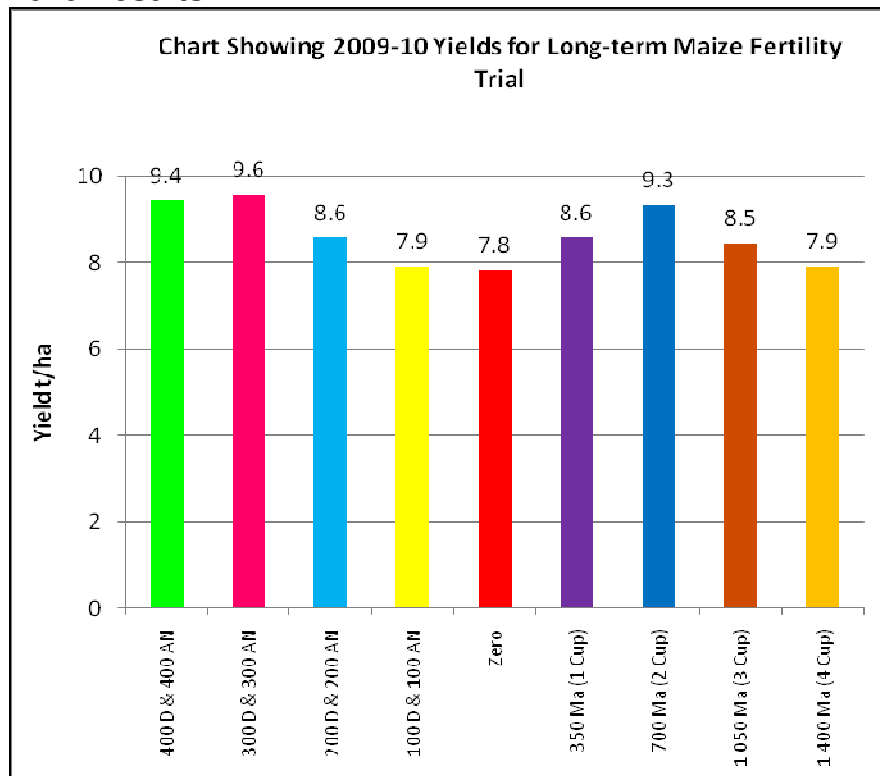
Long-term Fertility – Inorganic vs Manure

Objective: To test the yield results for different levels of applied inorganic fertilizer and manure for maize and soya.

Description

This research began in 2004. 10 different levels of fertilizer and manure were tested. Each year the maize and soya were rotated.

2010 Results



Manure Quantities

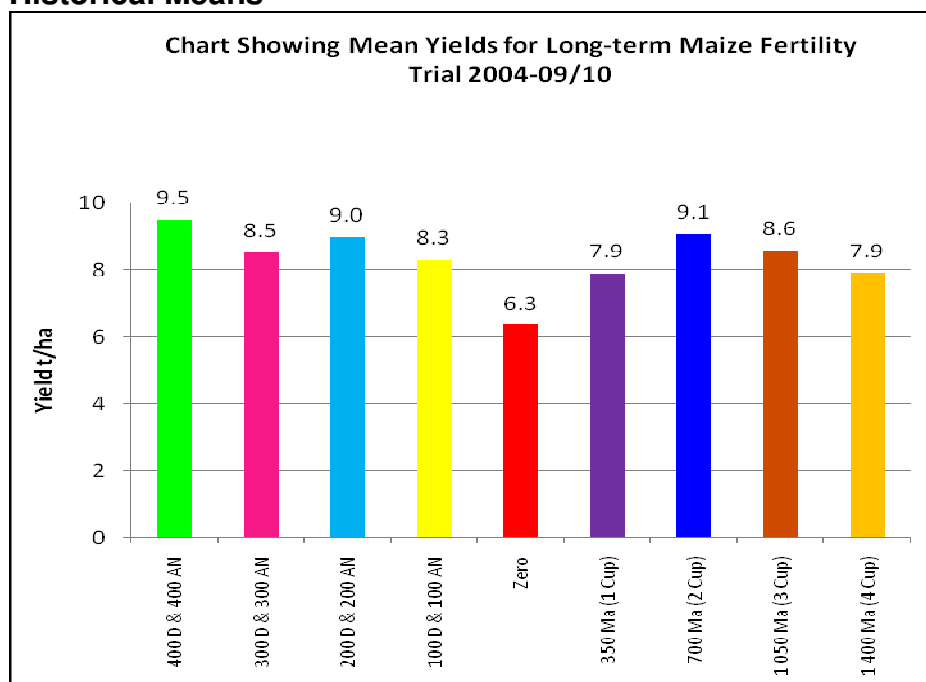
350 Ma = 350 ml/plant station

700 Ma = 700 ml/plant station

1 050 Ma = 1 050 ml/plant station

1 400 Ma = 1 400 ml/plant station

Historical Means

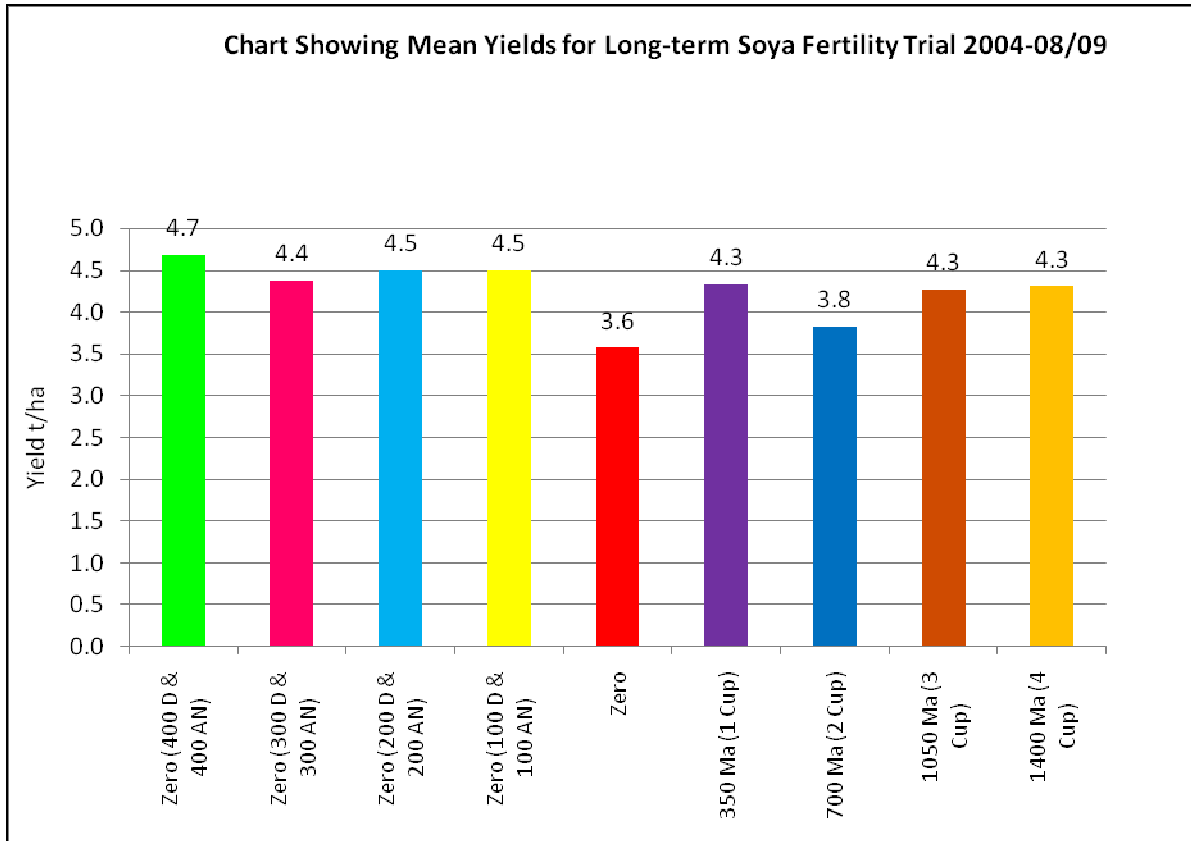


Discussion

It is important to note that this demo was in two strips, of maize and soya, with the strips rotated each year. The yield level of the zero treatment can show an indication of the effect of the maize soya rotation, which was 6.3 t/ha.

Results show little difference between 200 kg/ha D + 200 kg/ha AN and 400 kg/ha D + 400 kg/ha AN, suggesting that there could be significant savings in fertilizer cost by using the lower level. A manure level of 700 ml / plant station appeared to be adequate and gave the same yield as 200 kg/ha D + 200 kg/ha AN (9 t/ha).

Soya Historical Results



Discussion

On the soya rotation the levels of manure treatments are continued, but the four plots which receive inorganic fertiliser for maize, receive zero treatment on the soya rotation. Over four years there has proved to be little difference between the two types of plots. There is a need for a replicated trial with greater precision than this observational trial.

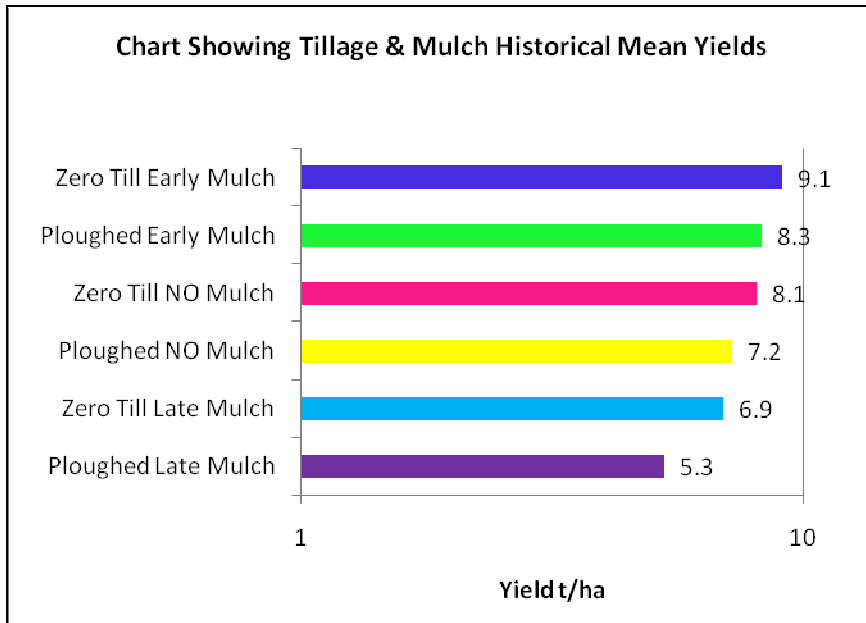
Soil Tillage & Mulch

Objective: To test the yield results for different combinations of tillage and mulching.

Description

This research began in 2007. It compares yield results for zero tillage and ploughed with early, late and no mulch. A single plot was used to test each treatment.

Historical Mean Results



Discussion

The trend was for zero-till to do better than ploughed and for early mulch to do better than no mulch and no mulch to do better than late mulch. This trend should be verified in a replicated trial.

Nutrition

Objective: To test the yield results for different types of inorganic fertilizer for maize and soya.

Description

The first phase of this trial began in 2006 and it was extended in 2007 to compare 2 way combinations of the organic fertilizers. This plot used to be a car park and football pitch, therefore the soil was very compacted. In 2009/10 season 19 different combinations of organic basal fertilizer were tested, with 200 kg/ha D and 200 kg/ha AN used as a standard. Each year the maize and soya were rotated.

The abbreviations represent the following:

Ma: Manure

Co: Compost

VC: Worm Casts

EM: Effective Microorganisms

Ke: Kelp

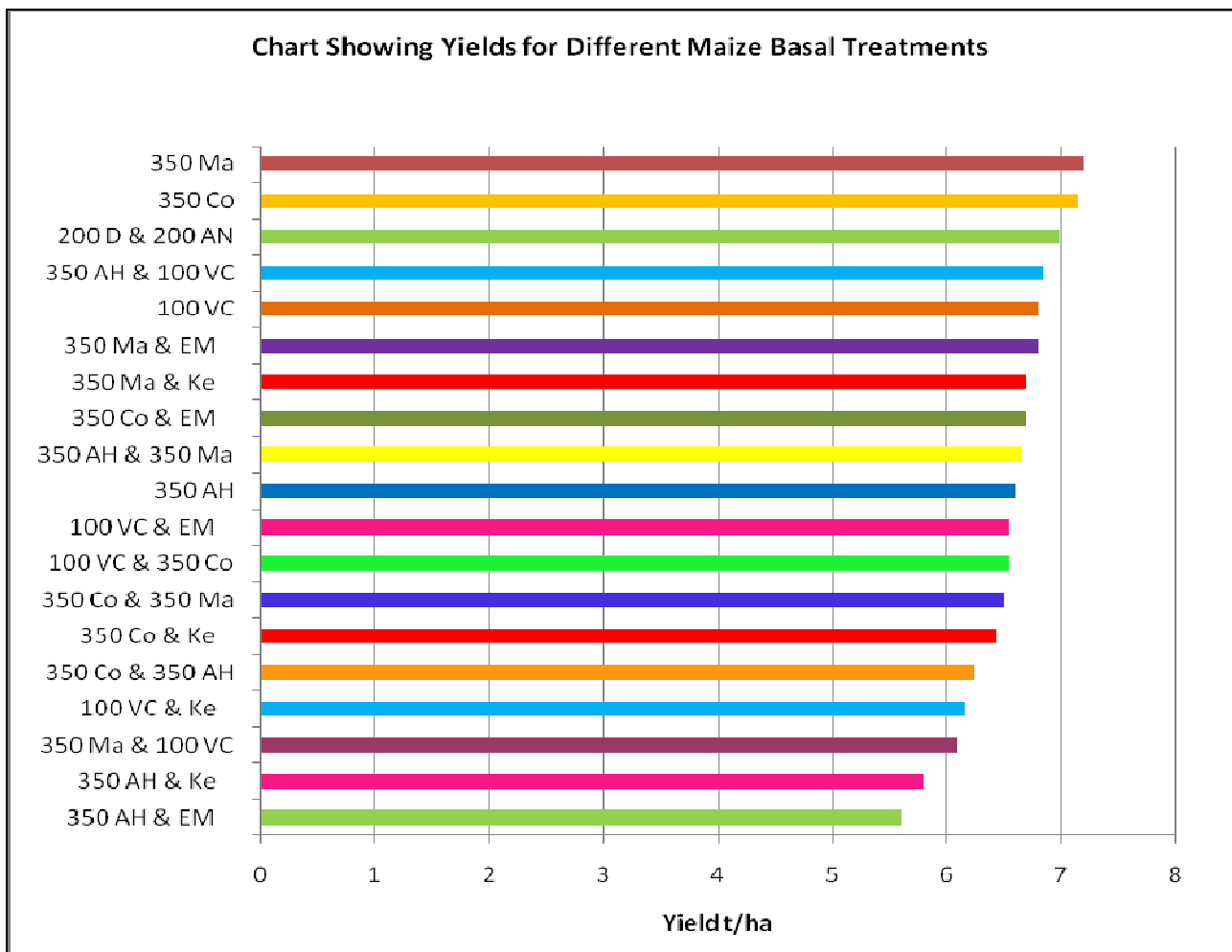
AH: Ant Heap

D: Compound D (7%N; 14% P₂O₅; 7% K₂O)

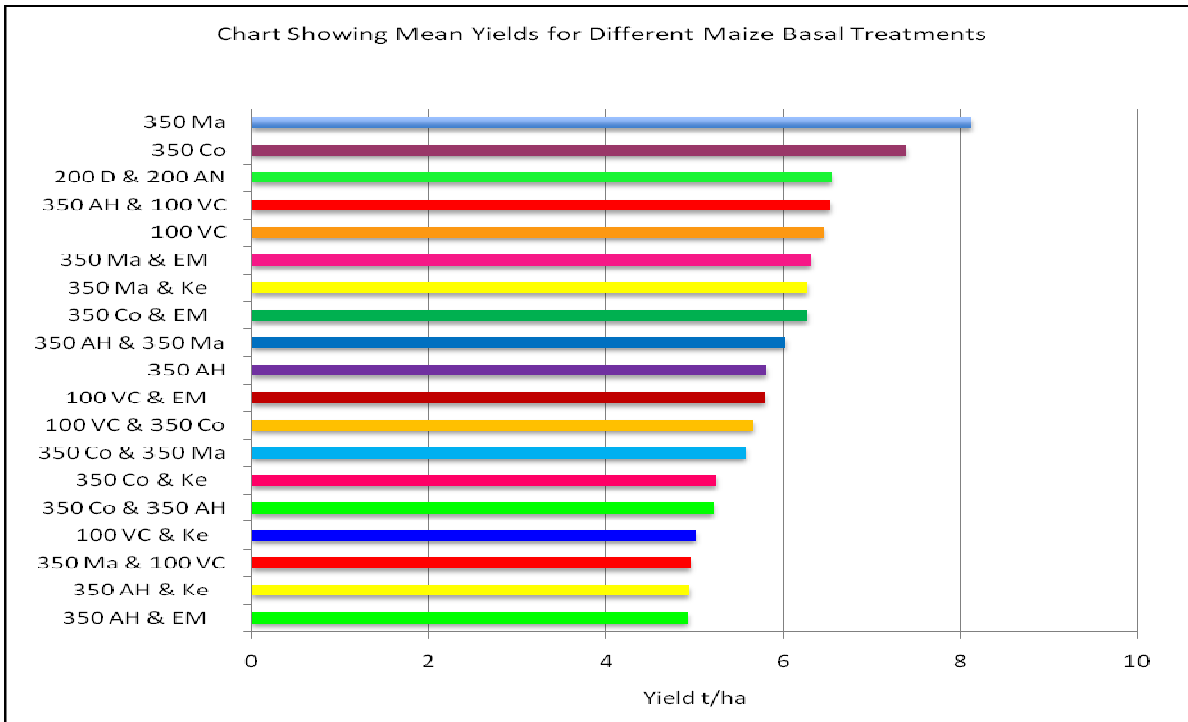
AN: Ammonium Nitrate (34.5% N)

Quantities are ml/ plant station, except for Compound D and Ammonium Nitrate which were in kg/ha.

Maize: 2009/10

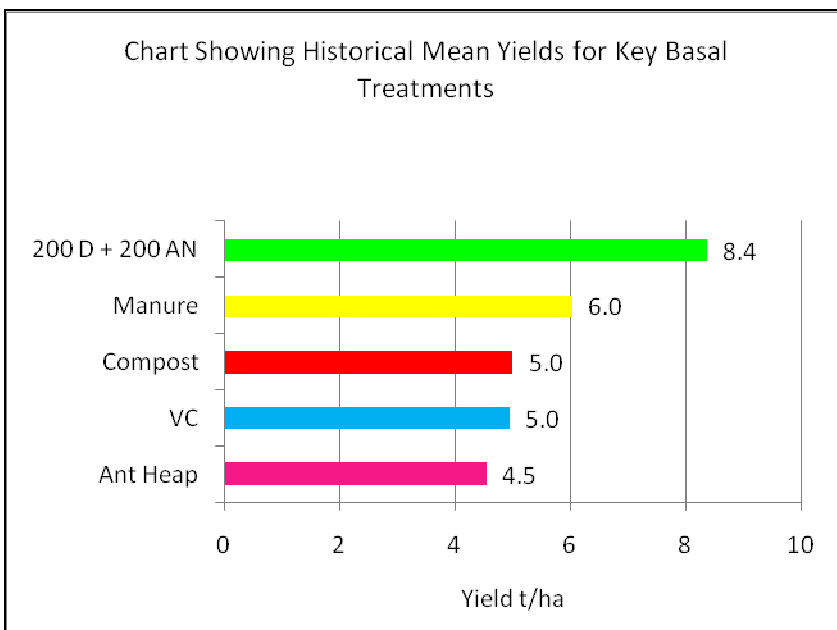


Mean Historical Yields

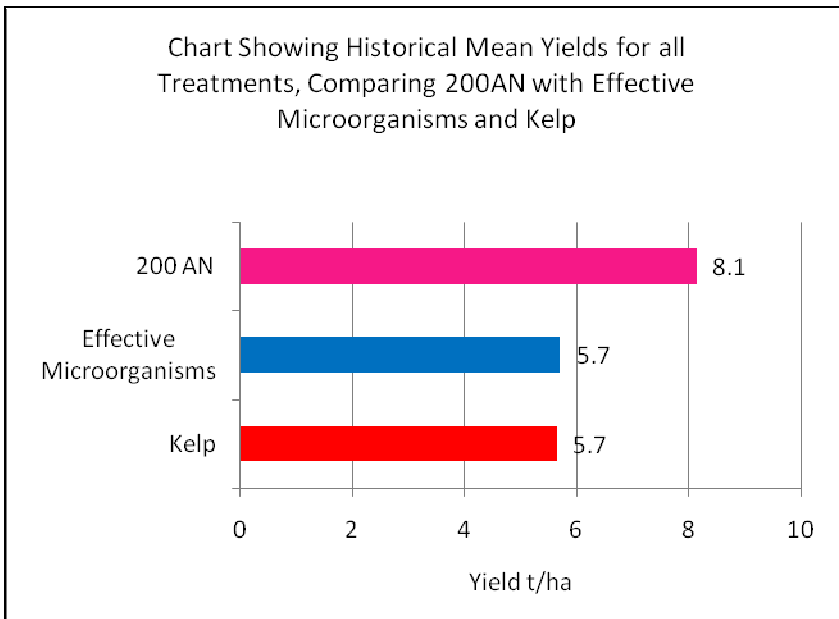


Maize: Historical Yields Compared

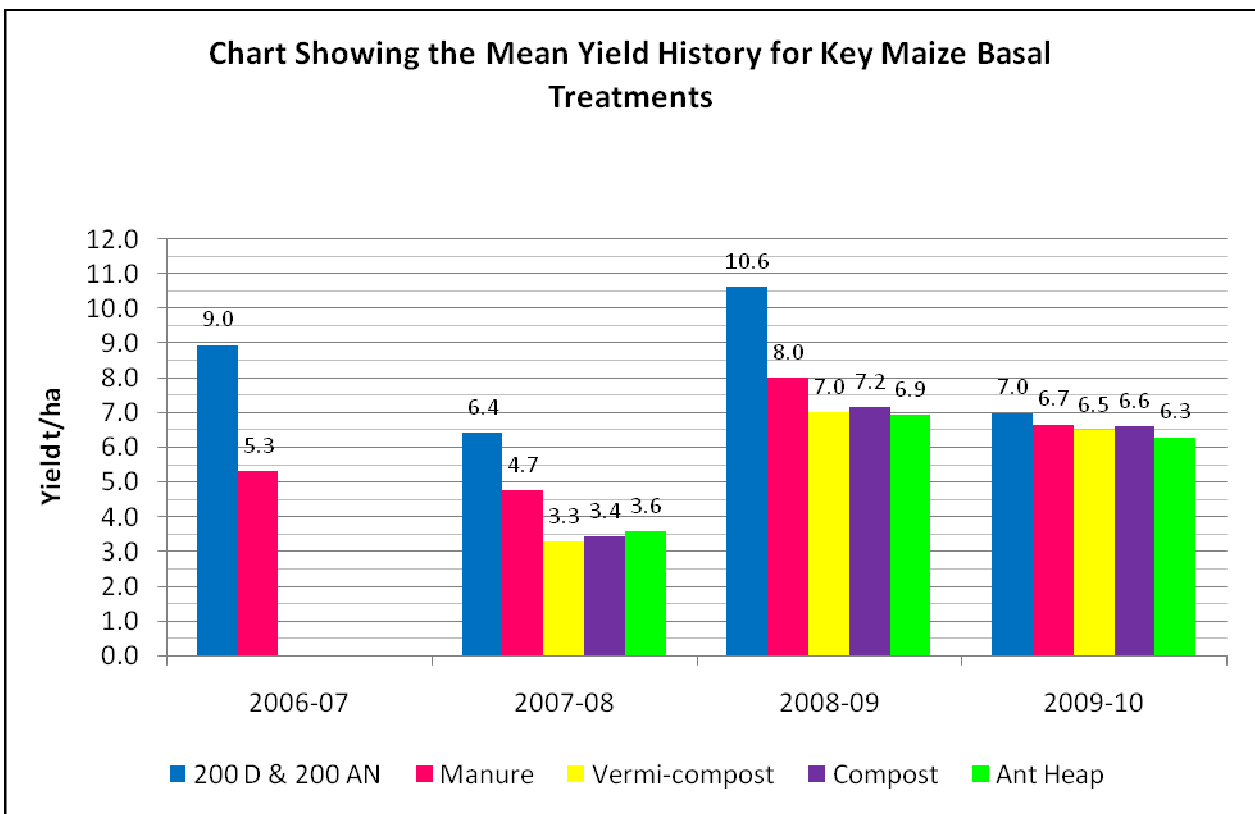
The chart below shows yield results of all basal treatments separately. While organic treatments gave good yields by small-scale farming standards, they did not match the standard treatment of 200 kg/ha Compound D + 200 kg/ha AN. These demo plots were also rotated in a maize / soya rotation. Unfortunately there was no zero fertilizer treatment to measure the yield that could be attributed to good management and residual fertility from the soya. It is therefore difficult to quantify the yield that can be attributed to the different fertility treatments. However, the yields of the organic treatments have exceeded our expectations. The experiment began on soils with very low levels of nutrients, having been a football field with very low vegetation cover for many years and quite compacted.



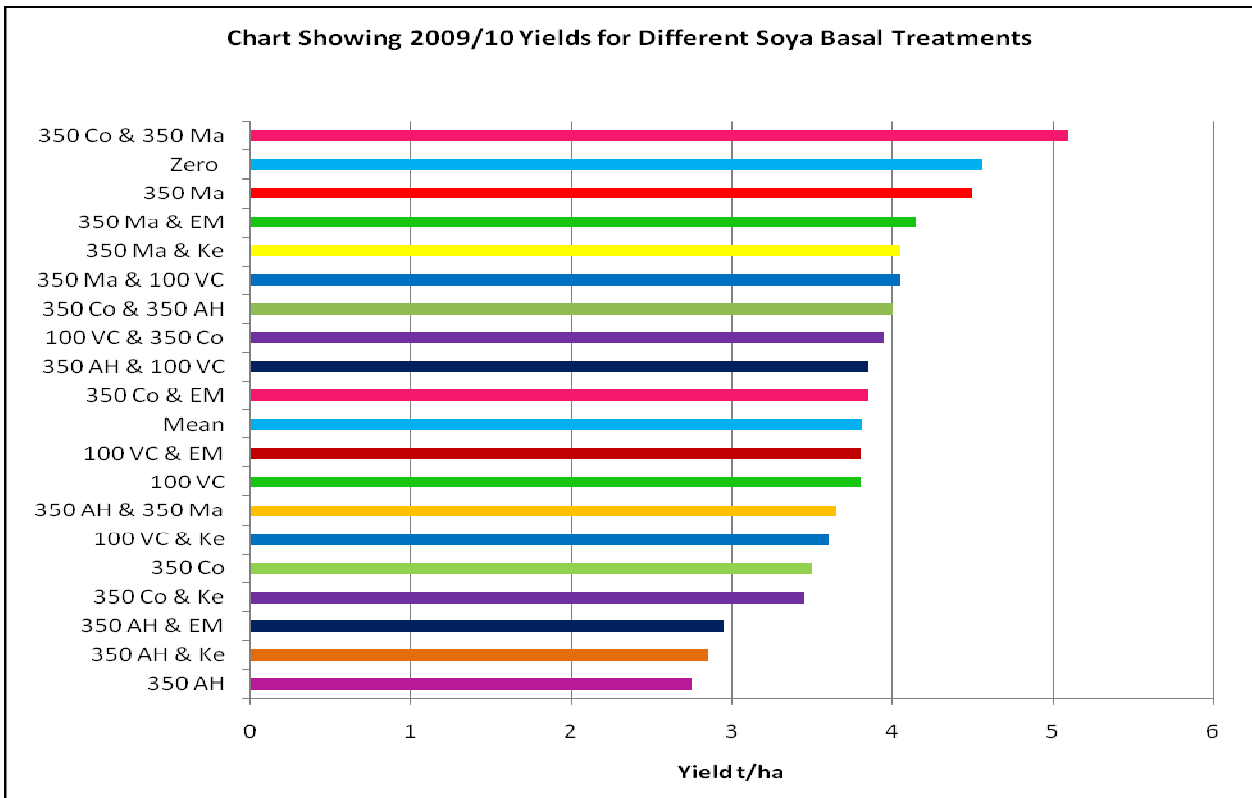
The chart below show the yield levels of all treatments with kelp and effective microorganisms compared to the standard of 200 kg/ha Compound D + 200 kg/ha AN. Again, these did not match the yield of the standard and the effect of the residual fertility from the soya was difficult to quantify.



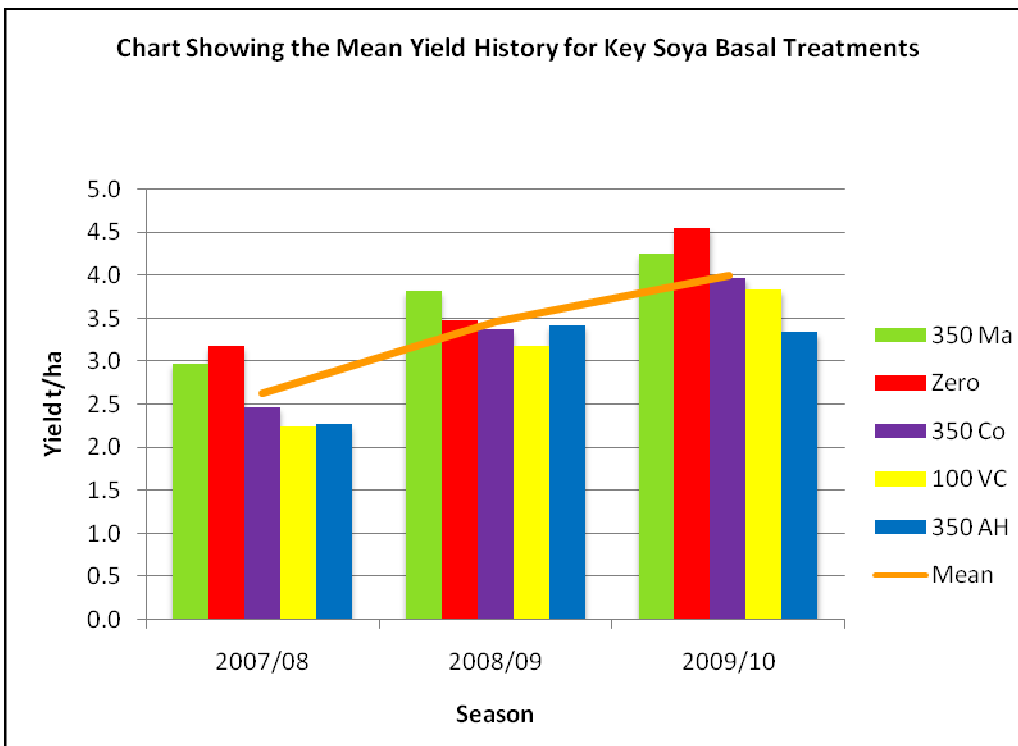
If the means yields of the main treatments are compared over time we can see a trend: the organic treatments dramatically increased in the second season and by the third season performed on par with the inorganic fertilizer. However, this trial would need to be replicated before concrete conclusions are made regarding the relative performance of inorganic and organic fertilizers.



Soya: 2009/10 Yields



Soya: Historical Yields Compared



Discussion

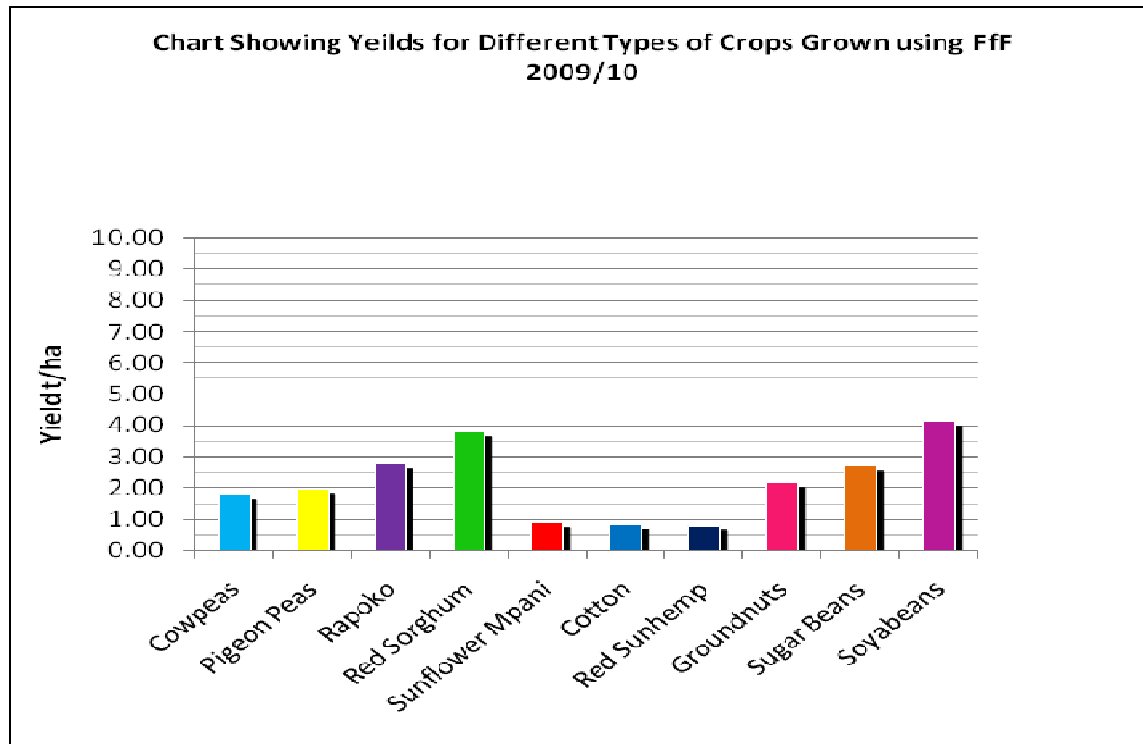
The yield results for this soya trial have been variable. The manure treatments have had the most consistent performance. However, in two out of the last three seasons zero treatment has recorded the highest yields. Over the three years the mean soya yields have steadily increased. This reflects the improving condition of the soil in all treatments. It appears that there is insufficient benefit (yield increase) to warrant the use of vermi-compost in comparison to compost, especially in view of the extra management time and risk in the making of vermi-compost.

2.3 Demonstration Reports

Crop Type

Objective: To demonstrate that many different crop types can be grown using CF.

2010 Results



2.4 2010/11 Trials

Replicated Trials:

- Planting-hole trial (5 innovations)
- Levels of mulch trial (5 innovations)

Observational Trials

- Long-term Fertility – Manure vs. Inorganic Fertilizer (9 Innovations)
- Soil Tillage (6 innovations)
- Plant population and spacing wheel (1 innovation)
 - Plant population on the inside is 62,892 and decreases to 22,222 on the outside.
- Historical demo (fertility) (15 innovations)

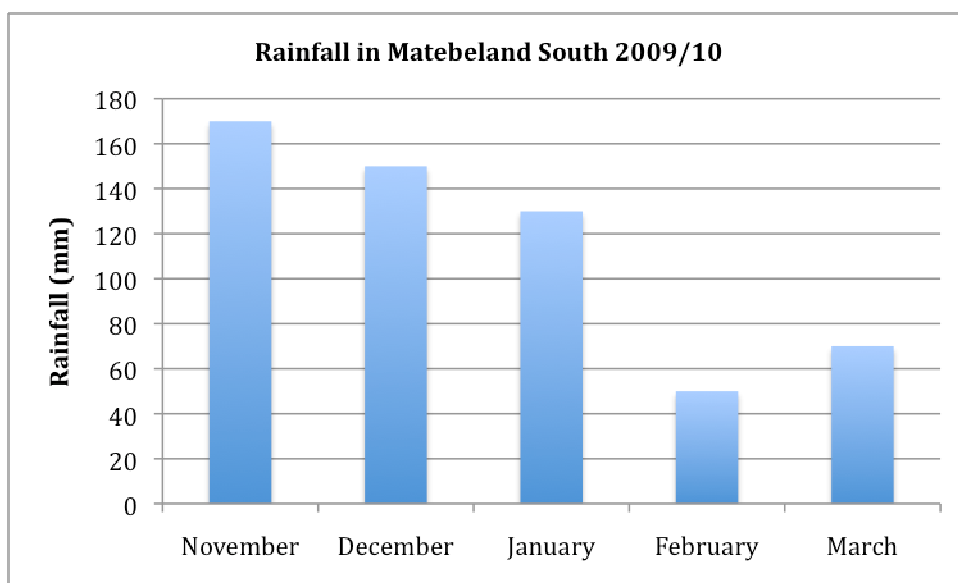
Demonstration Trials

- Crop type (10 innovations)

3. Ebenezer College

Ebenezer College trains young people from the surrounding communities in business and life skills. Students spend two years at the college learning practical skills such as conservation farming which they can then take with them back into the community and establish strong livelihoods. The college also focuses on building the character of students using biblical principles. The college has set aside an area for research, which will enable River of Life PVO to expand the breadth of its research and test treatments and methods on a different soil type. The soils at Ebenezer College are very sandy and clay levels are less than 10%. The elevation is approximately 1 350 m.

Rainfall



3.2 2009/10 Results

Due to the drought at the beginning of 2010 all of Ebenezer College's trials experienced crop failure.

3.3 2010/11 Trials

In the 2010/11 season Ebenezer College will replicate the planting hole and mulch level trials being carried out at Westgate, but with an extra innovation on the mulch level trial.

Replicated Trials:

- Planting-hole trial (5 innovations)
- Levels of mulch trial (6 innovations)