

APPENDIX 5: KWAZULU-NATAL MIDLANDS PROGRESS REPORT

CA Farmer Innovation Programme (CA-FIP)
for smallholders in KZN Midlands.

Period: October 2016 - February 2017

**Farmer Centred Innovation in Conservation Agriculture in upper
catchment areas of the Drakensberg in Midlands of KwaZulu-
Natal**



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Identification of the project

Description and selection of study areas

The idea with this programme was to expand the CA Smallholder Farmer Innovation Programme (SFIP) activities in Bergville to other maize growing areas in the Midlands, i.e. Estcourt, Ladysmith, Greytown and New Hanover.

For this the Cornfields Land Reform community outside Estcourt was targeted as was Mpholweni- a communal tenure area, originally on church land close to Greytown.

In addition an expansion was planned in Nkandla in partnership with the Siyazisiza Trust working with community groups in their agroecology projects.

Approach and Methodology

The farmer-centred innovation systems research process underpinning the programme, which is based on working intensively with farmer learning groups and local facilitators in each of the villages, has been continued and strengthened.

Within the learning groups farmer innovators volunteer to set up and manage farmer-managed adaptive trials as the 'learning venues' for the whole learning group. Farmer Field School (FFS) methodologies are used within the group to focus the learning on the actual growth and development of the crops throughout the season. New ideas (CA practices) are tested against the 'normal' practise in the area as the controls. Farmers observe, analyse and assess what is happening in the trials and discuss appropriate decisions and management practices. Small information provision and discovery-learning or training sessions are included in these workshops/ processes. These are based also on the seasonality of the crop and the specific requests and questions from farmer learning group participants.

Local facilitators are chosen from within and by members of the learning group to be a person who has the required experience, knowledge and a willingness to support the other farmer innovators in their implementation. Facilitators are only chosen and appointed where people with the appropriate skill and personality exists. Local facilitators receive a stipend for a maximum of 10 working days per month, for their support to the farmer innovators. They fill in detailed timesheets outlining their activities against which they claim a monthly stipend.

Learning group members agree to a season long learning process and put forward the farmer innovators to run the trials. Each prospective innovator is interviewed and visited and signs an agreement with the Grain SA team regarding their contribution to the process. They undertake to plant and manage the CA trials according to the processes and protocols introduced as well as a control plot of the same size. For the latter, farmers provide their own inputs.

The adaptive trials are also used as a focus point for the broader community to engage through local learning events and farmers' days. Stakeholders and the broader economic, agricultural and environmental communities are drawn into these processes and events. Through these events *Innovation Platforms (IPs)* are developed for cooperation, synergy between programmes and development of appropriate and farmer led processes for economic inclusion. These IPs

also provide a good opportunity to focus scientific and academic research on the 'needs' of the process.

In this season (2016-2017) we have continued to focus on the following elements of the model, namely:

- a) Support farmers who are in their 2nd and 3rd season,
- b) Conscious inclusion of crop rotation to compare with inter cropping trials
- c) Inclusion of summer cover crops in the crop rotation trials
- d) Continuation with experimentation with winter cover crops, but planted in separate plots rather than in-between maize
- e) Mulching as a form of ground cover
- f) Initiation of nodes for farmer centres that can offer tools, input packs and advice
- g) Continued support for the local maize milling operation for maize meal and cattle feed in Khutsong.

Key activities: October 2016-February 2017

A learning group has been set up in Cornfields (Estcourt area) with the assistance of the councillor and the Land Trust Committee. There are now around 8 villages on this "farm". Trial sites were chosen across the villages and 8 trials were initiated.

The learning group in Mpholweni was set up early in the process and close collaboration with the Local Municipality was expected until the municipal elections and subsequent strikes and violence slowed down this process to a snail's pace. Thus far the group is still interested but no planting has been done.

In Nkandla the expansion of the process with Siyazisiza did not materialise as was expected and had been negotiated with their KZN manager. Training was conducted for the field staff of the organisation and they have taken part in activities in Bergville, but we are still working with the one group in Vulamhlamvu only. Expansion of the work with the Mphotolo group was not initiated due to extremely limited engagement by members of the farmers' cooperatives there.

A Stakeholder forum has been set up in Madzikane (Creighton), to represent and coordinate the interests of a number of role players in the area namely: DARD (Department of Agriculture and Rural Development), Grain SA farmer Development Programme, PANNAR variety testing, LandCare and The Farming Systems Unit from Cedara Agricultural College.

A further forum is active in Matatiele (Nkau). This forum consists of local leadership and farmers from the area, along with councillors and a few officials from government departments that support participants in this village. In addition, this local forum is linked into the Umzimvubu Catchment Partnership Programme, where landscape approaches to development, ecosystem services and ecosystem health are being explored, between a number of high level stakeholders including Government Departments and NGOs. A forum is active in Bergville, although not formalised and consists of role players from DARD, the LandCare programme and the KZN No-Till Club. The Local Municipality is involved and has pledged future support for the process.

The budget set aside for the 1st six month period, according to the overall work plan is R333 945. Actual expenditure for the last five months has been R257 106,22. The slight under expenditure will be rectified in the coming few months. The two row planters are on order from Eden Equip and delivery is expected sometime in March 2017. The overall programme is on track and the budget is deemed sufficient for completion on target in September 2016.

Results achieved to date

Three learning groups (mentioned above) have been supported under this process. Training/learning workshops have been conducted for the following topics:

- **How to implement CA:** introduction to the principles, soil health, crop diversification and different planting options for CA
- **Working with herbicides and knapsack sprayers:** information on different herbicides, their uses and safety measures, as well as operation of knapsack sprayers, protective clothing, etc.
- **Trial plot layout and planting** using different CA planting equipment such as hoes, MBLI planters, and animal drawn not till planters.
- **Top dressing and pest control measures** for mid-season growth of crops and planting of cover crop mixtures where people have been interested in this option

The learning groups provide the innovation platforms also for discussion of the value chain issues, such as bulk buying, harvesting, storage and milling options and marketing.

In both Nkandla and Cornfields, mid-season visits revealed unsatisfactory growth of the trials. In both areas prevailing weather patterns and bad soils have led to patchy germination in trials and slow subsequent growth of crops. The Cornfields learning group is still enthusiastic and late season beans and cover crops are to be planted for a few participants. In Nkandla the savings and credit group linked to the CA group is flourishing and participants are keen to expand their field crop production. A new fieldworker has been employed starting in March 2017 to provide more implementation capacity to these groups.

Stakeholder engagement and awareness raising have included the following:

1. Attendance, by 4 staff members of the Soil health symposium in Pretoria in November 2016.
2. Participation in the CA working group set up through the Grain SA CA facilitator and provision of thematic input on soil health work in the project (Sylvester Selala).

The table below outlines activities related to objectives and key indicators for the period of October 2016-February 2017.

TABLE 1: SUMMARY OF PROGRESS (OCTOBER 2016 - FEBRUARY 2017) RELATED TO OBJECTIVES AND KEY ACTIVITIES

Objectives	Key activities	Summary of progress	% completion and comment
1. Document lessons	Documentation for learning and	- Finalisation of CA manual (Eng and Zulu) - Soil health symposium –	- 100 copies of E and Z manuals printed. A further print run expected. (50% complete)

learned	awareness raising	presentation and participation (Nov 2016) - Sharing of information through innovation platforms processes -Articles and promotional material	- 100 copies of group and individual savings books printed and in use. A further print run of 300 copies done in January 2017 (100% complete) - (50% completion; Madzikane, Matatiele, Bergville -No articles or promotional material printed to date (0% completion)
	Final report	- 6 monthly interim reports	- 50% Interim report finalised. Final report at end of project
2. Increase the sustainability and efficiency of CA systems	1 st level experimentation: 24	- 6 participants in Cornfields planted 400m ² intercropping trials as advised. Other participants used the inputs for their regular maize planting and a few did not plant at all - Planting in Mpholweni has not taken place – due to political instability in the area, and a combination of difficult weather conditions.	- 45%. Basic CA design- intercropping with maize beans and cowpeas on a 100m ² - 400m ² plot, with a control plot managed entirely by the participant. Adaptation trials will include late season planting of beans with a mixture of winter and summer cover crops.
	2 nd level experimentation: 10	- 8 participants in Nkandla planted their 100m ² intercropping trials.	- 50%. Participants opted to continue with intercropping practice from their 1 st year.
	Develop and manage PM&E framework; – weekly and monthly M&E visits	- M&E forms redesigned and used - Digital monitoring system piloted	- 65%. Monitoring still to be done for winter cover crops and harvesting. Planting and growth monitoring completed
	Facilitation of innovation platforms	- Co-facilitation of information sharing and action planning with stakeholders and role players	- 35%. Further meetings with municipal and local leadership stakeholders in the new areas are required for full support of this process. New groups are to be canvassed from now onwards. Participants will be brought to join the farmers’ days in Bergville and or the SKZN
	CA working group, and reference group	- Attended and presented in Feb 2017	- 50%

A performance dashboard is indicated below. This provides a snapshot of performance according to suggested numbers and outputs in the proposal.

TABLE 2: PERFORMANCE DASHBOARD; FEBRUARY 2017

Outputs	Proposed (March 2016)	Actual (Feb 2017)
Number of areas of operation	2	2
Number of villages active	3	2
No of 1 st level farmer experiments	24	10
No of 2 nd level farmer experiments	6	8
No of local facilitators	2	-
No of direct beneficiaries	30	18
Participatory M&E (farmer level)	Yes	Yes
Soil biological assessments	54	53
Stakeholders forums	4	2

Initiation of the learning groups for the Midlands region has been somewhat underprioritized. The partnership with Siyazisiza Trust in Nkandla has been fruitful and field level staff of the organisation have been trained in CA implementation and practice. Some financial support for the trial inputs has also been provided by the organisation. The expected expansion to more farmer cooperatives for this organisation has however not materialised. We are still implementing with the 1 group in Vulmahlamvo.

In Mpholweni (Greytown) a learning group was established, but due to capacity issues for the process no further action has been taken. The relationship with the LM has also not developed, given the shambles the municipality is still in after their offices were burnt down late last year. The plan was to refocus and plant late season beans and cover crops with this group, but given the present extremely wet conditions that have continued now for 2-3 weeks, this may or may not happen.

A new group has been started in the Estcourt area in the Cornfields community. This is a land reform community who received their land in the early 1990's. There was a substantial area of around 80 hectares of good arable land laid out as fields close to the river. We were asked to assist in re-initiation of agriculture in the area by their councillor Mr Simon Mchunu. Upon return, this community has turned into a vast, sprawling settlement with almost 800 households. Householders there have opted to plant within smaller fenced fields close to their homes. The area is over-stocked and there is substantial erosion.

Here the programme was initiated by starting trials with 2 participants from each of the 8 villages in Cornfields. A demonstration workshop was held where all participants joined in planting one trial plot together. They were then provided with inputs for their trials and asked to plant their trials at their homesteads. Of the 15 participants only 3 planted the trials as they had learnt. A further 5 participants did plant, but did not follow the suggested layout of the plots.

The table below summarises the planned and actual farmer trial implementation for the 2016-2017 planting season. A total of 34 trial participants volunteered through the planning processes across 3 villages in three areas. Eighteen (18) of these farmers planted trials.

TABLE 3: SUMMARY OF FARMER INNOVATION NUMBER AND AREAS PLANTED PER VILLAGE IN THIS CA PROCESS; KZN MIDLANDS, 2016-2017

Area	Village	Farmers selected	Farmers planted (1 st level)	Farmers planted (2 nd level)	Experi-mentation	Comments; incl planters used.
Estcourt	Cornfields	16	8		Intercropping, late season beans, cover crops.	Farmers planted using hand hoes and MBLI planters. The group is not well established
Nkandla	Vulam-hlamvu	10	2	8	Intercropping, winter cover crops,	
Greytown	Mphol-weni	8				
TOTAL		34	10	8		

Overall process

As this is an existing 'technology' the farmer level experimentation is in essence an adaptation trial process.

Year 1:

Experimental design is pre-defined by the research team (based on previous implementation in the area in an action research process with smallholders). It includes a number of different aspects:

- Intercropping of maize, beans and cowpeas
- Introduction of OPV and hybrid varieties for comparison (1 variety of maize and beans respectively)
- Close spacing (based on Argentinean system)
- Mixture of basin and row planting models
- Use of no-till planters (hand held and animal drawn)
- Use of micro-dosing of fertilizers based on a generic recommendation from local soil samples
- Herbicides sprayed before or at planting
- Decis Forte used at planting and top dressing stage for cutworm and stalk borer
- Planting of cover crops; winter mix in Autumn

Experimental design includes 2 treatments; planter type (2) and intercrop (2). See the diagram below>

	PLOT 1: Hand Hoe			PLOT 2: Planter	
10m or 5m	Maize 1, bean 1	Maize 2, Bean 1		Maize 1, bean 1	Maize 2, Bean 1
	Maize 1, Bean 2	Maize 2, Bean 2		Maize 1, Bean 2	Maize 2, Bean 2
	10m or 5m				
	PLOT 3:	OR repeat plot 1 and 2		PLOT 4:	
	Hand hoe	Planter		Hand hoe	Planter
	Maize 1, cow pea	Maize 1, cow pea		Maize 1, Dolicho	Maize 1, dolichos
	Maize 2, Cow pea	Maize 2, Cow pea		Maize 2, Dolicho	Maize 2, Dolichos

Figure 1: Example of plot layouts for the 1st level farmer trails.

The basic process for planting thus includes: Close spacing of tramlines (2 rows) of maize (50cmx50cm) and legumes (20cmx10cm) intercropped, use of a variety of OPV and hybrid seed, weed control through a combination of pre planting spraying with herbicide and manual weeding during the planting season and pest control using Decis Forte, sprayed once at planting and once at top dressing stage.

Year 2:

Based on evaluation of experiment progress for year 1, includes the addition of options that farmers choose from. Farmers also take on spraying and plot layout themselves:

- A number of different OPV and hybrid varieties for maize
- A number of different options for legumes (including summer cover crops)
- Planting method of choice
- Comparison of single crop and intercropping planting methods
- Use of specific soil sample results for fertilizer recommendations
- Early planting
- Own choices

Year 3:

Trials are based on evaluation of experimentation process to date; to include issues of cost benefit analysis, bulk buying for input supply, joint actions around storage, processing and marketing. Farmers design their experiments for themselves to include some of the following potential focus areas:

- Early planting; with options to deal with more weeds and increased stalk borer pressure.
- Herbicide mix to be used pre and at planting (Round up, Dual Gold, Gramoxone)
- A pest control programme to include dealing with CMR beetles
- Intercropping vs crop rotation options
- Spacing in single block plantings
- Use of composted manure for mulching and soil improvement in combination with fertilizer,.
- Soil sample results and specific fertilizer recommendations
- Planting of dolichos and other climbing beans

- Summer and winter cover crops; crop mixes, planting dates, management systems, planting methods (furrows vs scatter)
- Seed varieties; conscious decisions around POVs, hybrids and GM seeds
- Cost benefit analysis of chosen options

Possible agrochemical spraying regime options

1. Roundup 2 weeks before planting - if there has been some rain. DualGold at planting (just after with Decis Forte/Kemprin).

2. Gramoxone at planting (just before or after planting) with or without Dual Gold and Decis Forte/Kemprin – Dual Gold does not work on dry soil (followed by heavy rain)

Soil fertility and soil health

Soil health samples were analysed for a number of participants from Matatiele and Bergville, who also had this analysis undertaken last year. From each trial plot being monitored, eight (8) top-soil samples (5 cm depth) were collected on a Z-grid across the plot, which were then mixed together as a composite sample. These composite samples were dispatched to the Soil Health Support Centre (SHSC) in the Western Cape through which the following analyses were done: Haney soil health test (done by Ward Labs in Kearney, Nebraska), aggregate stability, the Labile Ammonium Nitrogen Analyses (SLAN) (done at the SHSC) and Nematode Indices for soil health (at Nemlab).

Of interest, would be to determine whether there are trends noticeable in the soil health parameters measured as participants undertake their 3rd and 4th years of CA.

The table below summarises some of the results.

TABLE 4: SOIL HEALTH TEST RESULTS ACROSS TWO SEASONS FOR MATATIELE AND BERGVILLE PARTICIPANTS

		2014/2015					2015/2016				
Name	Sample	CO ₂ - C, ppm C	Organic C ppm C	Organic N ppm N	C:N ratio	Soil health Calculation	CO ₂ - C, ppm C	Organic C ppm C	Organic N ppm N	C:N ratio	Soil health Calculation
Mamoleker	Control	86,3	180	12	15	10,51	36,4	272	17,1	15,91	6,72
Mamoleker	CA CA intercr	155,6	213	9,2	23,2	21,44	38,1	304	25,6	11,88	8,81
Matsepo Fu	Control	94,1	159	10,1	15,6	12,44	34,7	156	10,5	14,86	4,95
Matsepo Fu	CA intercr	141,8	119	10,7	11,1	15,6	26,4	154	8,9	17,30	3,96
Simon Tsold	Control	34,7	81	7,2	11,3	6,75	16,8	118	7,5	15,73	3,00
Simon Tsold	CA intercr	39,8	89	7,5	11,8	7,36	14,6	116	8,5	13,65	3,08
Bulelwa Dzi	Control	41,5	120	12,3	9,7	5,54	12,8	168	11,3	14,87	3,67
Bulelwa Dzi	CA intercr	98,1	133	8,4	15,8	14,54	57,2	227	13,4	16,94	6,99
Bergville											
		2014/2015					2015/2016				
Name	Sample	CO ₂ - C, ppm C (yr1)	Organic C ppm C (yr1)	Organic N ppm N (yr 1)	C:N ratio (yr 1)	Soil health Calculation (yr 1)	CO ₂ - C, ppm C (yr2)	Organic C ppm C (yr2)	Organic N ppm N (yr2)	C:N ratio (yr2)	Soil health Calculation
Smephi Hla	CA intercr	86,3	148	12,1	15,9	10,65	43,5	211	17	12,41	7,31
Dlezakhe Hl	CA intercr	179,1	161	13,1	12,3	16,15	82,3	214	15,3	13,99	9,55
Mtholeni D	Veld base	179,1	374	22,5	16,6	13,35	155	316	22,4	14,11	16,39
Mtholeni D	CA intercr	179,1	89	12,1	7,4	16,48	108	178	13,4	13,28	11,25
Khonzaphi	CA intercr	118,5	148	16,6	8,9	9,5	82,3	250	14,9	16,78	8,90

Samples were taken in the same month (September) for the two seasons. 2014/2015 was a very good season and participants had very impressive growth and yields. 2015/2016 was an extremely dry year and although those who planted late in the season were rewarded with some yields, production was definitely lower. It would appear that the extremely dry soil conditions affected the soil health test results as well.

From the soil analytical data in Table 4 the following general observations can be made:

- The values for the 2nd season were mostly lower than the first season.
- Organic carbon (ppm) has generally increased between 2014/2015-2015/2016 seasons, for both control and trial plots
- Organic N (ppm) has generally increased between 2014/2015-2015/2016 seasons, for both control and trial plots
- The C:N ratios however are generally lower for the 2014/2015 season than the 2015/2016 season. This points towards the carbon readings being proportionally higher than the N readings for the drought year.
- The Solvita CO₂ tests are all higher for the 2014/2015 than the 2015/2016 season, except for the veld baseline sample. This is probably due to the drought in 2015/2016.
- As a consequence, the soil health scores for all samples, except the veld baseline sample, are lower in the 2015/2016 season than the previous year. See figure 2 below.
- The soil health scores for the control samples are generally lower than the CA intercropping trial samples. This observation does not hold for Masthepo Futu and Tsoloane Mapheele from Mataitele. These participants have severe soil fertility restrictions and cover crops were introduced for them to build soil health. Positive results are likely to take some time before becoming apparent

These observations point to the fact that the drought conditions influenced the results to an extent where a comparison across years could not be reliably made. The one reliable change is that soil health score for the CA trial plots are higher than those of the conventionally tilled plots. This can be considered a very positive outcome for continuation of CA. See the figure below for the Soil health score results

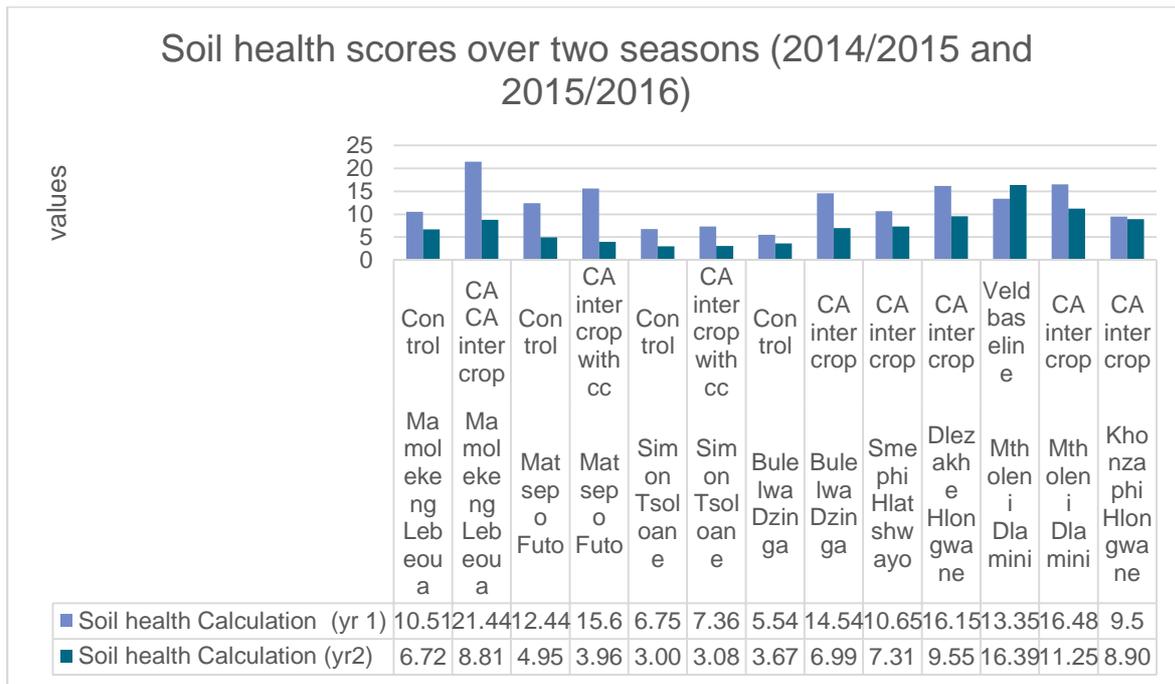


FIGURE 1: A COMPARISON OF SOIL HEALTH SCORE RESULTS FOR TWO GROWING SEASONS FOR PARTICIPANTS FROM MATATIELE AND BERGVILLE.

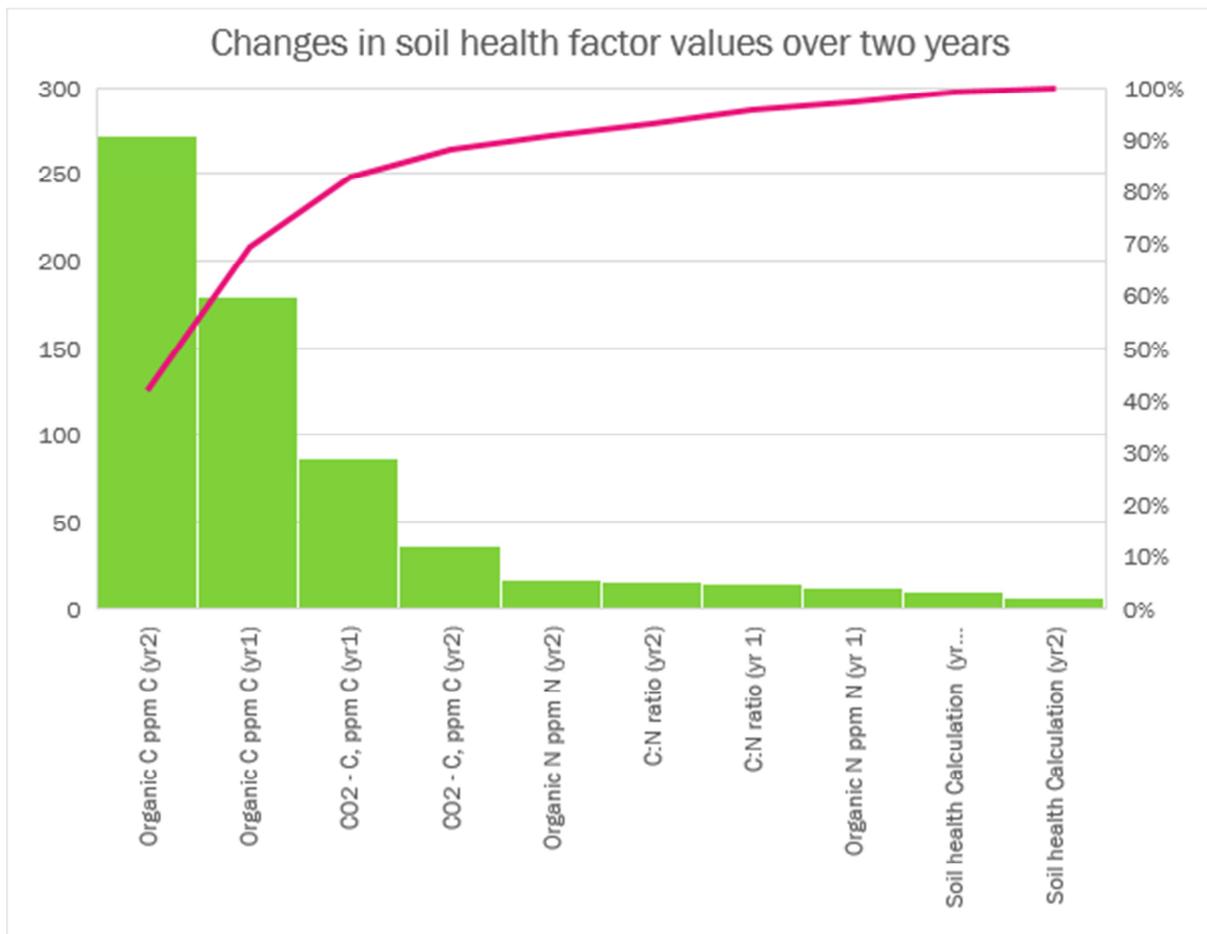


FIGURE 2: THE PROPORTION OF CHANGE OF THE FACTORS USED TO CALCULATE THE SOIL HEALTH SCORE OVER THE 2014/2015 (YR1) AND 2015/2016 (YR2) SEASONS

The figure above shows that the proportional increase of organic carbon measure for year 2 (the drought year) is quite high and that of Organic N is much lower. This explains how the C:N ratios for the 2nd year are higher than the first. It however does not give an indication of why. What is also apparent is that the microbial activity as shown through the Solvita CO₂ test is much lower in the 2nd year. It may mean that the drought conditions significantly depress microbial activity, increase potential volatilisation of N and therefore produce a completely different soil health score result.

Individual soil health test results for the 2015/2016 season are very promising for a number of the good smallholder farmers who have been doing CA for a number of years. Comparing different practices within a season appears to be more reliable than trying to compare results across seasons.

Below, in Table 5, as an example, is Phumelele Hlongwane’s (Ezibomvini) soil health test results for different practices within her trials.

Mrs Hlongwane tried out a number of different practices as shown in the figure alongside, including Lab-lab beans and summer (sunhemp, millet and sunflower) and winter (Saia oats, fodder rye and fodder radish) cover crops alongside a rotation trial and the intercropping plots.

Control	(5) LL	(4) M + B	(3) M + WCC + SCC	(2) Sunhemp + Millet + Sunflower	(1) M + B
	(10) M + B	(9) M + CP	(8) M + B	(7) M + CP	(6) M + LL
Control					
<p align="center">Legend</p> <p align="center">M – Maize; B – Beans; CP – Cowpea; WCC – winter cover crop, LL – lablab</p>					



Above left; Mrs Hlongwane’s trial plot showing a maize and bean intercrop in the foreground and the summer cover crops in the background. Above right: Mrs Hlongwane standing in her Lab-lab bean plot.

TABLE 5: SOIL HEALTH TEST RESULTS FOR DIFFERENT PRACTICES FOR MRS HLONGWANE –

sample	CO ₂ - C, ppm C	Organic C ppm C	Organic N ppm N	C:N ratio	Soil health Calculation	Comment	N released	N reserve
Veld	113	195	13,7	14,23	11,26	Very Good	13,7	0
Lab lab	90,2	203	13,7	14,82	9,49	Very Good	13,7	0
Millet, sunflower and sunhemp	78,4	222	15,2	14,61	9,11	Very Good	13,7	1,5
Control (maize under CA)	62,7	201	12,5	16,08	7,16	Good	8,2	4,3
Maize and beans intercrop	54,5	204	13,4	15,22	6,96	Good	8,2	5,2
maize and cowpea	62,7	175	10,1	17,33	6,38	Good	6	4,1
Maize and lab lab	52,3	216	11,8	18,31	6,20	Good	4,1	7,7
maize trial	68,7	157	6,5	24,15	5,06	Average	2,8	3,7

EZIBOMVINI (2015-2016)

NOTE; Control maize under CA- is maize grown under the normal fertilization and management practices, but now under CA, compared with the trial that uses a slightly different fertilizer and management regime.

From the table above the following observations can be made:

1. The veld provides a good positive benchmark for soil health scores in this case and is higher than all the different CA cropping options.
2. The maize CA trial plot has the lowest soil health score while the Lab-Lab bean and summer cover crop plots have the highest.
3. The maize CA control plot has a higher score than the Maize CA trial plot.
4. The CA plots with maize and maize and legume intercrops provided for the highest N reserve values, meaning that a balance between nitrogen utilised and nitrogen in reserve was created in these plots.
5. The cover crop plots (Lab-Lab and summer cover crops) provided the most available nitrogen for use by the following crop, but did not build nitrogen reserves in the soil to a significant extent.

As Mrs Hlongwane started on a crop rotation system in her experimental plots it is possible that the anticipated build-up of organic matter and increase in soil fertility will take a few more seasons to be obvious. At the moment some plots do a lot better than others and it is difficult to assess exactly why.

Progress per area of implementation

Cornfields (Estcourt)

This is a new expansion area in the Midlands.

The Grain SA CA trials (400m²) were planted 6-12 December 2016 once rains had properly started. Gramoxone /Paraquat was sprayed at planting, along with Decis Forte for cut worm

and stalk borer. A hybrid variety of maize (Pan 6479) was used, intercropped with Gadra sugar beans and mixed brown cowpeas. Both hand hoes and MBLI hand planters were used.

Mrs Chonco

Mrs Chonco and her husband have been quite enthusiastic about the no till planting. They like the idea of not being reliant on a tractor. They did a bit of experimentation of their own by planting beans into their maize control plot after seeing the intercropping in the trial plot. Mr Chonco also planted another no till plot of maize at the beginning of January. The herbicide he used however was not effective at all and the plot is a bit weedy.

The trials are also weedy. They were apparently told by a senior member of the CA learning group that they should not weed and that herbicide would be brought for this purpose. Germination in the trial plot was good, but subsequent growth not. Mrs Chonco also transplanted some of her maize into the patches where there was not growth.



Above left to right: Mrs Chonco speaking to Mr Madondo and one of the interns Sandile Madlala; the new planting of no till maize that Mr Chonco tried out in January- the herbicide was ineffective and the patch is weedy; one of the maize and bean intercrop plots. The wilted maize has been transplanted by Mrs Chonco from basins where two plants were growing- she assured us that this works. The beans did not germinate well and subsequent growth was not good. Plants are small and yellowing and the maize and cowpea intercrop plot. The cowpeas germinated and grew quite well.

Soil samples were not taken, as the team wanted to see how the group settles into the CA idea before going to the expense. It is however very clear that the soil is in a really bad condition- both very infertile, with low organic matter and potentially also acidic.

Mr Maqhawe Mkhize (Ntabeni Ezibovu)

He planted the 4 intercropping plots, with maize, beans and cowpeas in early January due to the heat and drought. Germination has been patchy. Plant growth shows signs of severe soil infertility and difficulties with crusting and compaction. Mr Mkhize, like other in the village, just plant, often without manure and fertilizer.



Above left to right: patchy germination of maize evident, as is the grey structure less soil of the area. Mr Mkhize planted the intercrop as he understood it, so wide spacing with one row of each crop. Germination of the control plot (bottom left corner) was even less than the trial.

Mr Miya (Mayekani Village-Cornfields)

He only planted in the 2nd week of January as it was too hot and dry before. He planted 4 plots comparing MLI planters with handhoes.

His control plot has been ploughed and has been planted to maize for 7-8 years without a rotation. Applied 2:3:4 and sowed seed in behind the tractor. This has led to patchy germination. Generally he broadcasts fertilizer but has been interested in the CA as he thinks he is wasting fertilizer. Also, he can see that people are not looking after the soil, which is not very good to start with. He would like to try winter cover crops and Lucerne to increase his soil fertility.



Above left to right: A view of Mr Miya's ploughed control plot and his CA plot below that. Germination in the CA plot is very patchy and subsequent growth bad. Hot and dry conditions continued, added to capping and compaction of the soil. Germination and growth beneath the

Acacia tree was good, and beans grew well there- again indicating infertility and heat as the reasons for lack of growth in the trial plot

Nkandla

In Nkandla we continued into a second year of CA trials with the Vulamhlamvo group. They opted again to plant all the trials in one plot as it is well fenced. The plot was donated by one of the group members for the purpose.

Due to wet conditions at planting in Late October (planting dates was 20 October), Gramoxone was sprayed at planting instead of Roundup prior to planting. This was only partially successful and participants struggled with weeds in their trial plots right from the onset. One issue could have been the quality of the herbicide spraying as the group was asked to do this. It appears specifically that couch grass and a local broadleaf weed “Qambalala” were not well controlled.

Right: Ms Moloji, a Siyazisiza fieldworker assisting with the spraying prior to planting.

Far right: A shot of the “Qambalala” weed prevalent in the CA trial plots in Vulmahlamvo

The group opted to redo the 1st year trial of intercropping and comparing hand hoes with MBLI planters. Growth of maize in the trials has unfortunately been slow and a bit disappointing. Lack of soil fertility and soil acidity could have a role to play. The plot was also badly eroded due to runoff.





Clockwise from top left: the Vulamhlamvo group planting maize in basins. Mrs Biyela using an MDLI planter and growth of maize in December 2016. There is evidence of erosion and plants are small and yellowing.

The group instituted a savings group by the name of Maphothwe. The savings group has 15 members. The group started saving in February 2016. They set their share price at R100/share, which is the amount that each member saves per month and added a start-up amount of R169/member. They set their interest rate for their small loans at 10%.

At the yearly share out meeting on 6 December 2016 the group had a total amount of R30 210 saved. This means that the group had made a substantial 'income/profit' from the interest they had charged on their small loans as their capital had increased by 78%. The money was distributed according to the amount of shares each individual had bought.

The table below outlines the income for each participant.

TABLE 5: THE SHARE OUT OF INCOME FOR THE MAPHOTHEWE SAVINGS AND CREDIT GROUP IN NKANDLA. DECEMBER 2016.

Names of participant	Number of shares. R100/ share	Amount earned (with 78% interest)
1. Zithini Biyela	12	R2136
2. Buselaphi Majola	10	R1780
3. Ntombifuthi Majola	12	R2136
4. Thandiwe Shezi	10	R1780
5. Ntombizini Biyela	12	R2136

6. Babhekile Majola	12	R2136
7. Thembani Kunene	11	R1958
8. Thakathile Gazu	12	R2136
9. Zenzile Mthimkhulu	11	R1958
10. Snenhlanhla Biyela	10	R1780
11. Mpumelelo Mdakane	12	R2136
12. Zamile Kunene	10	R1780
13. Lungeleni Mthimkhulu	11	R1958
14. Celiwe Biyela	12	R2136
15. Fikile Majola	12	R2136

Each participant in the group thus increased their savings by around R450 during the year through the small loans scheme of the group. It is through this process that cash flow can be generated to buy input for maize production.

Challenges in the savings process included the following:

- During the share out meeting there were no coins for change and this made sharing the cash a little difficult.
- Initially people did not understand that one earns according to how much he/she puts in.
- There was also some misunderstanding regarding why the small loans are done. They thought they take the money just to make sure that there is nothing left on the money box for the case of theft. Some members of the team borrowed a huge amount of money and they did not have the money to pay back the amount that they have borrowed.

These challenges are not atypical for new savings groups and overall it is considered that this group is functioning very well. A few more members were recruited

Right: the share out meeting for the Maphothwe group. This very transparent process of sharing out cash where all are present and all can see the actual cash is one of the reasons that these group work well and why people can trust each other.



Farmer Innovation Platforms

Madzikane Stakeholder Forum

An innovation platform and stakeholder forum has been set up at Madzikane (Creighton) in Southern KZN. The process was formalised through the hosting of a farmers' symposium called 'New frontiers in CA implementation for smallholder farmers in Southern KZN'

The event was co-hosted by KwaNalu (KwaZulu-Natal Agricultural Union) on the 8th of February 2017. The agenda is outline below

Item	Person
1. Opening prayer	Mr C.D Xaba
2. Welcoming of guests	Mazwi Dlamini
3. Objectives	Erna Kruger
4. Background of the Madzikane farmers	Mazwi Dlamini
5. Visits to two nearby trial sites <ul style="list-style-type: none"> • Mrs Shozi (homestead based) • Mr CD Xaba (Co-op – PANNAR, Cedara FSR, GrainSA, LandCare) 	Mazwi Dlamini
6. Stakeholder presentations: HOW CAN WE INTERGRATE ROLES FOR AN OPERATIONAL CA SYSTEM THROUGHOUT THE VALUE CHAIN?	<ul style="list-style-type: none"> - GrainSA CA SFIP (Erna) - Agroforestry (INR-Zanele Shezi) - Working with savings and credit groups (StratAct- Nqe Dlamini) - DARD (Mr Mncwane), LandCare (Mr B Mashiyane), Farming systems research (Mr s Madiba)
7. Open discussion	Roy Dandala
8. Drafting of a plan of action	Erna Kruger
9. Closing Remarks	Roy Dandala

Attendance: 65 participants including;

- Cooperative members form Nokweja (8),
- PACSA farmers and facilitator (Michael Malinga)
- Around 45 Madzikane community members
- INR field staff (4)
- LandCare, DARD, FSR – provincial government structures

- Lawrence Sisitka (Rhodes University -Environmental Learning Centre)

Right: Mr Dandala chairing the session



Objectives of this session and the forum

The stated aim of the day was to engage stakeholders involved in Conservation Agricultural trials and in supporting farmers in the area, along with the farmers in a discussion around the types of support being offered touching also on a cost benefit analysis of the proposed system for each of the stakeholders and to discuss jointly the pro's and cons of the various ideas being introduced.

The idea was to attempt to create a space conducive to discussion rather than outsiders competing against each other – to move away from the concept that is created that farmers must choose the one best idea or support package being offered by one of the stakeholders to a concept of analysis of the various ideas to assess pros and cons, understand the varying intentions of each intervention and make decisions then that can incorporate positive aspects across interventions.



The idea was also to use this as a springboard to set up a stakeholder forum around the concept of a Community of Practice.

Right: Participants of the Madizkane farmers symposium

Discussions

Field walks were conducted to Mrs Shozi's homestead based fields and Mr Xaba's trials and fields in the cooperative fields. Discussions were held on the trials and implementation showcasing the Grain SA SFIP trial (intercropping with beans and cowpeas, OPV maize, close spacing, micro dosing and cover crops, with the control plots, which are CA plots planted to a GM maize variety (7374). PANNAR has set up a trial of different PANNR Maize hybrids and GM varieties and the FSR unit at Cedara set up a trial plot of different bean varieties under CA.

Mrs Shozi: She described that she initially planted her own traditional maize and got quite low yields. They then started the farmers' association and started to work with KwaNalu. Here CA and GM varieties were introduced to them. After this it was difficult to go to NCD in town and buy yellow maize of unknown origin, so they now club together to buy GM seed for their plots.



Far left: A group of participants visiting Mrs Shozi's homestead plots, here looking at the CA maize and bean intercropped plot.

Left; A view of Mrs Shozi's maize and cowpea intercropped plots.

Mr Xaba mentioned that he has been doing experimentation and trials with a number of stakeholders over the last few years. This has all been extremely useful to him – working with different organisations and the community members, he learned a lot. In summary, he is now doing all his cropping with "no-till". It is more work than when using a tractor, but in this way he now has bumper yields and is expecting a 10ton /ha yield this year.



Above left to right: A group of participants visiting Mr Xaba's trial and control plots. A view of Mr Xaba's Gm maize control plot. And a view of his CA maize and bean intercrop plot.

Questions and comments for field walks

1. Which are the best months to plant beans?
2. How long does fertilizer last in the soil? We are told to put at planting and to top dress, but then there are still deficiencies in our fields – why is that?

3. When we do intercropping should we plant the maize and beans together or should we wait 2 weeks before planting the beans?
 4. Please explain why the two rows of maize and 2 rows of beans ? Why not single rows? And why are they planted to close?
 5. We need some more information about the input packs supplied through GrainSA.
1. We like the idea of intercropping with beans- it means there is crop diversity and also a better income. It also suppresses weeds which is a big problem for us
 2. What I saw with the intercropping is that Mrs Shozi's intercrop was very good and Mr Xaba's not so good, as the maize and beans both showed some signs of nutrient deficiency here. The way I understand it is that Mr Xaba's soil may not be so good... and not that it is a problem with intercropping itself as Mr Mashiyane was saying.
 3. In Nokweja we are planting 12,5 ha's We are getting the input packs from GrainSA FDP – at R1 900 for enough inputs for 1ha. This is helping us a lot as we could not plant the whole area otherwise. It would be good for other farmers to also know about this option.

Stakeholder perspectives; Way forward

Both KwaNalu and Mr Mancawne from DARD emphasized that it is good to have many stakeholders in an area working together to assist farmers. There is a great need and everyone's contribution is valued. Mr Mancawne stated the positive role of NGOs in the communities for communicating closely with farmers and being concerned with helping them. He said there should be no competition between organisations as our role is to assist in improving the farming systems and as far as he can see all the interventions have that as an aim even if they are not doing the same thing. He said that the trials are good for communities to learn and that the department can coordinate the organisations coming in.

The LandCare representative was concerned that the NGOs are emphasizing outdated methods that are not very good- such as intercropping and OPVs and that this detracts from the latest technologies. He felt also that government should coordinate the activities in an area.

Eventually the meeting was closed by thanking all participants and by offering that this would be the beginning of ongoing sessions of this nature to bring farmers and stakeholders together - so that eventually one could work on collaborative activities and joint planning. A few of the farmers present felt that they needed a more concrete plan of action. Farmers felt that it is very important for all the stakeholders and farmers to be in meetings together

It was thus decided to set up a stakeholder forum for Madzikane and Nokweja which would meet quarterly with the following broad agenda for each meeting

- Information session; topical presentations and discussion
- Discussion of present progress and issues
- Joint action plan between farmers and stakeholders (join activities, collaborative efforts)

Problems encountered, milestones not achieved and reasons for that

As mentioned the expansion into Midlands communities has been a lot slower than anticipated due to unforeseen lack of cooperation from stakeholders to support the needed entry into communities.

A further issue has been that of capacity within Mahlathini as fieldworkers were already fully extended in the Bergville and Southern KZN expansion areas. The budget proposed for this project was small and assumed working with existing staff.

In addition, working in Land reform communities and on previously church owned land means that those areas are not well serviced by Government Departments as these areas are considered private land and are not a priority. Although this has been the actual reason for attempting to expand into these areas and provide support to smallholders there, it also means that one is starting from a base where self-organisation among smallholders is somewhat incoherent.

The choice of sites was based more along social lines and not much attention was given to the overall agronomic maize production potential. Some of the areas are thus a bit marginal for commercial maize production.

With the present vagaries in climatic conditions, any implementation of a production support process is constrained and the risk of failed harvests, especially in the more marginal smallholder production areas is substantially increased. Climate variability in dryland cropping systems is becoming a major risk factor in production support processes.

The model for awareness raising and expansion of CA into new areas where smallholders produce maize is solid and works well but it may take time to create traction for CA in newer areas, especially if maize production potential is not that great to start with. Positive results from using CA in difficult climatic conditions and in conditions of poor soil fertility and soil health take a few years (3-5 years). Smallholders however expect positive results in the short term and are not motivated to continue with the new ideas if these results are not forthcoming.

The soil health tests and analysis have run smoothly and will be continued yearly from this point forward as will the taking of soil samples and comparison of soil fertility results. Soil health tests are expensive and are only possible for a small group of the smallholders involved.

Suggestions/ potential solutions

- MDF has employed more field staff to increase capacity and is also now working with 2-3 interns in a continuous basis.
- There may be a need to separate the expansion and awareness raising aspects of this programme to an extent from the research aspects-
 - Further funding is required for the expansion, both in terms of resources for the inputs required for the farmer experimentation and the required logistical capacity to service many different areas
 - Research requires greater focus, time and technical expertise than some of the fieldworkers have and specific staff may need to be employed for this.

Instrumentation and analysis is generally too expensive to fall within the present budgets

- Bringing other potential donors on board is important both for the research and the expansion as is the initiation of smaller, dedicated research projects within this process.
- Opportunities exist to work within the realm of climate change adaptation and payment for ecosystem services schemes, but this aspect is complex and will require focussed attention.
- Partnerships with government departments such as Agriculture, Rural Development, Environment and Economic Development are important.