



Agricultural developments on Middelrus farms on land not part of the joint ventures – livestock and arable options

Report on a brief study in November 2012

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Introduction and methodology

There are six community groups¹ currently part of a company, Siyathuthuka, that is in a joint venture in vegetable production and marketing with Vrystaat Farming in the Middelrus Valley near Mooi River. Each community provides (or will provide) between 10 and 35 hectares arable land to the joint venture. In addition the community groups rent land to Vrystaat Farming for potato production – upto 30 hectares on some farms. These six farms range in size from 254 to 1035 hectares and so it can be seen that a substantial amount of land is not utilised in these commercial operations.

There are six additional properties that it was felt were needed to be included in this planning research as they will become important to addressing the livestock matters in the valley - four farms already owned by land owning community groups that are not currently part of the Siyathuthuka company², a further farm where the community group³ will be moving onto the land into a agricultural village, as well as Clifff Egberink's⁴ farm (referred to as Manana in the report below). These farms were therefore included in some of the analysis below.

Phuhlisani received some funds from ADA to briefly investigate options for the use of such other land on the different farms:

1. Arable land for household production
2. Arable land for small-scale commercial production
3. The better use of the grazing land as the current practices are not sustainable.

Phuhlisani submitted a budget for such work, which was an extension to the existing contract that Phuhlisani has with ADA to support the six communities in the Joint Venture. ADA could not provide the full budget due to procurement regulations and so the research and the output had to be adjusted to the budget.

Methodology

The following methodology was adopted:

1. A survey of households on the six farms was undertaken to determine the households' interests in and approaches to arable and livestock farming. This was crucial in the design of possible options.
2. A rapid survey of physical resources:
 - a. The resources on the 6 farms as well as confirming arable land most suited to household and small-scale production – to add the earlier study that was done under the auspices of Inkasa.

¹ The six community groups include the following: Emketeni, Gugulethu, Phumelelani, Thembanani, Ngwazini and Hlanganani.

² These include Igqumusha, Zamokuhle, Zondi and Avalon.

³ Ebuhleni – which comprises worker families who currently stay on the farm owned by Clifffie Egberink until recently and who will be moving to an adjacent farm once the village has been built.

⁴ The owner of Vrystaat Farming

- b. The resources on additional farms in the valley whose owners will become part of the Siyathuthuka company in the future, as well as the Manana farm of Cliffie Egberink which have been sold to the government.
3. An engagement with the fledgling livestock farmers association about options to be investigated
4. An analysis of options, for cropping and for livestock.
5. Discussions with the community groups about the options proposed.
6. Refining the options.

The cadastral and size data for each of the farms is included in the table below.

Table 1: Cadastral data for the farms

Present farm and community name	Original farm name, and number and sub-division	Area in ha.
Group 1		
Emketeni	Waterval 1003 Sub 12	333,41
Gugulethu	New Farm 18006	344,14
Hlanganani	Portion 3 of Middelrus 1989	410,19
	Portion 1 & 2 of Rensburg 1022 (411,26 + 205,63ha)	616,89
Ngwazini	Rem of Doornkloof 1318	253,60
Phumelelani	Portion 10 of Waterval 1003	443,17
Thembanani	Portions 9 & 11 of Doornkloof 1318	236,69
Group 2		
Avalon	Portion 9 of Rensburg 1022	208,15
Ebuhleni	Portions 4 & 7 of Doornkloof 1318	1 050,56
Igqumusha	No 17341	1 869,50
Manana	Portions 4, 6 & 8 of Rensburg 1022	874,19
Morgenzon (Zondi)	Portion 1 of Doornkloof 1318	187,49
Zamokuhle	Portions 5, 6 & 8 of Doornkloof 1318	286,41
		7122,44

Survey of people⁵

The survey instrument was prepared by Phuhlisani in consultation with three individuals from the community who then administered the survey with Phuhlisani staff located in the Valley. The survey was aimed at the households. The “household” is a complex concept in the Valley as it most often refers to an umuzi which is a cluster of homes of relatives who are under the primary authority of the most senior male member of the family. While it is problematic from a gender perspective in particular, given the time available, the survey was aimed at interviewing the household head on all matters including the use of arable land which is most often undertaken by women.

⁵ The survey instrument is attached as Appendix 1.

Livestock farmer analysis

Major findings of the survey are summarised as follows:

1. Livestock ownership and grazing resource use

	Cattle	Sheep	Goats	LSU equivalent ¹	Grazing needs ² (ha)	Good veld available (ha)	% stocked
Emketeni	16		25	20.2	80.7	230	35%
Gugulethu	80	2	91	95.2	380.7	251	152%
Phumelelani	166		31	171.2	684.7	426	161%
Thembanani	151		50	159.3	637.3	126	506%
Ngwazini	77		108	95	380	190	200%
Hlanganani	70	3	72	82	328	946	35%
TOTAL	550	5	371	622.8	2491.3	2169	115%

Notes:

¹LSU – All livestock converted to Large Stock Unit equivalents

²Grazing requirements were established at 4ha per LSU

Livestock ownership is particularly high (78% of households) and probably double the incidence of livestock ownership compared to what is normally found on land reform projects and in communal farming areas.

Herd sizes are not uniform, and cattle numbers are particularly influenced by a few large herders (33% of cattle owners own 76% of cattle, and conversely amongst 62% of cattle owners, herds are smaller than 10).

Thembanani is critically overgrazed. Gugulethu, Phumelelani and Ngwazini farms are also grossly overstocked. Importantly, while the stock numbers owned by the farm owners at Emketeni and at Hlanganani are substantially less than the carrying capacity of the farms, both farms are leased out to commercial farmers and the result is substantial over-grazing of these farms too – it is understood that the farmer leasing Emketeni has in the order of 150 livestock units and thus the grazing is currently at about 300%.

2. Reasons for keeping cattle.

	% of cattle owners
Household ceremonial slaughter	74.4
<i>Lobola</i>	69.2
Form of savings/ investment	66.7
Milk for home consumption	66.7
Breeding stock for regular sale	56.4
For occasional sale/trade to local households	41.0

To pay social fines (<i>Ihlawulo</i>)	38.5
Home meat consumption	25.6
Social prestige	15.4
Sale of milk	10.3

Ceremonial slaughter, *lobola*, investment and milk for home consumption are all important reasons for keeping cattle and therefore these factors have to ideally be retained in planning for future farming operations. Regular stock sales were also claimed as a reason but only 45 head of cattle were sold in total for the past year (an 8% herd offtake). Most cattle were sold locally and prices were generally on the low side (some cows, and even oxen, were sold by respondents in the survey for R3000).

3. Problems faced by cattle farmers

Water	Grazing	Advice	Lack of fencing	Transport	Vet serv	Calving %	Quality stock	Market	Bull/cow management	Theft
66.7	51.3	46.2	43.6	43.6	41.0	38.5	33.3	28.2	25.6	25.6

As could be expected in an overstocked situation, access to water and lack of grazing featured prominently as constraints to cattle production (these 2 factors interact e.g. where stock watering is scarce one gets an undue concentration of grazing pressure adjacent to watering points, especially where herds are largely unmanaged and farms are not fenced off into grazing camp areas).

4. Preparedness to pay for support

	Pastures	Repairs and maintenance	Winter feed	Bull rental	Extra grazing	Grazing fees
YES	30.8	28.2	28.2	28.2	25.6	12.8
NO	35.9	35.9	35.9	35.9	43.6	43.6
DON'T KNOW	28.2	28.2	25.6	23.1	28.2	30.8

In general there was a low level of nearly one third of farmers being willing to pay for various support services. In the case of grazing fees it was even lower, and this is of concern if CPI management is to recoup maintenance expenditure incurred on cattle-related infrastructure.

5. Herd management

All farmers claimed that their herds were managed separately (although obviously with no internal fencing, and with scant supervision, and bull/cow management is presumably minimal) for that is what they prefer. However, a *surprising response was that 80% of cattle owners said they would like to manage their herds on a co-operative basis.*

Small-scale cropping

The survey revealed 94% of all households have attempted small-scale cropping, mainly for household subsistence purposes, and all virtually on a dryland basis (the main reason why households had given up on cropping was lack of irrigation water). In the main, maize, beans, cabbages, spinach and potatoes have been or are the usual subsistence crops. In Gugulethu there have been reported successful attempts to grow maize on a slightly larger scale, even to the extent of using the Gugulethu hammer mill for the production of a coarse mealie meal.

Such cropping is usually done by the head of household's wife (65%) or by another household female (21%).

The recent survey recorded that a high 80% of households (spread proportionately across all farms) would be interested in household subsistence vegetable cropping, while only 28% (and 40% of these came from Gugulethu) of households were interested in emergent commercial cropping. 80% of households interested in emergent commercial cropping wanted to produce maize (that could be a significant factor if a possible maize milling project for the valley is shown to be feasible – one of the valley's emergent commercial cropping constraints would be access to markets, but under a local milling scheme, a local market for maize would be automatically created).

Survey of physical resources on the different farms

A detailed survey of the six Siyathuthuka-linked farms (Group 1) was undertaken at an earlier stage - from December to February 2011. This current survey added to that information particularly regarding infrastructure and assessed more briefly the other farms (Group 2) as indicated above.

The detail about the climate, soils, grasses and water is included as an extract from the main report by Pat Hawkins attached as Appendix 2. The important aspects of the current available physical resources are as follows.

Grazing

The present position is that although the Valley as a whole is not yet overstocked, parts of it are – and this trend is aggravated by the concentration at this time of year (October and November) of livestock close to the river as the main, if not only, source of water. The problem is also aggravated by the fact that at least 2 communities are leasing out large tracts of their grazing land to neighbouring commercial farmers so that their own land is also overstocked. In brief, serious overstocking is already a serious problem in all of the Siyathuthuka linked farms. Stock numbers for the Group 2 farms are not yet available.

The grazing capacity of Dry Tall Grassveld is assessed at 3,5ha per Animal Unit when in good condition but in the Valley as a whole it is put at 4,0ha per Animal Unit.

It is important to note that in the study area there are several areas which are suffering the effects of over-grazing⁶⁶. The sparser grass cover on old lands on Igqumusha and the scars of severe

⁶⁶ The vegetation throughout the study area is what the Department of Agriculture describes as Dry Tall Grassveld, which is a grassland veld type in open savannah with *Acacia sieberana* and *Acacia karroo* as the

overstocking as shown on Map 1 on the most northerly of the Hlanganani farms as well as on Zamokuhle, Emketeni, Phumelelani and Ebuhleni are most concerning. In all of these cases large areas were in the past bared of all grass cover leading to severe sheet erosion, the loss of most of the topsoil and extensive gullying.

As discussed below, these areas of past overstocking, although dating back to long before the present communities acquired the land, were highlighted in the discussions with different communities as the consequences of overstocking and poor veld management.

Soil mapping

As regards soil mapping, the soils of the Valley floor tend to be highly variable with changes usually related to topographic factors. As a result it was decided that rather than trying to map each soil form separately, which would require a very high density of observations, the emphasis should rather be on separating the high potential soils from the low potential ones even if this necessitated the mapping of soil associations rather than separate soil forms as long as the associations were of forms which occur together in a recognisable landscape unit.

The resulting soil maps, below, are therefore more correctly described as *land resource maps* which show land capability units within the arable land, and different categories of grazing land in the non-arable areas so as to give the following 5 broad land resource units, as shown on Map 1 (the Land Resource map).

- High potential arable land mainly of the Hutton, Oakleaf, Avalon and Tukulu soil forms.
- Arable land of lower potential mainly of the Valsrivier and Sepane soils.
- The non-arable upland areas of good grazing land.
- The degraded upland grazing areas where there has been severe past erosion.
- The non-arable bottom lands i.e. wetlands, watercourses and dongas.

Water

This area relies heavily on the Mooi/Mpofana River for perennial water supplies. The only other perennial stream of any consequence being the Mhlozane river which drains the Scottberg Mountain and provides all of the irrigation water for the Hlanganani farm No 1022/2. As a result all other irrigation development in the area is dependent on being able to obtain a sufficient water right from the Mooi/Mpofana river from the Department of Water Affairs and the Mooi River Irrigation Board.

Negotiations were undertaken during March 2011 with the Department of Water Affairs and the Irrigation Board to establish the position regarding the 6 farms which were about to join the Joint Venture with Vrystaat Farming. The existing water rights, as recorded by the Mooi River Irrigation

most common tree species. Dominant grasses in veld in good condition are: *Themeda triandra*, *Tristachya leucothrix*, *Hyparrhenia hirta*, *Eragrostis capensis*, *E. racemosa* and *Heteropogon contortus*. On overgrazed land and on old lands *Hyparrhenia hirta* becomes dominant with an increase in less desirable species such as *Digitaria monodactyla*, *Eragrostis curvula*, *E. chloromolas*, *E. plana*, *Sporobolus pyramidalis* and *S. africanus*. In the driest areas *Aristida congesta* and *Cynodon dactylon* become dominant. There is also a marked decrease in the density of grass cover in overgrazed areas and on old lands.

Board, at that time, were as tabulated below. It was then agreed that the Board would accept and support additional allocations where necessary as shown in table 3.

Table 2: Water rights and approved additional applications (March 2011)

Farm No.	Community	Existing water right (ha)	Approved additional applications (ha)
1022/1	Hlanganani	50	-
1022/2	Hlanganani	40	-
Rem 1318	Ngwazini	50	10
1318/9 & 11	Thembanani	S ₁ only	110
1318/4 & 7	Ebuhleni	S ₁ only	25
1318/6	Zamokuhle	15	-
1003/10	Phumelelani	15	-
1003/12	Emketeni	20	15
18006	Gugulethu	50	20

At that time the Group 2 farms were not included in the negotiations. At this point it is not clear what the water right situation is on these farms. This matter was outside the brief for the present study.

Summary of physical resources

It will be evident from the foregoing discussion on climate, vegetation, soils and water resources that the broader study area has two major agricultural resources:

- a) An impressive irrigation resource based on matching soil and water resources for the development of some 800ha of irrigable land.
- b) A grazing resource of over 7 000ha of grazing land of the Dry Tall Grassveld type.

The detail of this summary per farm is shown in the tables and map below:

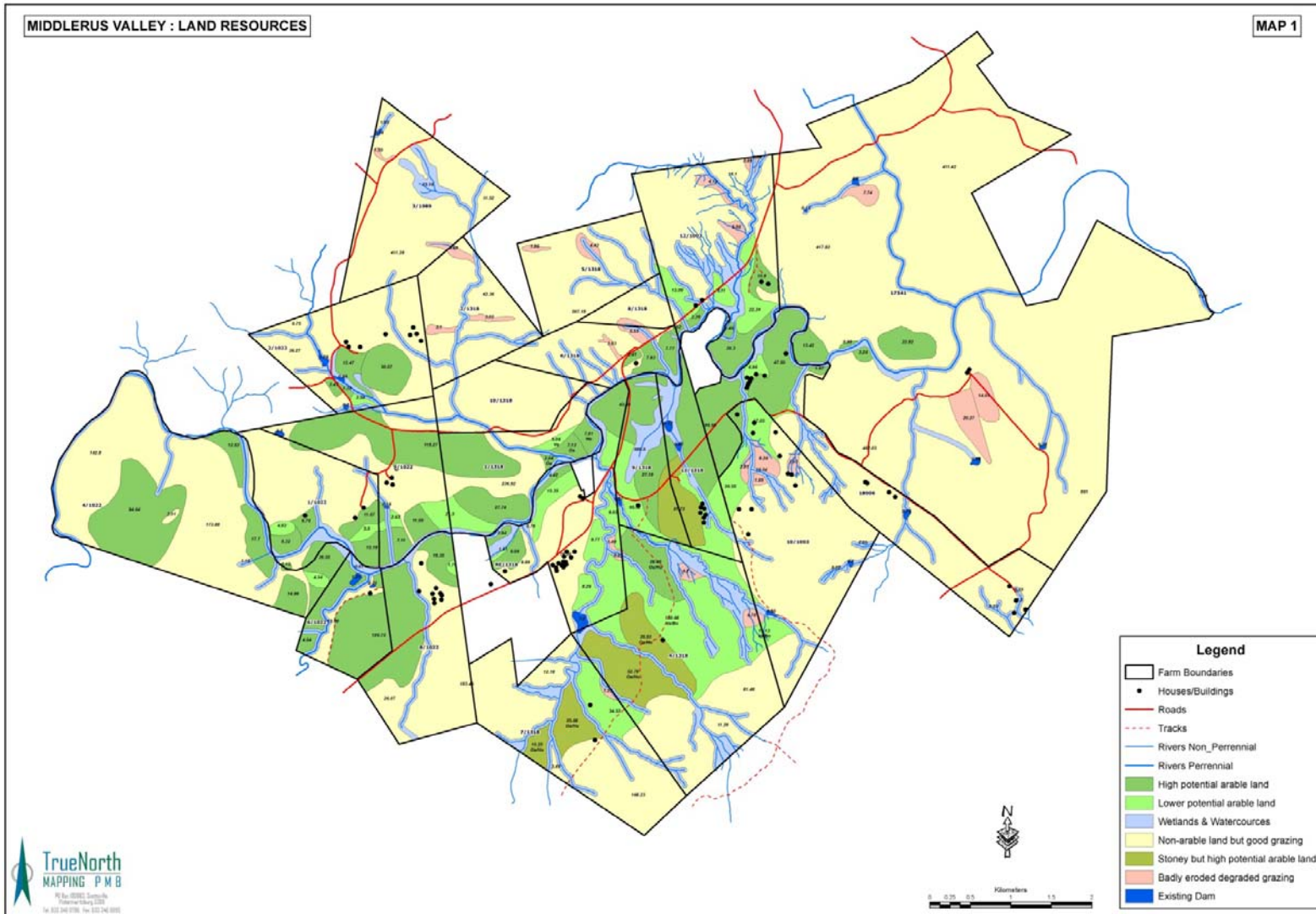
Table 3: Summarised individual farm data for all group 1 (Siyathuthuka linked) farms

Farm details	Emketeni	Gugulethu	Hlanganani	Ngwazini	Phumelelani	Thembanani
SG's Farm No. & Sub No	1003/12	18006	1989/8 1023/1 &2	Rem of 1318	1003/10	1318/9 &11
Area (to nearest ha)	333	344	1 035	254	443	237
<u>Land resources</u>						
High potential irrigable land	26	70	78	56	16	66 + 54 (stony)
Lower potential irrigable land	30	-	16	27	33	42
Good grazing land	241	251	926	171	376	92
Degraded grazing land	36	23	15	-	18	-
<u>Land use allocations</u>						
Leased to Joint Venture	30	20	25	23	12	25
Leased to Vrystaat Farming	-	50	62	27	-	36
Leased to Lion Valley Fruit	-	-	-	-	-	50 (potential)
Retained for community crops	2	5	2	6	5	2
Grazing land	267	274	946	190	426	126
<u>Water sources & rights</u>						
Water sources	Mooi River			Mooi River (no frontage)		
Water rights (ha)		70			15	
<u>Bioresource & climatic data</u>						
Bioresource Group	DTG	DTG	DTG	DTG	DTG	DTG
Bioresource Unit(s)	Tc10 & Uc9	Tc10	Tc10 & Uc9	Tc10	Tc10	Tc10
Mean annual rainfall (mm)	680	680	680-740	680	680	680
<u>Livestock & grazing data</u>						
Cattle	16	80	70	77	166	151
Goats & sheep	25	93	75	108	31	50
Total AU	20	95	82	95	171	159
Grazing land needed	80	380	328	380	684	636
Grazing land available	230	251	946	190	426	126
Stocking rate (%)	35	151	35	200	160	505

Note: The only farms which are not already fully stocked or overstocked are Emketeni and Hlanganani but both lease most of their grazing land to neighbouring commercial farms so that in practice their farms are also overstocked.

Table 4: Summarized individual farm data for all group 2 farms

Farm details	Avalon	Ebuhleni	Igqumusha	Manana	Morgenzon (Zondi)	Zamokuhle
SG's Farm No & sub number	1022/9	13118/427	17341	1022/4, 6 & 9	1318/1	1318/5, 6 & 8
Area (to nearest ha)	208	1051	1870	874	187	286
<u>Land resources</u> (provisional assessments)						
High potential irrig. land	100	119 (but stony)	27	±120	70	15
Lower potential irrig. land	15	-	13	±80	15	-
Good grazing land	98	998	1700	720	100	265
Degraded grazing land	-	33	170 (old lands)	-	-	5
<u>Land use allocations</u>						
Leased to Joint Venture	Nil at present	Not yet occupied	Nil at present	Nil at present	Nil at present	Nil at present
Leased to Vrystaat Farming	60	Not yet occupied	Nil at present	40	20	All land leased
Leased to Lion Valley Fruit	Nil at present but potentially 100	Not yet occupied	Nil at present	85	Nil at present but potentially ±30	To MC Wolhuter
Retained for community crops	1ha	Not yet occupied	Nil irrigated	4	2	Nil
Grazing land	92ha	1051	1700	750	165	265
<u>Water sources & rights</u>						
Water sources	Mooi river	2 boreholes	Mooi R. with 2 former pump stations	Mooi R. 3 pump stations	Mooi & Mhlazane R. 2 pump stations	Mooi R. 1 pump
Water rights	To be determined	S ₁ only at present	To be determined	To be determined	To be determined	15ha
<u>Bioresource & climatic data</u>						
Bioresource Group	Tall Dry Grassveld (TDG)	TDG	TDG	TDG	TDG	TDG
Bioresource Unit(s)	Tc10	Tc10	Tc10 & Uc9	Tc10 & Uc9	Tc10	Tc10
Mean annual rainfall	680	680	680-740	680-740	680	680
<u>Livestock & grazing data</u>	Livestock numbers not yet known.					
Cattle						
Sheep & goats						
Total AU						
Grazing land needed						
Grazing land available						
Stocking rate (%)						



Assessment and recommendations regarding infrastructure

The recommendations for infrastructural development which follow are aimed at rectifying 5 main deficiencies which affect practically all of the communities in the Valley. These are:

1. Problems relating to boreholes which are intended to supply water for both domestic and livestock water but which, for various reasons are unsatisfactory or non-functional.
2. Access for community use (e.g. community gardens or for livestock watering) to irrigation water supply systems.
3. The need for stock watering dams in the more distant hilly grazing areas which are, at present, unavailable for grazing due to distance from existing water sources.
4. Fencing in order to secure farm boundaries and provide internal grazing camps.
5. Lack of facilities for livestock handling and veterinary purposes.

Borehole problems

During dry spells, like the October/November period, the need for access to a safe, reliable, clean source of water becomes an over-riding priority for both people and livestock. It is thus extremely frustrating to find in an area like the Middelrus Valley where most of the farms have, or have had, boreholes that at present most of the communities have borehole problems. In some cases the borehole is not working at all (reason unknown). In others the water has a bad taste, in others the pump is faulty or there are problems with the reticulation system.

In short, the situation in the Valley is that the area desperately needs a systematic examination by a suitably qualified person of all of the existing boreholes in order to

1. see which boreholes and pumping installations are faulty and why;
2. do proper tests of both the yield and quality of water available on all existing boreholes;
3. advise on appropriate rectification measures;
4. consider possible additional borehole sites in at least 2 specific needy areas at Phumelelani and Upper Gugulethu and also at Ngwazini if it is found that the water quality from the existing borehole cannot be rectified.

Access to existing irrigation water supplies for stock-watering and for community gardens

There are places on most farms where stock watering points are needed that are most conveniently, inexpensively, and reliably supplied with water from nearby irrigation pipe-lines. In these cases it is recommended that suitably sized reservoirs be built so as to hold enough water for say at least a week's supply for the relevant number of animals, the details to be worked out in each case with the ADA appointed engineers. In each case the reservoir would also need to be connected to a drinking trough (or two where 2 grazing camps need watering points from the same reservoir).

It is possible that arrangements can then be made with Vrystaat Farming who, in their own right, or as participants in KwaGezibuso, operate the irrigation systems to fill the reservoirs as and when required.

A similar arrangement is also recommended for those community gardens which are to be supplied via reservoirs supplied from Vrystaat Farming or KwaGezibuso pump stations, again in consultation with the engineers.

Stock watering dams, mainly in more distant hilly grazing areas

As discussed earlier with the Department of Agriculture (by Pat Hawkins) there is a need for:

1. Assistance in de-silting existing stock-watering dams as found on Igqumusha, Gugulethu, Phumelelani and Ngwazini, as shown on Map 3.
2. Building additional stock-watering dams on Phumelelani, Ngwazini, Hlanganani and Emketeni, as shown on Map 3 below. Wherever possible these need to be large and deep enough to hold water throughout the year.

Fencing and paddocking

As explained earlier the present “system of veld management” seems to be simply to release all livestock daily to roam at will across the Valley largely unchecked by fences. In order to enable any veld management system to be introduced it will therefore be necessary to:

1. Contain all livestock within the boundaries of their own farms.
2. Introduce some form of rotational grazing on the individual farms. (Say at least 2, but preferably 4 grazing camps in each case, which can then be grazed according to the recommended 1 herd : 4 camp system which permits one camp to be completely rested every 4 years while the other 3 camps are grazed with 21 day periods of stay and 42 day periods of absence – this will of course need to go hand in hand with the reduction of stock on each of these farms).

There are 3 district roads in the area, most of which are fenced, pass through most of the farms thereby automatically dividing such farms into 2 basic grazing camps. Each of these may in turn be sub-divided into 2 more or less equal-sized grazing camps provided that each has access to an existing or potential source of water.

As regards the boundary fences the position varies from farm to farm. Some, like the Hlanganani farms and parts of Gugulethu are adequately fenced. Others are poorly fenced or have at least sections of boundary fence needing rehabilitation or replacement, as shown, provisionally, on Map 3.

Access to veterinary and stock handling facilities

There are, or were, 5 dipping facilities in the Valley located at Emketeni, Gugulethu, Thembanani, Ebuhleni (all dip tanks) and the Manana farms (a spray race). Of these both Emketeni and Thembanani, because of their present condition and proximity to water courses, are considered to be unsuitable for restoration, while the Ebuhleni dip is basically sound but needs some maintenance work to be done. The Gugulethu and Manana facilities also need a check-over but are otherwise functional.

It is recommended that new dip tanks and associated holding and crush pens be constructed at Emketeni and on the Hlanganani-Avalon boundary but just inside Hlanganani farm 1022/2 beside the district road.

In addition to these it is also recommended that basic stock-handling facilities consisting of a holding pen, a crush pen and a loading ramp be constructed on each farm in a locality where they can be protected from damage by the veld fires which are prevalent in the area.

Other development needs

A less general development need is spring protection works on the 2 springs on Emketeni which provide domestic and livestock water supplies, and for the spring which provides water for the Zamokuhle residential area. This service should also be provided to any other perennial springs in the area.

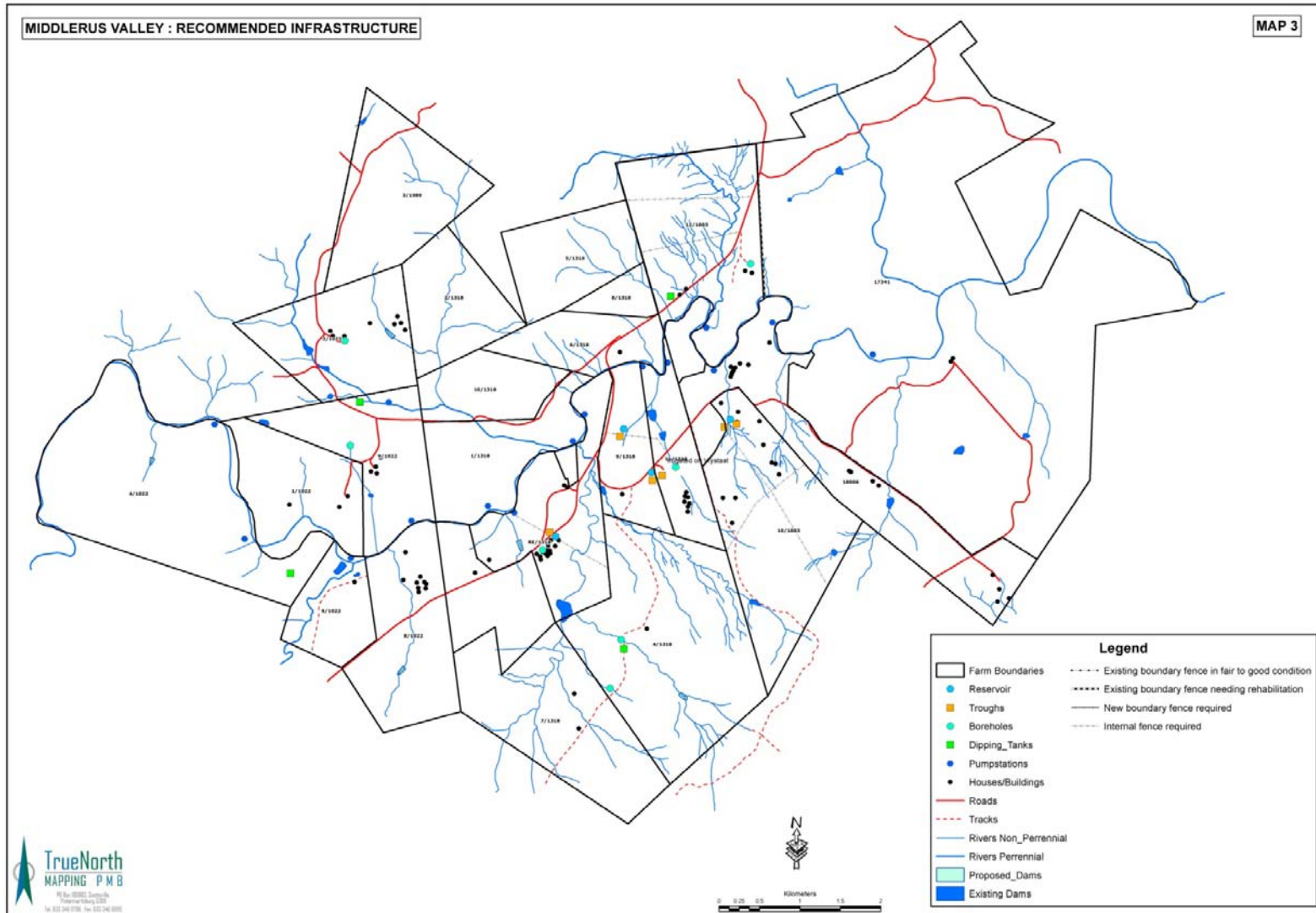
Summary and map of infrastructure

The table overpage and the map that follows provide the summary of these infrastructure needs. This summary table was provided to ADA in December in anticipation of the need to proceed with the addressing some of these needs before the financial year came to an end.

Table 5: SUMMARY OF INFRASTRUCTURE REQUIREMENTS AND INITIAL ESTIMATION OF COST

Items	NOTES	Farms												Total cost R.
		Emketeni		Gugulethu		Phumelelani		Thembanani		Ngwazini		Hlanganani		
		Unit	R.	Unit	R.	Unit	R.	Unit	R.	Unit	R.	Unit	R.	
External fencing	1	12.7km	222885	4.0km	70200	Unknown	Upper boundary			9,3 km	163215	0	0	456,300
Internal fencing (metres)	2	2830	49667	380	6669	2800	49140	1100	19305	1010	17726	1830	32117	174,623
Crushes	3	1	750	1	750	1	750	1	750	1	750	1	750	4,500
Assembly pens	4	1	15000	1	15000	1	15000	1	15000	1	15000	1	15000	90,000
Loading ramps		1	1500	1	1500	1	1500	1	1500	1	1500	1	1500	9,000
Dip tanks new		1	5000									1	5000	10,000
Dip tanks rehabilitation	5			1	4000					1	4000			4,000
Spring protection		2	3000			1	1500					2	3000	7,500
New boreholes	6			1	40000	1	40000	1	40000					120,000
Pumps and piping for new boreholes	7			1	35000	1	35000	1	35000					105,000
Borehole/borehole pump rehabilitation	8									1	37500			37,500
De-silting dams	9			1	1250	1	1250	1	1250	1	1250	1	1250	6,250
New stock dam	10	1	2500			1	2500		2500	1	2500	2	5000	15,000
Water troughs	11	4	6000	4	6000	4	6000	4	6000	4	6000	5	7500	37,500
Perimeter fencing of Vrystaat cropping areas - area ha	12			32.2	51000			36	53200	28	46900	32	50140	201,240
Reservoir/water tank (litres)	13	175000l	175000	225000l	225000	237500l	237500	350000l	350000	500000l	500000	387500l	387500	1,875,000
Subsistence vegetable cropping														
Irrigation (ha)	14	0.2	2400	0.6	7200	0.45	5400	0.4	4800	0.5	6000	0.55	6600	32,400
Fencing off plots (metres)	15	210	5250	580	14500	410	10250	370	9250	450	11250	490	12250	62,750
Gates		2	1800	4	3600	2	1800	2	1800	2	1800	2	1800	12,600
Emergent commercial cropping														
Irrigation (ha)		0.5	5000	3.0	30000	0.5	5000	1.0	10000	1.5	15000	1.0	10000	75,000
Fencing off plots (metres)		300	7500	1300	32500	300	7500	500	12500	700	17500	500	12500	90,000
Gates		2	1800	12	10800	2	1800	4	3600	6	5400	4	3600	27,000
Maize mill refurbishment	16			1	50000									50,000
Maize mill storage facilities	17			1	90000									90,000
TOTAL CAPITAL REQUIREMENTS			505,052		694,969		421,890		566,455		853,291		555,507	3,593,163

NOTES
1. This a minimum provision for boundary fencing, and will depend on engineering assessment. Cost assumed at R17550/km. Cost derived from KZN DoA 2010 ComBud (R12.15/m. for 5-strand fence). Allowance made for inflation and a 25% contractor mark-up.
2. R17.55/metre. Cost derived from KZN DoA 2010 ComBud (R12.15/m. for 5-strand fence). Allowance made for inflation and a 25% contractor mark-up. (NB Does not include internal public roadside fencing)
3. Est. R750 for poles and labour for a basic crush.
4. Small assembly pen structure only. Est.R15000 for poles and labour.
5. Rehabilitation of dip tanks assumed at 80% of a new one.
6. R40000 is a standard guideline cost per new borehole. Final cost will depend on depth of drilling.
7. R35000 is a guideline cost for pump/piping for a new borehole. Final cost will depend on final location of borehole.
8. Borehole rehabilitation assumed at 50% of new borehole and new pump/piping.
9. Based on 5 hours work of a 65kw tractor and 4 cu.m. dam scoop per dam.
10. Based on 10 hours work of a 65kw tractor and 4 cu.m. dam scoop per dam.
11. Concrete water troughs with valves and piping @ R1500.
12. Bonnox fencing @ R25/m.
13. P.Hawkins recommends water storage capacity equivalent to 25mm of irrigation per week = 250000 l./ha. Storage would incur capital cost of R1/
14. Subsistence cropping irrigation based in intensive sprinkler system of R12000/ha (emergent commercial cropping would be less intensive and a figure of R10000/ha has been applied).
15. Fencing off of subsistence and commercial plots would require Bonnox type fencing at an estimated R25/m.
16. Maize mill refurbishing (and feasibility) will depend on engineering appraisal. This R50000 is a provision for rehabilitation.
17. Existing mill infrastructure is unknown at this stage. This item is a provision for a 75m2 shed @ R1200/m2.



Options - for cropping and for livestock.

The survey undertaken with household heads above provided the basis upon which the cropping proposals (below) were developed.

With regard to livestock however it was intended that the process should begin with a detailed discussion with all the livestock farmers as to what it was they saw as the objective of farming, and the most appropriate methods and so forth. This session was due to be with the Department of Agriculture and was to have inputs from two different types of farmer – a farmer that is a commercial livestock farmer and a farmer who follows more traditional practices. This meeting did not proceed due to lack of attendance. A follow up session was then held with the newly created livestock farmers association in the valley – this includes one representative from each of the 6 Siyathuthuka-linked community groups. That session included a discussion on the initial ideas for addressing the problems of livestock farming in the valley.

Cropping proposals

The Phuhlisani team developed initial proposals regarding the cropping options and these were then discussed in community meetings in each of the community groups. There are two proposed types of land allocations and these have different conditions of use attached to them.

Policy for cropping lands

1. Land for household subsistence plots
 - All households should have a basic free right to an irrigated plot of 500m² for subsistence and household food security purposes.
 - If the household did not use the plot, another household could negotiate to use it for a period.
 - The managing agency (probably the CPI but it could be Kwagezubuso if the CPI does not feel capable) should keep an up to date register of land use registration.
 - Such subsistence plots would be fenced and gated, would be as close to residential clusters as possible and would be provided with a basic irrigation method.
2. Land for emergent commercial cropping
 - Individuals who want to become emergent commercial crop producers would first have to demonstrate a suitable interest and ability at the subsistence level of cropping (either at the subsistence level plots or under existing informal arrangements).
 - 5000m² units would be prepared (fenced, with probable dragline and sprinkler irrigation) for an emergent commercial cropping level.
 - These farmers would pay R200 per year for the use of a 5000m² unit. Such money would be paid to the relevant CPI as a contribution towards infrastructural repairs and maintenance and irrigation costs.
 - Upon demonstrated success at this level of small-scale commercial cropping, emergent farmers would have the opportunity to enter into negotiations with Kwagezubuso or Vrystaat farms for a sub-lease of some irrigated land to become a larger-scale 'outgrower', producing under contract (such a policy is seen to circumvent what otherwise would be a probable marketing constraint to emergent crop farmer opportunity).

- It is important to note that the proposed development of the Agrivest marketing company envisages the establishment of the contract farmers in the different areas that it will draw its produce from. The emerging commercial farmers on these lands on the farms of Middelrus could therefore become involved in such contract farming arrangements through Kwagezubuso to Agrivest. This will have to be negotiated in 2012.

Management of cropping phase land usage

Phuhlisani put two options forward with regard to the management of the cropping areas. Given that most of the CPI management systems have been essentially dysfunctional and there isn't a culture of land management amongst most of the CPIs, a first proposal was that the land areas could be managed by Kwagezubuso – the allocation of land, the collection of funds, and the management of the infrastructure. The second proposal was that the CPIs manage these themselves.

All the CPIs, except Emketeni, either have or will be going through an election of a new management structure and so will be new to the job. While this will mean that the committee or trustees will be inexperienced, it will mean that they will be able to start new practices, especially with Phuhlisani assistance. The general preference with regard to management was that the CPIs should handle this themselves.

Cropping resources

1. Land availability and likely demand

At the time of doing the survey there was a lack of clarity over whether or not Kwagezubuso would be wanting to take over certain pockets of land to compliment the location of existing leased land. At that time, 23.9ha were identified as being suitable for possible household or small-scale commercial cropping. As it turned out, upon analysis of demand captured in the survey with each household, in terms of the policy approach above, only a total of 2.15 ha would be required for household subsistence production and 7.5 ha would be sufficient at this stage for expressed interest in small-scale commercial cropping. Overall therefore there is more than sufficient land for these uses, although suitable land might be limited in Phumelelani, and Gugulethu might provide a challenge in respect of its split community locations.

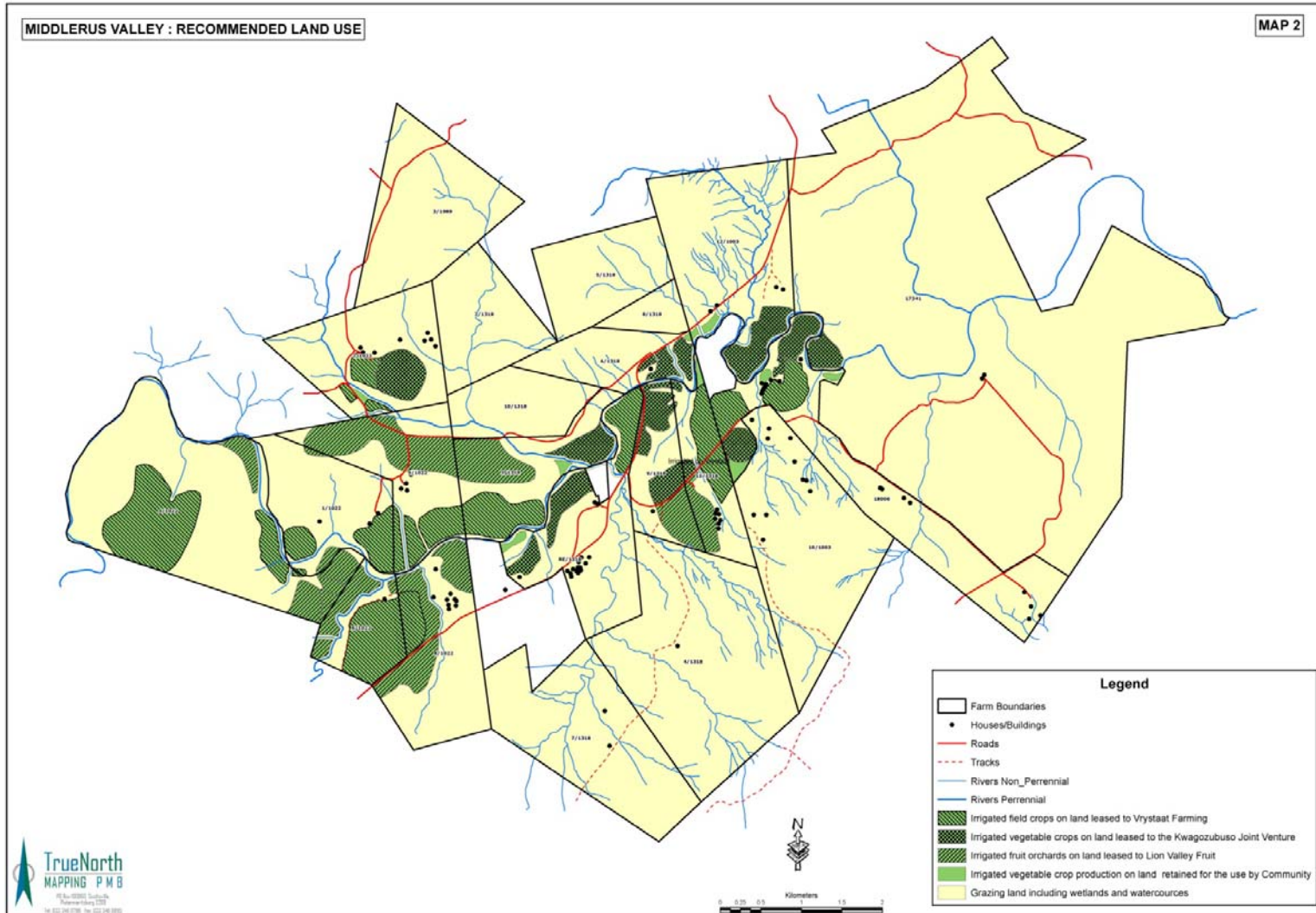
Table 6: A breakdown of cropping land supply and demand by farm

	Land needed for veg gardens				Land needed for commercial cropping		
	Land available (ha)	Growers	Area @ 500m ² (ha)	Balance available (ha)	Growers	Area @ 5000m ² (ha)	Balance available (ha)
Emketeni	2.0	4	0.20	1.80	1	0.50	1.30
Gugulethu	10.4	7	0.35	10.05	6	3.00	7.05
Phumelelani	0.8	9	0.45	0.35	1	0.50	-0.15
Thembanani	1.7	6	0.30	1.40	2	1.00	0.40
Ngwazini	3.0	9	0.45	2.55	3	1.50	1.05
Hlanganani	6.0	8	0.40	5.60	2	1.00	4.60

The community meeting held in each of the 6 communities also addressed the location of these lands. The issues that were taken into account included: the quality of the soils for cultivation; the

location in relation to proximity to the houses from a security point of view and with regard to the distance to walk to get to the lands; the ease of getting water to the lands.

The map overpage was prepared from the soil land resources survey to assist the communities to decide on the allocation of lands for these purposes (and for purposes of extended Kwagezubuso leased lands). In most communities final decisions were made – it is only in Thembanani that the lands still need to be identified as the area identified in the Phuhlisani study was deemed to be too far from the houses from a security and distance point of view. In some circumstances the communities disagreed with the initial proposal from Phuhlisani, such as at Phumelelani and Gugulethu, whereas in others there was agreement. As it turned out, this was clarified in the community meetings held with each of the communities and the identified areas were submitted to the engineers through the ADA.



2. Irrigation

There is as yet no finality over the exact method of irrigation by location. Many of the identified land sections for household and small-scale commercial cropping are immediately adjacent to the river, where there would seem to be merit in considering low-cost abstraction design (probably by portable diesel pump to a reservoir of some type for gravity feed to small-scale irrigation lands. Solar pumping is likely to be prohibitive from an initial capital cost point of view, but perhaps a hydraulic ram pump might have application on some river sites). Such independent irrigation methods would facilitate and strengthen CPI management and provide necessary flexibility. On the other hand, branch lines off Kwagezubuso irrigation mother lines might provide a more cost effective answer (but would largely remove irrigation control away from CPI level). Other possibilities that should be considered include a windmill and borehole for areas that are far from the river (such as Phumelelani and Thembanani).

An irrigation design report from consulting engineers will be necessary before detailed planning can be implemented.

Small-scale maize production – a potential opportunity

There is a sizeable, but unused mill situated on Gugulethu farm which provides a potential and unique opportunity for emergent maize production in the valley. Mention has been made in this report that marketing would be a significant constraint (due to the valley's situation) but the mill and more than 600 people making up the target farms' households represent a distinct market prospect (the potential demand could of course be far higher if resident population on other farms in the vicinity was taken into account, but the focus of this planning report is on the beneficiary households of the initial 6 farms which have come under the joint venture agreement to date).

Maize meal represents a key item in both diet and household budgets for beneficiary communities (anecdotal evidence indicates meal is purchased at R450 per 80kg bag in Mooi River – and transport of the product is also a problem).

There are three approaches to using this potential asset in valley:

- a. The first concept would be for maize to be produced by small-scale farmers under full or supplementary irrigation, and then milled and sold in bulk to valley residents. Initial local demand (based on beneficiary households of target farms) could be as high as 60 tons of meal per year. If so, even if grain (the equivalent requirement would be some 75 tons) was produced at a low input/low output level of say 3.5 tons/ha, sufficient additional arable land (and a farmer desire to produce maize) exists to produce the 20 or so hectares required.
- b. The second approach would be for Kwagezubuso to be contracted by Siyathuthuka to produce the maize under full irrigation. In this case, initial calculations are that it will cost approximately R100 000 to grow 10 hectares of maize. This will return approximately 80 tons of mealie meal valued at R352000 at retail prices. Alternatively, it would be made available at a lower price to members of the participating communities. In addition, it will provide stova for winter feed for cattle on the members, which could also be purchased by the cattle owners. Concern has been raised that diseases such as

diplodia are prevalent in the area when farming maize under irrigation. Further analysis of this would be necessary and possibly an initial test of this on a smaller portion of land.

- c. A third option would be to buy in guaranteed good quality maize in bulk and store it at the mill which is then milled on demand and sold at a lower price than people currently purchase it. The key issues to be assessed further with regard to this are the relative cost and the state of the storage facilities at the mill.

The aim of such an initiative would be to use Siyathuthuka funds that are generated through its association with Kwagezubuso to contribute to valley food security; providing lower cost meal (thus improving household economic situations) let alone a profitable outlet for empowerment of small scale commercial crop farmers.

As with the irrigation question, an appraisal report on the mill is awaited from the consulting engineers, before developing the concept further. The Board of Directors of the Siyathuthuka company have taken a decision to support the proposed use of the maize mill, pending the engineers assessment as well as an assessment of the quality of the meal that is produced by the mill.

Livestock options

Drawing from Phuhlisani's assessment of the current situation, its discussions with the Livestock Farmers Association and discussions with various specialists, three proposals or options to do things differently have been prepared with regard to livestock farming and particularly cattle farming. The option to proceed as farmers are currently farming is also an option, of course, but one with severe negative consequences. These three options are discussed below but in summary they are as follows:

1. Each community sorts out their livestock management issues internally
2. A company owned by the livestock farmers is established and willing farmers buy equity in the company with their cattle and other livestock. The cattle are then not individually owned by the shareholders.
3. A grazing cooperative is established in which the farmers retain ownership of the livestock but these are managed cooperatively with the cooperative acquiring and paying for additional grazing in the broad valley.

These options are all premised on a set of approaches or principles which are proposed but yet to be endorsed by the participating communities and farmers.

General approaches or principles established for the development of all livestock options

1. In the development of all planning options, 3 basic principles have been aimed for – economic sustainability, environmental conservation, and equity amongst grazing resource access and usage.
2. There must be a right for beneficiaries to keep a basic number of stock: In each option, each individual household (household understood broadly) would be allowed to keep 4 livestock units as part of their basic right to individual subsistence land use. The keeping of basic rights livestock would be free of charge, with the CPI covering the cost of the maintenance of the related infrastructure.

3. Any livestock owner who has more than the basic rights level of 4 LSU can graze his/her 'surplus' stock on the farm s/he is a beneficiary of, subject to the availability of sufficient grazing capacity, and in arrangement with her/his CPI. However grazing maintenance costs (mainly repairs and maintenance to fences and water supply) would be payable for these 'surplus' stock held on the beneficiary stockowner's farm, and the cost levels would be dependent on the farm and option chosen below.
4. Lease of land costs will not be incorporated into grazing costs where a stockowner qualifies to graze livestock on the farm he/she is a beneficiary member of (the rationale here is that the respective farm land is seen a resource for the benefit of the community group who is the land owner and no distinction will be made between owners and non-owners of livestock within that land beneficiary group).
5. No farm will exceed its livestock carrying capacity.
6. A stockowner must be prepared to pay market-related lease charges for grazing if the farm he/she is a beneficiary of has reached stocking capacity. This is because other grazing in the area will have to be found and negotiated for (for the purposes of this document, all area market costs for grazing are based on 6% of a land value of R1100/ha = R66/ha. This equates to R264/LSU per year where stocking rate is 1 LSU: 4ha.). The basic principle here is that the lessee pays market rates for grazing, while the lessor is responsible for maintaining the land resource he/she owns.

Option 1: CPI livestock control – an individual farm level approach

Key components of this approach

1. There will be a CPI-controlled grazing plan according to the total number of livestock which can be held on each farm – in terms of the common approach to determining carrying capacity.
2. The CPI determines how much stock each household has a right to. Where a household is not going to use their full right, another household that has more livestock can negotiate with that household to have some of the rights for a period – this will require an agreement between the two households or between an individual and a household, stipulating the cost of the right per livestock unit and the period of time.
3. Households are given time to negotiate amongst themselves to determine whether they can take over the right of another and for what period (where they have taken over the right on the basic stock of another household then the livestock-owning household should pay the infrastructure maintenance fee (i.e. the CPI would only cover such costs on 'basic rights' grazing allocations).
4. The household who still had additional livestock would have to sell those or find another place to keep and graze their stock.
5. The CPI, with support from Department of Agriculture, will be required to enforce the sale or removal to other grazing of stock that is surplus to the possible carrying capacity of the farm.
6. The CPI will organise the maintenance of the infrastructure and the movement of cattle – a "manager" will be appointed to do this and report to the CPA.
7. Each household will make its own decisions regarding livestock production (e.g. which animals to sell, when to sell, bull/cow management, etc.).

8. If individual households require more grazing land, they will individually negotiate such access to additional grazing on other land.

Physical issues

Among the 54 households on the 6 farms, 42 (78%) hold livestock (see table 1 below). Of the 2169ha of veld grazing available, 672ha would currently be taken up by the “basic rights” livestock allowances of these livestock-owning households – proposed at 4 LSUs per current household configuration.

Table 7 : Livestock ownership and basic grazing rights by farm

	¹ Total no. of households	² Veld grazing available (ha)	³ No. households currently holding livestock	Current households basic livestock rights (LSU)	Current households basic grazing rights (ha)	Total area required for all basic grazing rights (ha) - given household numbers
Emketeni	4	230	2	8	32	64
Gugulethu	12	251	10	40	160	192
Phumelelani	9	426	6	24	96	144
Thembanani	8	126	6	24	96	128
Ngwazini	10	190	8	32	128	160
Hlanganani	11	946	10	40	160	176
Total	54	2169	42	168	672	864

Notes

¹ Based on Oct survey results

² Based on data from P.Hawkins 18th Nov

³ Based on Oct survey results

All required stocking rates based on 4ha per LSU

Due to excessive over-stocking pressure on Gugulethu, Phumelelani, Thembanani and Ngwazini farms, there are insufficient grazing resources for the balance of livestock holdings and farmers on these four farms would have to either sell off livestock, or negotiate with 3rd party farm owners in the district for their own grazing requirements for such ‘surplus’ stock.

Table 8: Grazing availability and requirements

			POTENTIAL BASIC LIVESTOCK RIGHTS EFFECT		CURRENT SITUATION				
	Total no. of households (no.)	Veld grazing available (ha)	Grazing area for potential basic rights livestock (ha)	Balance of veld grazing available (ha)	Number of stock	Number of basic right livestock	Number of livestock in addition to basic right livestock	Number of ha required for additional stock	Off-farm grazing required if stock not sold (ha)
Emketeni	4	230	64	166	20.2	16	4.2	16.8	149.2
Gugulethu	12	251	192	59	95.2	48	47.2	188.8	-129.8
Phumelelani	9	426	144	282	171.2	36	135.2	540.8	-258.8
Thembanani	8	126	128	-2	159.3	32	127.3	509.2	-511.2
Ngwazini	10	190	160	30	95	40	55	220	-190
Hlanganani	11	946	176	770	82	44	38	152	618
Total	54	2169	864	1305	622.9	216	406.9	1627.6	-322.6

Financial issues

Each livestock holder will need to pay grazing fees for any stock held in excess of their basic rights (in order to cover the cost of maintaining grazing infrastructure and stock watering facilities).

For stockowners grazing their 'surplus' stock on a farm that they are a beneficiary of, grazing costs are calculated to be an average of R35.20/ha per year (R140.80/LSU). However not all farms are of the same size and each has a different grazing resource. Therefore these costs vary from R27.58/ha (Hlanganani) to R50.41/ha (Thebanani). The individual farm grazing costs are shown in the following table:

Table 9: Estimated cost of maintaining grazing resources on individual farms, with an indication of liability for such costs

	Cost of maintaining grazing areas on individual farms					Liability for cost of maintaining grazing areas on individual farms at current livestock holding level	
	¹ Repairs & Maint. R.	² Livestock officers @R4800 R.	Total grazing costs R.	Grazing costs per ha R.	Grazing cost per LSU R.	Total costs to be born by CPI (current level of basic rights) R.	Total costs to be born by households with more than 4 LSU. R.
Emketeni	5985	4800	10785	40.55	162.20	1298	9487
Gugulethu	6165	4800	10965	40.02	160.08	6403	4562
Phumelelani	9405	4800	14205	33.98	135.92	3262	10943
Thembanani	3870	4800	8670	50.41	201.64	4839	3831
Ngwazini	4320	4800	9120	47.50	190.00	6080	3040
Hlanganani	21263	4800	26063	27.58	110.32	4413	21650
Total	51008	28800	79808	35.20	140.80	23654	56154

NOTE Costs are based on:

¹5% of grazing infrastructural value per ha. of R450.

²Salary of R4800p.a. (A part-time officer on each farm to monitor stock numbers, fencing and water points).

The data contained in both tables above can now be amalgamated to calculate the cost of grazing to each farm, assuming that livestock numbers were not reduced where necessary (i.e. the current situation).

Table 10: Cost of grazing if current stock levels are retained (and off-farm grazing leased)

	Unused basic rights grazing			Balance of veld grazing available/used			Off-farm grazing required if stock not sold			Total cost R	Av. cost of grazing R/ha
	(ha)	Rate/ha R	Cost R	(ha)	Rate/ha R	Cost R	(ha)	¹ Rate/ha R	Cost R		
Emketeni	32	40.55	1297.60	49	40.55	1986.95				3285	40.56
Gugulethu	32	40.02	1280.64	82	40.02	3281.64	107	66.00	9174.00	11624	52.60
Phumelelani	48	33.98	1631.04	274	33.98	9310.52	267	66.00	20790.00	28564	48.50
Thembanani	32	50.41	1613.12	44	50.41	2218.04	465	66.00	32802.00	34521	63.81
Ngwazini	32	47.50	1520.00	32	47.50	1520.00	188	66.00	14520.00	15448	61.30
Hlanganani	16	27.58	441.28	168	27.58	4633.44				5075	27.58
Total	192	35.20	7783.68	1403	35.20	45730.32	1027	66.00	77286.00	121296	46.26

NOTE

¹Calculated @ 6% of a market value for grazing land of R1100/ha.

In this scenario, off-farm grazing has to be found for the 4 over-stocked valley farms. As a result those farms' weighted average grazing costs are higher than the all-farm average of R46.26/ha. Thebanani is particularly high (an average of R63.81/ha) due to its current exceptionally heavy stocking rate. What is of concern is that this means an extra annual cost of R255/LSU in the case of Thembanani stockowners.

During the concept planning phase with representatives of the various farms' livestock owners, it was always envisaged that grazing fees would be determined on a sliding scale (to encourage de-stocking). Thus while 'basic rights' livestock grazing would be free, it was envisaged that grazing of 'surplus land' would escalate in cost dependent on quantity of stock grazed by the individual livestock owner. Upon subsequent integration of cost and other data however, the reality has been discovered that most farms are far too small to accommodate current beneficiary stock holdings and sliding cost scales for other grazing.

Benefits of this approach

- Smaller scale operation would make it easier to manage by a CPI.
- The concept displays community equity and would prevent "elitist" dominance of resources.
- The concept promotes sustainable resource use.

Constraints of this approach

- *CPI's might lack the power to implement the agreements (stock number control and grazing cost payment).*
- *The small size of farms (and therefore lack of 'surplus' grazing) means that in some cases grazing revenue might be too low to act as sufficient motivation for the CPI to manage their own grazing.*

Issues in its implementation

1. The CPIs are still very weak. Would they be strong enough to implement these conditions?
How will enforcement of the grazing regulations and agreements be managed?
2. There is a danger that this option might be divisive to the general community – livestock play a major role in Zulu societal values and practice. Therefore the mechanism would have to be managed carefully and with great sensitivity, particularly as beneficiary communities now correctly sense land ownership, although there is evidence of a lack of appreciation of the dangers of over-stocking.
3. Payment of maintenance fees “on our land” appears to be an anathema to livestock owners. The October Phuhlisani survey of the communities reveals that only 12% of livestock owners are prepared to pay grazing fees.
4. There is no doubt that this option could not be implemented without an intensive veld management training programme and clarification of the law – in particular the Conservation of Agricultural Resources Act (a probable role for the Dept. of Agriculture).

Option 2: Collective commercial beef production via a Cattleowner Company

Components of this approach

1. In this option, the bulk of valley cattle (cattle ‘surplus’ to individual basic grazing rights) would be used to buy shares in a specialist commercial beef production Company. Therefore the Company (and its cattle) would be collectively owned and controlled by contributing farmer shareholders.
2. The cattle put up by farmers would be valued and sorted. Individual farmer shareholding levels would be dependent and proportional to their cattle presented, and such cattle could either be incorporated into the venture’s breeding herd, or sold off to generate funds for the purchase of perhaps more appropriate and suitable breeding stock for the Company herd. If a participating farmer provided goats, these would probably be sold and the cash generated could be used to buy relevant Company cattle (however, if shareholders requested it, a small goat herd could also be run to provide goats to meet shareholders’ occasional requirements).
3. Company shareholders would still have the personal right to keep a basic number of 4 LSU stock equivalents (these basic rights are discussed in Option 1). The composition of such cattle would depend on the owner’s own choice e.g. cattle for ceremonial slaughter; cattle for milk consumption, etc. Any livestock held over and above this level would have to be on another person’s unused basic right land which could be rented.
4. Careful consideration should also be taken by the Company of the reasons why people hold cattle in the valley. In this regard, a small milk production and/or ceremonial slaughter cattle section could be planned and operated (or even goats as mentioned in 2. above) whereby local households could purchase their requirements when needed. A bull rental scheme could also be initiated wherein basic rights cattle owners could hire a quality bull from the Company. All of these types of “community service add-ons” would relieve grazing pressure at the basic rights level e.g. basic rights cattle owners wouldn’t have to include oxen or bulls in their small herd profiles.

5. Notwithstanding the above, the Company should be managed on a strict business basis – the aim of which would be to make money for shareholders who had given up their stock.
6. A number of production systems could present the Company with different production options (e.g. weaner production, steer production, stud production, etc). While an optimum production system is usually a subject of controversy amongst farmers (it usually depends on factors such as climate, veld fodder flow, transport costs to market, extent of cattle infrastructure development, market price movements and personal choice) it is recommended however that weaner production be seriously considered as such would facilitate early cash flow. Weaner systems though do contain a high percentage of breeding cows, which makes weaner systems relatively inflexible and poorly suited to areas prone to periodic droughts. Perhaps at a later detailed planning phase, thought could also be given to committing a small part of the grazing area to a buying and selling speculative system. Therefore during years when rainfall is poor, cattle are not bought and the relevant part of the farm could be used to graze home-bred cattle.
7. The Company would utilise all grazing land in the valley that is not used by “basic rights cattle”, for which it would pay grazing fees to the respective CPI’s. In this regard grazing management, stocking rates, and repairs and maintenance on infrastructure, could also be managed by the Company for the CPI’s.
8. There are 3 possible management strategies for the Company. Either the Company could employ management itself, or the management could be under Siyathuthuka control, or the management of the herd and the business could be contracted out to Kwagezubuso. Preliminary discussions with parts of Kwagezubuso management indicate their current high level of requisite stock knowledge and experience, and it is possible that they might be interested (possibly at no charge as a social responsibility strategy).

Physical issues

Apart from grazing quality and climate, the single biggest physical constraint to beef production output is stocking rate and grazing area. The 6 target farms would present a grazing area of 1403ha after allowance had been made for basic rights cattle holdings, which in turn would indicate a breeding herd ceiling of 350 LSU (in the case of weaner production that would indicate a capacity for some 220 breeding cows).

Opportunity for production expansion nevertheless exists in an anticipated merger of further Middelrus land reform farms into the Siyathuthuka/ Kwagezubuso fold. The following table summarises what this added production capacity could be. After this anticipated Phase 2, a total 3862ha could be available for livestock production, and new shareholders could accordingly be admitted to the Company. Such an area would hold a 966 LSU breeding herd (probably a 644 breeding cow herd potential under a weaner system).

Further capacity could also be provided through use of the annual 150ha oats crop planted in rotation on the leased Joint Venture/Vrystaat irrigated lands. If so, and assuming a dry matter content of 6 tons/ha, it should provide grazing for 90000 LSU days.

Table 11: Middelrus farms - 1st and 2nd phase grazing capacity.

	Grazing area ¹ (ha)	Veld for basic rights livestock (ha)	Net veld available (ha)	LSU capacity ⁴
Emketeni	266	64	202	51
Gugulethu	274	192	82	21
Phumelelani	418	144	274	69
Thembanani	172	128	44	11
Ngwazini	192	160	32	8
Hlanganani	945	176	769	192
Sub-total	2267	864	1403	351
	Grazing area ¹ (ha)		Net veld available ³ (ha)	LSU capacity ⁴
<i>Avalon</i>	158		126	32
<i>Zondi(Morgenzon)</i>	117		94	23
<i>Zamokuhle</i>	100		80	20
<i>Igqumusha</i> ²	928		742	186
<i>Manana</i>	720		576	144
<i>Ebuhleni</i>	1051		841	210
Sub-total	3074		2459	615
Total			3862	966

NOTES:

¹ Based on data from P.Hawkins' earlier calculations of 18th Nov. 2011

² 50% of available Igqumusha grazing (balance is for game)

³ 2nd Stage grazing availability = 80% area (decision taken at 18th Nov meeting)

Average stocking rate 4 ha. = 1 LSU

Financial issues

The Phuhlisani-conducted survey indicated that 623 LSU's are currently grazed on the 6 farms. From the survey results it can also be calculated that if the envisaged 'basic cattle rights' concept was brought in now, it would amount to 168 LSU meaning that a theoretical 455 LSU could be offered for the potential Company share capital at this stage (see table below for individual farm breakdown). Assuming an average value of R3500/LSU, that means that initial share capital could be approximately R1.6m.

Assuming further that if only 50% of the cattle presented would be suitable for use in the suggested weaner breeding herd, it indicates that some 230 LSU would be carried forward as breeding stock. The balance would be sold off (possibly generating R0.8m) and more appropriate stock could be purchased (if new stock was bought at an average cost of R4500/LSU, some 170 LSU could be purchased).

Table 12: Theoretical cattle supply to the Company

	(A) Current livestock holding (LSU)	(B) Current h'hold basic rights livestock (LSU)	Theoretical contribution to co. capital (A-B) (LSU)
Emketeni	20	8	12
Gugulethu	95	40	55
Phumelelani	171	24	147
Thembanani	159	24	135
Ngwazini	95	32	63
Hlanganani	82	40	42
Total	623	168	455

Adhering to these stocking figures for the Company, and guided by the KZN Dept. of Agriculture Combud budgets for weaner production, an indication of potential cooperative profit potential can now be calculated. The Govt. data is based on 2010/2011 but is used to maintain a degree of conservatism to the financial performance which is shown in the Table below.

Under the envisaged 1st phase (a 220 breeding cow herd utilising the balance of grazing available on the 6 farms) a Company gross profit of R184 250 should be possible). With the foreseen availability of extra grazing when the other farms are integrated into the overall project (Phase 2) a 644 breeding cow herd has the potential to generate a gross profit of R544 900 per year.

Essentially this is a change of cattle production systems based on farmer shareholder cattle contributions, moving from a low input/low output/low risk system (largely supplying local socio-cultural and socio-economic needs) to a higher input and output system aimed at on cash profit. It therefore requires careful understanding by potential shareholders.

The phase 2 profitability level is not necessarily a ceiling to future production as consideration could be given to value-adding strategies (such as the marketing of grass-finished beef into an increasingly health conscious consumer market which is aware that 82% of SA beef is now feedlot-finished). The Company could also possibly involve itself in the Igqumusha game farm, not to operate it as a hunting camp, but to treat it as an eland or impala or a specialist Nguni herd farming operation (with obvious eco-tourism potential) to produce venison or beef/hides. Caution is however advised that it is important to get the 1st phase working properly (including shareholder understanding, influence and participation in the running of the cooperative) before expansionary plans are introduced.

Table 13: An indication of possible Company profitability levels

	¹ Budget guideline	1st phase	2nd phase
	100 breeding cow herd	220 breeding cow herd	644 breeding cow herd
	Total (R)	Total (R)	Total (R)
Grazing availability (ha)		1403	3862
Gross income (A)	263 000	578600	1693720
Less			
Feed (licks) cost	39 600	87120	255024
Other direct production costs	85 900	188980	553196
² Grazing lease cost	-	92598	254892
Total allocated costs (B)	125 500	368698	1063112
GROSS PROFIT (A - B)	137 500	209902	630608

Note:

¹Budget guideline based on 2010/2011 KZN Dept of Agriculture ComBud data for weaner production

²Grazing lease based on 6% of a market value of R1100/ha (CPI's pay for maintenance of resource).

Benefits of this approach

1. Improved veld management and livestock stocking rates.
2. Improved gene pool for all cattle.
3. A savings and investment scheme that would probably provide participating farmer members with a better economic return than their currently stressed and physically impaired stock.
4. This production system shows sensitivity to the important socio-cultural values of cattle in Zulu society (such as the provision of a supply of ceremonial slaughter animals which the wider community could purchase).
5. Making a contribution to food security (through the important availability of milk or *amasi*).
6. Grazing rental provides CPI's with a revenue stream.

Constraints of this approach

1. Identity of personal cattle is forsaken by stock owners.
2. The Company will only work where there is a genuine willingness and trust to be able to cooperate.
3. Company management is complex – as a concept and in practice and especially when it involves such a sensitive and important product as livestock in such societies. Participating shareholders must feel that they not only benefit from their association through shareholding, but that they understand (and can influence) a necessary transparent

management mechanism. Such probably highlights the need for relevant business literacy training at an early stage.

Issues

1. Will the farmers actually be willing to hand over cattle and not have any rights to specific cattle?
2. Is it possible to ensure that the main reasons for keeping cattle – ceremonial slaughter, lobola, savings and investment and milk for consumption – can be addressed.
3. Where are ceremonial slaughter cattle kept – as part of the Company herd or only by individuals as part of their basic rights?
4. Bull rental – are the bulls to be made available to the individual farmers who keep their individual cattle at home? What are the risks?

Option 3: Cattle grazing management cooperative

Components of this approach

In this option, farmers would each maintain their own cattle and take decisions regarding bull selection, buying, selling, etc. but would be open to advice from the grazing scheme manager.

1. Farmers' cattle would be branded with each farmer's brand for easy identification, and the manager would keep an "owner's register".
2. The cooperative grazing scheme manager would be responsible for managing a grazing regime for all cattle kept over and above the "basic rights" allocation (which would probably be 4 LSU that each beneficiary household should receive).
3. The grazing manager would therefore be involved in planning, negotiating and securing required grazing amongst not only the valley's CPI's but 3rd party land available in the project vicinity.
4. The manager could also be responsible for the dipping, dosing, inoculation of livestock. It is assumed that most of these costs would be covered by the State, but where they aren't, costs would be recovered by being built into grazing fees which would be charged out on a pro-rata basis according to the number of livestock LSU's a participating member might have.
5. Similarly, the repairs and maintenance of grazing-related infrastructure on CPI land would also be managed, the costs of which would be recovered from the grazing fees paid by the farmers.
6. The animals would be held in different camps across the valley, sometimes separated according to owner/manager production decisions.
7. There would be no enforced stock reduction, but farmers would be advised herd aspects such as herd profiling and balance.
8. While the owner would make all major decisions regarding the livestock (such as buying and selling) communication of such decisions with the manager would be essential to ensure control.
9. It should be possible for a bull pool to be built up (owned by Siyathuthuka, but managed by the scheme) and these could be rented to farmers who would pay separately on a time basis.
10. Payment for grazing fees would have to be made by livestock owners in advance (either in cash or in livestock).

Physical and financial issues

The immediate grazing requirements would be similar to those discussed under Option 1, and these are summarised again below:

Table 14: Current grazing requirements

	Total no. of households (no.)	Veld grazing available (ha)	POTENTIAL BASIC LIVESTOCK RIGHTS EFFECT		CURRENT SITUATION				
			Grazing area for potential basic rights livestock (ha)	Balance of veld grazing available (ha)	Basic rights livestock currently held (LSU)	Grazing for current basic rights livestock	Unused basic rights grazing (ha)	Balance of Veld grazing available (ha)	Off-farm grazing required if stock not sold (ha)
Emketeni	4	230	64	166	8	32	32	166	149.2
Gugulethu	12	251	192	59	40	160	32	59	-129.8
Phumelelani	9	426	144	282	24	96	48	282	-258.8
Thembanani	8	126	128	-2	24	96	32	-2	-511.2
Ngwazini	10	190	160	30	32	128	32	30	-190
Hlanganani	11	946	176	770	40	160	16	770	618
Total	54	2169	864	1305	168	672	192	1305	-322.6

Assuming that all existing leases on CPI land with 3rd parties could be terminated and that all surplus CPI veld grazing area could be absorbed by this mooted grazing Cooperative, there would still be a shortfall of 322.6ha which would have to be negotiated for (such should be available from the anticipated 2459ha of grazing from other land reform farms in the valley – see list under option 2).

The cost of leasing this required area (plus associated costs of the option) are calculated as follows:

Table 15: Estimated annual cost of a grazing Cooperative (Based on the current situation of 454 LSU held in excess of basic rights livestock, requiring 1816ha annual grazing)

	Cost per		Cost
	ha		(R)
	R./ha/		
	year		
Lease of unused basic rights grazing (192ha)	22.50 ¹		4320
Lease of balance of veld available (1305ha)	66.00 ²		86133
Lease of 3rd party land (322.6 ha)	<u>66.00²</u>		<u>21292</u>
Sub-total			111745
Less Repairs and maintenance (all 1819ha CPI grazing used)	22.50 ³		<u>40946</u>
Net grazing fees			70798
Grazing management – salary ⁴	28.01		60000
Motor vehicle costs ⁵	29.18		62500
Repairs and maintenance (all 1819ha CPI grazing used)	19.73		40946
Dipping costs @ R105/LSU ⁶	-		-
Veterinary med. costs @ R100/LSU ⁶	-		-
TOTAL	128.78		234245

Notes

¹ Based on repairs and maintenance cost 5% of grazing infrastructural value per ha. of R450

² Based on 6% of est. market value of land of R1100 per ha.

³ Based on 5% of grazing infrastructural value per ha. of R450.

⁴ Salary of R60000 p.a.

⁵ 25000 km/yr. @ R2.50

⁶ The assumption is made that this cost would be funded by Govt.

The concept behind charging a theoretical market rate for the 1305ha of “balance of veld available” (see table above) would probably be criticised. However this is land leased out by one CPI group to farmers from another CPI group and is a resource for the benefit of the community group who is the land owner. Therefore it is equitable to charge a market-related opportunity cost as the farm owners could lease it out to a 3rd party in the open market (an example is the current lease of Hlanganani land to a commercial farmer. It is reported that the lease charges there equate to only R23/ha, but if so the indication is that that is unrealistically low).

This need for farmers to pay R515 per LSU (4ha @ R128.78) under this option is prohibitive for farmers used to a low input/low output system, but now really being asked to change their production regime. On average stockowners own 15 LSU which would cost them R7727 a year for grazing and management costs alone - as it is unlikely that farmers would have sufficient cash for advance payment of these costs, they would have to sell off 15-20% of their livestock each year just to fund the grazing. The current unforced selling only equates to some 8% of stock.

Broiler production

One cannot leave this livestock section of the report without acknowledging that in the Phuhlisani survey, 67% of households expressed interest in small-scale broiler production. What is envisaged

here is small-scale poultry keeping by households using family labour and, wherever possible, locally available feed resources. The poultry may range freely in the household compound and find much of their own food, getting supplementary amounts from the householder.

“Family poultry” or “village chickens” represents one of the few opportunities for relatively low cost family food security and saving. A regular supply of low-cost feed, over and above maintenance requirements, is essential for improved productivity in the three farming systems used in family poultry production:

- free-range – poultry roost in trees and structures at night;
- backyard – poultry are confined at night; and
- semi-intensive – poultry are enclosed during the day in a very limited scavenger resource base.

Experience shows that a scavengable feed resource base in a fairly dense housing situation (household cooking waste; cereal and cereal by-products, shrubs, grubs and insects) can make a considerable contribution to feed requirements before commercially prepared feed needs to be considered. When feed resources are inadequate, a few birds in production are better than more birds that are just maintained, but without enough food for effective production.

Overnight shelter which is roomy, clean and airy should be provided under free-range systems.

Otherwise houses may be either fixed or mobile. A mobile chicken house (“chicken tractor”) may be appropriate where it can be moved on a daily basis.

Where housing already exists or can be made up from scrap timber and wire, the economics of family poultry are attractive, for example a typical enterprise could be:

Table 16: An indication of potential small-scale broiler production economics

	R. per bird	Total (R.)
20 day old chicks @ R4.80 delivered to Mooi River	4.80	96.00
Say 20% feed requirements from scavenging		
Starter/broiler mash – 2.8kg/bird @ R180/50kg	10.08	201.60
Assume 10% mortality (2 deaths)		
Housing sanitation (Jeyes fluid)	0.25	5.00
Total costs	16.81	302.60

Broilers could be produced on a 7-8 week cycle. The above feed costs should produce 1.5-1.8kg broilers. If heavier broilers are favoured, obviously feed costs would rise accordingly. Production in winter would obviously require a heating source to reduce mortality.

It was discussed above that a maize milling opportunity is being considered. If the maize initiative was feasible, whichever one, that project will produce grits and other by-products in sufficient quantity and at a favourable price for the level of small-scale broiler production contemplated here.

It is advised that CPI's contact the Department of Agriculture or an appropriate NGO to arrange broiler training courses.

Discussions with the community groups about the options proposed.

There were a number of phases of consultation with different parts of the community groups in the process of preparing these proposals:

1. An initial meeting was held with the Livestock Association representatives – this was after a meeting with all the livestock owners, with the Department of Agriculture officials responsible for animal production methods, was cancelled due to the lack of attendance by farmers and by the Department of Agriculture.
2. A meeting was held with each community group to report back on the different options (particularly regarding the livestock), to seek direction as to which was the preferred option and to agree on the area that they wanted for community gardens and small-scale commercial crop production. Most of these meetings were tense, in particular regarding the livestock options.
3. A meeting was held with livestock farmers and interested people to specifically look at the livestock options in order to obtain direction as to which option to pursue in more depth.

The proposals regarding the arable land were well received however the livestock farmers slowly became more and more antagonistic to the proposals and were not willing to even hear the proposals. It is important to note, as is known, that livestock is an important issue amongst the dwellers in the valley involving both cultural and personal issues. In the process of undertaking the research, it is apparent that a rumour developed that Phuhlisani was proposing that livestock owners should be reducing their stock numbers and so forth. The final workshop (3 above) which specifically addressed the livestock proposals was therefore essentially boycotted by the big livestock farmers.

This is a very complex matter which essentially deals with the possibility of moving from a low input low output production system in which very few funds are spent on non-direct costs, to a situation where the farmers would have to pay for maintenance of infrastructure, the rental of grazing land, management of livestock, etc. The antagonism to these proposals caused a delay in the finalization of this report and lack of clarity as to how to proceed. It has meant that Phuhlisani is unable to finalise the consultation processes within the given time allocations in the contract. Moreover it meant that Phuhlisani was unable to prepare an implementation plan of the specific option and this will have to occur during a different process.

The way forward.

The way forward with the various proposals emerging out of the study is complex. There are two components to this.

1. With regard to the **community gardens and small-scale commercial cropping**, the implementation of this requires further consultation with ADA. While Phuhlisani's role in the valley includes community consultation, it does not have the role of project managing such

developments. On the one hand, it is understood that the fencing for the community garden areas is being put in on each of the farms through a tender that has recently been advertised.

The most appropriate manner in which irrigation would be supplied to the different lands needs to be clarified with the assistance of the appointed engineers. This is not currently part of their terms of reference and would need to be included in the future allocation of responsibilities.

But the implementation of the farming on each farm needs the support of a project manager and it does not seem that the Department of Agriculture has the staff resources to undertake this role.

2. Regarding livestock it is proposed that a more detailed consultation and training/information process is undertaken through a new contract - which could be undertaken by Phuhlisani but would not necessarily have to be. The most important thing about livestock farmers, given the experience in many areas in South Africa, is that they need to agree to and see value in whatever the strategy is or else they will disregard it and continue with the current practices. Facilitated processes of enabling farmers to come to agreement on strategies are therefore crucial if farmer practices are going to be affected. These consultation processes are time consuming especially given the fact that most livestock farmers also have other jobs.

This process of consultation proposed would need to have two components regarding livestock:

- a. Work with all livestock owners in terms of understanding land management and animal production methods and result in jointly worked out plans for managing the livestock and their lands better.
 - b. Work with the approximately 10 livestock owners who have large herds of cattle to specifically develop strategies to obtain additional grazing in the valley and a way in which to manage these. This would use the various options presented above as a start.
3. A crucial part of working out the livestock situation, and the access to the arable plots, is the tenure arrangements – what are the rules and regulations regarding the access to and use of the different portions of land. This was not part of Phuhlisani’s brief in its overarching contract but the organization has been aware that it is a central issue that needs to be sorted out in each community. In the discussions regarding the proposals above, it became abundantly clear that the tenure arrangements have never been addressed on the Middelrus farms and what has resulted is elite capture – the most powerful people (particularly livestock owners) have proceeded to utilize the vast majority of resources on the farms and have not been able to be stopped as there is no system of rules. The consultation process about livestock proposed above will necessarily have to also address tenure at the same time and result in a tenure system for each farm. And this system would need to address all assets on the farms – including machinery on those farms where the community possesses such assets.

There is a substantial urgency about this intervention. Speaking to farmers in the valley they are very concerned that the extent of overgrazing in recent years and the limited rain that has happened to date this season means that the grazing does not appear to be recovering sufficiently and it is therefore anticipated that significant numbers of cattle are likely to die in the winter season. Getting this consultation process going soon, so that farmers can either acquire alternative grazing or can sell cattle (if that is what they decide to do) prior to the winter is crucial.

Conclusion

The initial aim of this research was to be able to prepare highlevel implementation plans for the community gardens and livestock initiatives. The two aspects of a reduced budget and a consultation process regarding livestock that was derailed meant that less progress was able to be achieved and implementation plans have not been able to be developed. The information and the proposals drawn from this research and consultation are, however, important in providing direction to the utilization of the land other than that involved in commercial vegetable and potato production on each of the farms in the Middelrus Valley. The sustainable use of such land by individual members of the community is as important as the joint venture to the success of the overall initiative in the Middelrus Valley. While the joint venture and the Vrystaat farming provide work for many people the income received per household remains low. The use of the greater portions of the land they own for additional livelihood strategies means that households can bolster the income received from employment in the companies. It is hoped that this report provides the next steps in the development at Middlerus.

References:

This report drew heavily on reports presented to Phuhlisani from two sub-consultants – Mike Murray and Pat Hawkins. Both these original reports are available on request.

David Mayson 22 February 2012.

Appendix 1: Middelrus Community Survey – English version

Sample: This will be a census of all households in the valley (it is anticipated that some 50% of households own livestock, therefore probably only 30 households will be asked the Livestock Section questions. However all respondents should be asked the questions in Part 1 (Cropping/small enterprises).

Person to be interviewed

Head of the Household (it is anticipated that interviewing would mainly take place between 5pm and 7pm on weekday evenings so that the Head of Household could be contacted if he/she is employed during the day. However interviewers should use initiative, flexibility and cultural politeness to secure the required interviews.

Questionnaire

RECORD COMMUNITY NAME

Greet the interviewee and explain the purpose of the survey. Inform the respondent that the responses will be treated anonymously and are necessary to facilitate planning with the community. Stress that the answers will be treated confidentially.

Part 1 (Cropping/small enterprises)

Explanation

1a. Has anyone in your household grown crops in the past? Who? What did/do they grow? What did/do they do with the crops? If they have stopped, why did they stop?

Who grew the crops?		What did/do they grow?	
Wife/ self		Maize	
Other male household member		Beans	
Other female household member		Other (STATE)	
What did/do they do with the crops?		If they have stopped, why did they stop?	

1. Is there anyone in your household who, if small areas of suitable land could be made available, would be very interested in any of the following? :

Type of enterprise	Yes	No	Don't know	Which family member?
a)A vegetable plot for household consumption purposes (probably the size of a football field) EXPLAIN FULLY				

b)A plot of land (probably the size of 2-3 football fields) where a person might be able to start as an emergent farmer and produce some crops for sale. EXPLAIN FULLY				
c)A small broiler chicken project to produce live chickens for home consumption and for sale in the community. EXPLAIN FULLY				

3. If a) or b) above is answered positively, ask - What crop(s) do you think should be grown?

Possible crop(s) – see a)	Possible crop(s) – see b)

4. If a method of sufficient maize production could be developed in the valley, it might be possible for the maize to be produced and milled to a high quality standard. Do you think your family would be interested in buying such mealie meal? EXPLAIN FULLY

Yes	No	Don't know

Part 2 (Livestock)

5. What type of livestock and how many do you own?

Cattle		Sheep		Goats	
Bulls		Rams		Rams	
Oxen/steers		Ewes		Ewes	
Cows		Other		Other	
Heifers		TOTAL		TOTAL	
Calves					
TOTAL					

6. Why do you keep cattle? (PROBE for answers and record below)

For breeding stock for regular sale (commercial production)	For occasional sale/trade to local households	
Social prestige	Household ceremonial slaughter	
Form of savings/ investment	<i>Lobola</i>	
Sale of milk	To pay fines etc	
Home milk consumption	OTHER (State)	
Home slaughter for meat		

7. How many cattle have you sold in the last 12 months? – who did you sell to and what prices did you obtain?

	No. sold	Av. price	How were they sold/who were they sold to? (RECORD BELOW)
Bulls			
Oxen			
Cows			
Steers			
Heifers			
Young cattle			
Calves			

8. Are your cattle grazing with others currently or do they graze alone?

They graze together with others	They graze alone	They are kept in a kraal for feeding

9. Would you prefer to keep your own cattle separately or would you prefer to manage your herds together with others?

Prefer grazing alone	Prefer to graze with neighbours	I don't mind

10. Who looks after your cattle during the day? Do you pay someone?

Who looks after your cattle?	Do you pay someone?
No-One	Yes
Myself	No
Son	
Other young person	
Another adult	

11. What are the problems you face as a cattle farmer? (PROBE FULLY)

Bull/cow management		Stock theft	
Lack of fencing for management of herd		Low prices	
Quality of breeding stock		Unhappy with the auction system	
Water difficulties		Calving %	
Access to transport (purchases and sales)		Difficult to find market for cattle when you want to sell	
Insufficient grazing		Access to veterinary services	

Cattle mortality (why?)		Access to herd management advice	
OTHER (record fully)			

12. Would you be prepared to run your herd on a co-operative basis with others, or would you definitely rather be in control of your own herd?

Co-operative herd management	
Own management	
Don't know	

13. In principle, would you be prepared to pay for a share of the cost of any of the following if they were provided to assist you with improved cattle production?

Support service	Yes	No	Don't know
The lease of extra grazing			
The cost of repairs and maintenance to a cattle water supply system			
The purchase of winter feed (if necessary)			
The production of pasture grass to supplement veld grazing			
Occasional rental of a quality bull?			
An overall system of grazing fees - especially on cattle that are above a quota for each individual internally in each farm			

Appendix 2 – Overview assessment of the agricultural resources of the twelve land reform farms in the Middelrus Valley – an extract from report submitted by **P Hawkins, Rural Development Services, Pietermaritzburg, November 2011.**

2. OVERVIEW OF THE AVAILABLE AGRICULTURAL RESOURCES

The agricultural resources of any area are determined by its climate, topography, soils, vegetation and water resources. This discussion is therefore concerned mainly with these characteristics although it starts with a brief review of geology and landform as these factors have major effects on climate and land capability.

2.1 Geology and landform

The term landform is used here in two different senses:

- firstly, in the sense of major physiographic features of the surrounding country, which may have important climatic effects on the study area.
- secondly, in the sense of detailed slope patterns which, in this case, have important effects on soils and land capability.

In the macro sense the valley floor in the study area is about 4km wide and consists of gently sloping land at altitudes of 1 000-1 200m. At either side of this the land rises steeply to altitudes of 1 500m or more e.g. Mt Alida at 1 812m to the south east, and Scottberg Mountain to the north-west at 1 638m.

This landform pattern has four important agricultural consequences:

- a) The ridge of very high ground from Rietvlei and Mt Alida to Greytown to the south-east of the Valley causes the Middelrus valley to lie in its rain-shadow. This effect is graphically illustrated by the mean annual rainfall in the Valley of about 680mm compared to the corresponding figure of 1 343mm for Mbona Estate on the far side of the high ridge.
- b) As a result the dry north-western rain-shadow slopes have very few springs or perennial streams so that stock watering is problematic, especially in those parts of the study area on the southern side of the Valley.
- c) Most of the steeply-sloping land either side of the valley floor is on slopes of 15-20% with little or no arable land.
- d) Finally, the Valley floor has several distinctive internal landforms, each associated with particular soil types which are important in land selection for cropping in the Valley.

The associated soil types are discussed in the section on soils.

Geologically the Valley consists of 4 main geological materials:

- Beside the Mooi river a discontinuous strip of alluvium in the flood plain of the river although much of this may now be above the flood plain as the river is said to have recently become more incised.
- Between that and the steep hillsides either side of the river the Valley floor proper consists of gently sloping land overlying shale of the Volksrust formation with intrusions of dolerite.

- Along the footslope below the steep hillsides either side of the Valley a discontinuous strip of colluvium or hillwash deposits.
- The hillsides themselves again consisting of shale but with intrusions of dolerite.

2.2 Climate

As there are no official long-term climatic records for any of the farms in the study area, the best available climatic data are those given by the Department of Agriculture for its Stanger's Hoek Bioresource Unit (BRU) Tc10, which includes all of the farms on the Valley floor, as detailed below:

Table 2 : Climatic data for BRU Tc10

	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
RAINFALL													
Median rainfall (mm)		107	85	82	39	10	1	-1	6	25	60	82	105
Mean rainfall (mm)	681	112	96	84	45	19	10	10	18	37	60	86	104
TEMPERATURE													
Mean (degrees C)	16.0	19.9	19.8	18.7	16.3	13.7	11.0	11.1	13.0	15.2	16.4	17.6	19.3
Maximum (degrees C)	22.4	25.5	25.4	24.5	22.6	20.6	18.3	18.5	20.2	22.0	22.6	23.4	25.1
Minimum (degrees C)	9.7	14.4	14.3	13.1	10.0	6.8	3.8	3.7	5.8	8.5	10.3	11.9	13.5
Heat units (base 10.0 C)		307	277	271	189	114	31	34	92	156	198	228	288
Heat units (base 4.4 C)		481	435	444	357	287	199	208	266	324	372	396	461
Heat units (base 5 C)		462	418	426	339	269	181	189	247	306	353	378	443
Utah-7 chill units		0	0	0	0	46	330	294	139	0	0	0	0
Positive Utah chill units		0	0	0	0	70	308	326	140	0	0	0	0
EVAPORATION													
A-pan (mm)	1722	186	156	151	123	107	98	109	132	150	161	163	186
SUNSHINE													
Hours/day (Oct-Mar)	6.9												
Mean annual (hours)	7.5												
FROST HAZARD: Moderate													
CLIMATE CAPABILITY RATING: C6 (Climatic limitations to production are severe)													

It should also be noted that Vrystaat Farming are now keeping climatic records which will become very useful as the recording period lengthens. It should also be noted that although all of the farms on the Valley floor and to the south-east are in BRU Tc10, the farms on the north-western side receive slightly more rain as the altitude increases e.g. the most northerly Hlanganani farm (sub 3 of Middelrus 1989) and the northern parts of Emketeni and Igqumusha which all fall under BRU Uc9 (Middelrus) which receive a mean annual rainfall of about 740mm.

Two other climatic factors also need to be noted: the risk of late frosts in winter which are a hazard for fruit orchards, especially in low-lying areas, and the risk of hail. Otherwise, given irrigation, the area has a good agricultural climate but, without irrigation it is too dry for commercial dryland cropping.

2.3 Vegetation

The vegetation throughout the study area is what the Department of Agriculture describes as Dry Tall Grassveld, which is a grassland veld type in open savannah with *Acacia sieberana* and *Acacia karroo* as the most common tree species. Dominant grasses in veld in good condition are: *Themeda triandra*, *Tristachya leucothrix*, *Hyparrhenia hirta*, *Eragrostis capensis*, *E. racemosa* and *Heteropogon contortus*. On overgrazed land and on old lands *Hyparrhenia hirta* becomes dominant with an increase in less desirable species such as *Digitaria monodactyla*, *Eragrostis curvula*, *E. chloromolas*, *E. plana*, *Sporobolus pyramidalis* and *S. africanus*. In the driest areas *Aristida congesta* and *Cynodon*

dactylon become dominant. There is also a marked decrease in the density of grass cover in overgrazed areas and on old lands.

In the study area there are several areas which illustrate these points e.g. the sparser grass cover on old lands on Igqumusha and the scars of severe overstocking as shown on Map 1 on the most northerly of the Hlanganani farms as well as on Zamokuhle, Emketeni, Phumelelani and Ebuhleni. In all of these cases large areas were in the past bared of all grass cover leading to severe sheet erosion, the loss of most of the topsoil and extensive gullying.

These areas of past overstocking, although dating back to long before the present communities acquired the land, should nonetheless serve as a warning to the present land owners as to consequences of overstocking and poor veld management.

The present position is that although the Valley as a whole is not yet overstocked, parts of it are – and this trend is aggravated by the concentration at this time of year (October and November) of livestock close to the river as the main, if not only, source of water. The problem is also aggravated by the fact that at least 2 communities are leasing out large tracts of their grazing land to neighbouring commercial farmers so that their own land is also overstocked. In brief, serious overstocking is already a serious problem in all of the Group 1 farms. Stock numbers for the Group 2 farms are not yet available.

The grazing capacity of Dry Tall Grassveld is assessed at 3,5ha per Animal Unit when in good condition but in the Valley as a whole it is put at 4,0ha per Animal Unit.

2.4 Soils

The soils in the study area are generally mesotrophic or eutrophic i.e. only slightly leached and therefore of high base status. The two soil forming factors which vary most within the study area and therefore result in significant soil changes are the parent material from which the soil has formed and changes in relief or slope. Both of these factors tend to be related to the four landform or relief units mentioned earlier with the associated soil types being as follows:

- On the steep hillsides either side of the Valley floor: mainly shallow, stony soils of the Mispah or Glenrosa forms.
- On the colluvial footslopes: mainly soils of the Valsrivier form, where the colluvium has been derived from shale, or soils of the Arcadia or Bonheim forms where derived from dolerite.
- On the gently-sloping uplands of the Valley floor: mainly Glenrosa soils where the underlying rock is shale or Hutton or occasionally Shortlands soils where formed from dolerite.
- Where slopes flatten in the Valley floor or form minor depressions, the Hutton and Glenrosa soils tend to change to those of the Tukula or Avalon forms.
- In drainage areas and vleis on the Valley floor the soils are mainly of the Rensburg, Sepane or Katspruit forms.
- On the flood plain beside the Mooi river: alluvial soils mainly of the Oakleaf and Dundee forms.

Land selection in relation to soil types:

The land selected for irrigated crop production, as shown on Map 2, is mainly of the following high-potential soil forms:

- The Hutton soils are excellent agricultural and irrigation soils. They are generally deep (>1m), fine-textured, well-drained, structureless, red soils with very good physical properties such as a high moisture-holding capacity, good permeability and internal drainage and friable working properties. There is some variation within the unit in terms of texture, from sandy clay loam to clay loam as surface textures.
- The soils of the Avalon and Tukulu forms are also very good agricultural soils being moderately deep, fine-textured, structureless, friable, yellowish brown soils with good physical properties similar to those of the Hutton form except in regard to internal drainage. The difference is that whereas the entire profile of the Hutton soils is free-draining the Avalon and Tukulu soils have a lower subsoil showing signs of wetness. In both cases this horizon is itself permeable and free draining but it indicates a zone which is periodically water-logged due to a fluctuating water table. In the study area this horizon usually occurs at a depth of about 600-800mm indicating that to that depth the soil is well-drained and only occasionally becomes water-logged below that due to the local topography. In all needy areas drains have now been provided to ensure that drainage problems do not occur.
- The soils of the Oakleaf form are also very good agricultural and irrigation soils. They are of two types: alluvial soils of the Oakleaf form which occur beside the Mpofana river and colluvial soils also of the Oakleaf form which occur on gently-sloping colluvial slopes on the Valley floor. The colluvial Oakleaf soils occupy most of the Moor river flood plain which occurs as a narrow strip of up to about 100m wide astride the river. In the study area these Oakleaf soils are deep (>1m) dark yellowish brown, well-drained, structureless, medium textured soils, usually in the sandy loam to sandy clay loam range (15-35% clay). They are thus slightly sandier than the Hutton, Tukulu or Avalon soils, and are fertile and friable alluvial soils. They are, however, prone to occasional flooding when the river overtops its banks. The colluvial Oakleaf soils, on the other hand, occur on long gentle slopes and are prevalent in much of the Gugulethu area. Here the soils tend to be dark reddish in colour and to have more clayey textures than the alluvial Oakleaf soils. They are also deep, well-drained soils of very high potential, but often tend to be stony though not with
- The soils of the Glenrosa form are also good agricultural soils where they are of sufficient depth. This is because they are soils where the weathering of the underlying parent rock is still occurring in the subsoil so that the subsoil is, in effect, a mixture of soil and soft weathering rock. Where both the topsoil and this partially weathered subsoil are of good depth (with a combined depth of at least 600-700mm) they are good agricultural soils but, where shallower, have limitations.

The other common soil types found in the greater study area are those of the Valsrivier and Sepane soil forms. These are so-called duplex soils which have relatively permeable topsoils over a dense, poorly permeable subsoil and which therefore have several undesirable soil characteristics such as:

- An effective shallow soil depth as there is little root penetration into the dense, strongly structured subsoil, and hence only limited soil moisture-holding capacity.

- Poor moisture-absorbing capacity once the topsoil is saturated and hence increased run-off with a severe risk of erosion where the land is being cultivated or on overgrazed veld.
- Temporary water-logging in the saturated topsoil due to the restricted permeability of the subsoil.
- A soil with difficult working properties.

These soil types have generally been avoided in selecting land for irrigation except in those cases where some of the Valsrivier soils had already been included in the land developed by previous land owners.

Soil mapping

As regards soil mapping it was found that the soils of the Valley floor tend to be highly variable with changes usually related to topographic factors. As a result it was decided that rather than trying to map each soil form separately, which would require a very high density of observations, the emphasis should rather be on separating the high potential soils from the low potential ones even if this necessitated the mapping of soil associations rather than separate soil forms as long as the associations were of forms which occur together in a recognisable landscape unit.

The resulting soil maps are therefore more correctly described as land resource maps which show land capability units within the arable land, and different categories of grazing land in the non-arable areas so as to give the following 5 broad land resource units, as shown on Map 1 (the Land Resource map).

- High potential arable land mainly of the Hutton, Oakleaf, Avalon and Tukululo soil forms.
- Arable land of lower potential mainly of the Valsrivier and Sepane soils.
- The non-arable upland areas of good grazing land.
- The degraded upland grazing areas where there has been severe past erosion.
- The non-arable bottom lands i.e. wetlands, watercourses and dongas.

In terms of the land capability classification for KZN developed by the Department of Agriculture at Cedara the above land resource categories are classified as follows:

<u>Land Resource Category</u>	<u>Land Capability Classification</u>
High potential arable land	Classes I & II
Lower potential arable land	Classes III & IV
Wetlands, watercourses and dongas	Class V
Non-arable but good upland grazing land	Class VI
Degraded grazing land	Class VII

2.5 Water resources

It was explained earlier that for perennial water supplies the area relies heavily on the Mooi/Mpofana River. The only other perennial stream of any consequence being the Mhlozane river which drains the Scottberg Mountain and provides all of the irrigation water for the Hlanganani farm No 1022/2. As a result all other irrigation development in the area is dependent on being able to

obtain a sufficient water right from the Mooi/Mpofana river from the Department of Water Affairs and the Mooi River Irrigation Board.

Negotiations were therefore undertaken during March 2011 with the Department of Water Affairs and the Irrigation Board to establish the position regarding the 6 farms which were about to join the Joint Venture with Vrystaat Farming. The existing water rights, as recorded by the Mooi River Irrigation Board, at that time, were as tabulated below in table 3. It was then agreed that the Board would accept and support additional allocations where necessary as shown in table 3.

Table 3 : Water rights and approved additional applications (March 2011)

Farm No.	Community	Existing water right (ha)	Approved additional applications (ha)
1022/1	Hlanganani	50	-
1022/2	Hlanganani	40	-
Rem 1318	Ngwazini	50	10
1318/9 & 11	Thembanani	S ₁ only	110
1318/4 & 7	Ebuhleni	S ₁ only	25
1318/6	Zamokuhle	15	-
1003/10	Phumelelani	15	-
1003/12	Emketeni	20	15
18006	Gugulethu	50	20

At that time the following farms were not included in the negotiations. It is thought that all have (or had) water rights but the number of hectares in each case are unknown. This matter is outside the brief for the present study but it is now important and urgent that the water rights for the following farms be taken up with the Mooi River Irrigation Board.

<u>Farm No.</u>	<u>Community</u>
1022/9	Avalon
17341	Igqumusha
1022/4, 6 & 8	Manana
1318/1	Morgenzon (Zondi)

2.6 Overall assessment

It will be evident from the foregoing discussion on climate, vegetation, soils and water resources that the broader study area has two major agricultural resources:

- a) An impressive irrigation resource based on matching soil and water resources for the development of some 800ha of irrigable land.
- b) A grazing resource of over 7 000ha of grazing land of the Dry Tall Grassveld type.