Feasibility Study of
Mt Pleasant Settlement Project, Adelaide

Report to the
Amatole District Municipality

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EXECUTIVE SUMMARY:

Most of the building structures are dilapidated because of neglect and lack of maintenance. Three out of the six dams are functional, the other three are all silted up. All the three windmills on the farm are out of order as a result, the associated watering points for animals are not functioning. All the four water reservoirs on the farm collect water but the one with the biggest capacity is not in use. The access roads within and around the farm are still accessible but with difficulty due to overgrown grass and bushes. The spray race and attached engine are still in good condition and currently in use but other dipping structures for small and large stocks are not presently used. The camp fences are intact except in very few places where the fences have been cut. None of the farm workers owns a tractor as a result they depend on the farm owner to plough their lands.

Mt Pleasant Farm encompasses both the *False Thornveld of the Eastern Cape* and the *Dohne sourveld*. The former is characterised by an *Acacia karoo* dominated savannah, which shows signs of encroachment by the same species. The sourveld consists of an indigenous forest of about 350 ha and a high lying grassy crest of about 220 ha. The low-lying sweetveld shows signs of neglect or poor control of use. This is revealed by the veld condition assessment results, where the areas close to the current settlement show signs of overgrazing while those areas further away show signs of under utilisation. The grassy mountain crest has been heavily encroached by fynbos species probably due to lack of fire and a poor grazing strategy. The savannah nature of the low-lying area resulted in the recommendation of both a beef and goat production system. The grazing capacity of the farm for both the sweet and the sourveld areas averaged at 5.4 ha/AU. The browsing capacity for the low-lying *Acacia* dominated area is estimated at 2.8 ha/AU, which translates into about 714 goats.

A soil survey of Mount Pleasant Farm a great variability of soils within short distances. The major part of the landscape is covered by very shallow (<30 cm deep) to shallow (<60 cm deep) soils. However, soil depths increase significantly (>130 cm) moving from interfluve crests towards the stream banks where there is some land with good potential for arable agriculture. Land suitable for arable agriculture is estimated to be only about 150 ha out of the total farm area of 2 300 ha.

Approximately 50 ha of this land can be irrigated, based on existing dams and water availability. The low natural fertility of the soils requires that there be an adequate fertilization in any cropping programme.

Water quality from the dams and reservoirs is variable. Dam water was found to be highly contaminated with coliforms and as such is not suitable for human consumption. Water from the reservoirs was found to be marginal, which is conditionally acceptable and may lead to occurrence of negative effects in some sensitive people, such as babies and the aged. Users of such water need to be urged to boil it before drinking.

The average family size is 5, with at least 73% of the members in each household falling in the active population group. The ages of household heads range from 30 to 100 years, with an average of 53 years. Salaries and wages are the major source of income, followed by agriculture and government grants. Groceries take the biggest chunk of total household expenditure. Respondents keep cattle, goats, pigs and chickens, from which they get food and money to supplement their wages. They also have gardens ranging from $6m^2$ to $450m^2$, in which they grow crops for home consumption. The workers at Mt Pleasant farm are engaged in vegetable and pig production. They would like to have more projects such as sewing, wool sorting and cattle/goat/poultry to be initiated in the area. Respondents have access to infrastructure like water taps, electricity, primary schools and sports grounds. More than 70% of respondents expressed a greater need for other infrastructure/services such as roads, transport, clinics, schools, telephones and community halls.

Despite having stayed in the farms for variable periods, none of the respondents have their own land. The workers at Mt Pleasant farm are engaged in community projects, namely vegetable production and a piggery. Respondents would like to have more projects such as sewing, wool sorting and cattle/goat/poultry to be initiated in the area. Respondents have access to infrastructure like water taps, electricity, primary schools and sports grounds. More than 70% of respondents expressed a greater need for other infrastructure/services such as roads, transport, clinics, schools, telephones and community halls. Respondents are quite aware of HIV/AIDS and feel more should be done to combat the endemic.

The farm management plan was prepared on the basis of 50 ha of irrigable land and about 2000 ha of grazing land. The maximum number of beef cows that can be kept on this farm is 243. In terms of small stock the area can carry a maximum number of 714 Boer goats. Recommended crops for the 50 ha irrigable land are: green mealies, potatoes, cabbages, butternut and pumpkin. All crop and livestock activities have shown modest positive gross margins. The farm management plan exercise generated a number of scenarios regarding the maximum number of farm households that can be settled on this farm. Taking a R9600 poverty line income per 5-member family into consideration, the Mount Pleasant farm can accommodate 100 farm households at most. When the number of farm households exceeds 100, the share of income per household drops below the poverty line.

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1. BACKGROUND TO THE STUDY

1.1 Introduction

Mt Pleasant farm is situated in the Adelaide area within the boundaries of the Nkonkobe Municipality and the Amatole District Municipality. The farm, which is 2320 ha, is situated approximately 15 km from Adelaide town, along the main road R63 from Fort Beaufort to Adelaide.

Mt Pleasant farm was purchased by the Amatole District Municipality, for the purpose of settling farm workers and provide for their livelihoods. About 451 households were listed on the beneficiary list that was drawn in 1998. On the 5th November 2001, the Amatole District Municipality appointed the Agricultural and Rural Development Research Institute at the University of Fort Hare to conduct a feasibility study in terms of agricultural suitability and capability for the Mt Pleasant Settlement Project.

1.2 Terms of reference

ARDRI's terms of reference were to conduct a feasibility study of the Mt Pleasant as follows:

Phase one

Phase 1A: Situation Analysis to cover

- Identification of boundaries of Mt Pleasant farm
- A questionnaire survey to collect relevant information from 100 households
- Assessment of agricultural infrastructure, equipment and other resources
- Veld condition
- Soil survey & analysis

Phase 1B: Development plan (Draft)

- Give recommendations, based on the results of the study, which will determine the preferred course of action.

Phase 1C: Development plan (Final) & Implementation plans

- Give details of the plan and how the recommendations can be implemented

1.3 Deliverables

An acceptable plan of activities with time frames and budgetary requirements to be submitted to the Amatole District Municipality Offices in East London before commencement of the study.

A short preliminary report on the activities of Phase 1A to be submitted to the same address on or before the 15th January 2002, but later revised to 5th April 2002.

A report outlining recommendations and implementation plans to be submitted on or before the revised date of 30th April 2002.

A complete report of the study, including phases 1A-C, to be submitted to the same address on or before the revised date of 31st May 2002

1.4 Content of the report

This report presents findings, recommendation and implementation plans of the study.

2. EMPIRICAL INVESTIGATION

2.1 Methodology

2.1.1 Identification of boundaries of Mt Pleasant

A meeting was held with the former owner of Mt Pleasant, Mr Luttig who described the boundaries of the farm. This was coupled with field visits of the study team members together with some of the farm workers currently staying on the farm. Verification of the sketches was made with a 1:50 000 map of the area.

2.1.2 Determination of agriculture infrastructure and mechanisation equipment

As in the section above, meetings were held with the previous farm owner and farm workers coupled with field verification.

2.1.3 Rangelands Appraisal

Twenty-eight vegetation surveys (grass & bush) were conducted at 17 sites on the farm. These sites were chosen in order to cover as much variations in the vegetation as is possible, while also trying to achieve a representative sample size. The most noticeable variation was in bush density, while such factors as aspect, soils and geology played a minimal role since visually the farm is fairly uniform except for the south facing mountain slope, which is dense forest. For the grass sward at each site a 100-point quadrat survey was conducted. At each point the nearest rooted plant was recorded and the distance from the point to the tuft was estimated in centimetres. The data were analysed and interpreted using the Simplified Techniques for assessing veld condition (Trollope, Beckerling & Scogings, 1992).

In respect of the woody vegetation, the same sites as for the grass sward were used. At each site a 2m wide belt transect over 100m was demarcated where all the trees and shrubs within the area were identified and the measurements of height and lowest

browseable material recorded. The data were analysed and interpreted using the technique of Trollope (1986).

2.1.4 Soil survey

A reconnaissance survey was carried out along four transects running in an east-west direction across the farm. Along each transect, the soil was examined at eight or nine different places by augering. Auger profiles were made at each station by boring at 10 cm-depth intervals down to the impervious layer or to ±110 cm when depth was non-limiting. Diagnostic topsoil and subsoil horizons were identified for each profile and the soil classified according to the taxonomic system for South Africa (Soil Classification Working Group, 1991). In addition, the altitude and the slope of the land at each place were recorded.

Soil pits were dug in five of the fields that were identified as suitable for arable agriculture and the soil profiles described in detail. Soil samples were collected from different horizons of each profile for laboratory analysis.

2.1.5 Collection of climatic data

Secondary information was obtained from Whyte Bank, weather station, number 20289, located at latitude 32.416 and Longitude 26.2333, with Agromet No. 0099/415L at altitude 1212.

2.1.6 Determination of sources and quality of water

A field trip was undertaken with the aid of one of the farm workers to identify all the water sources. Water samples from dams and reservoirs were analysed for the ir microbiological and physical characteristics.

2.1.7 Socio-economic survey

A socio-economic survey was conducted in the white commercial farms in the Adelaide Magisterial district (Appendix A). The survey was conducted using a questionnaire during the period November 2001 to February 2002. The main aim of conducting the survey was to obtain quantitative information on contemporary livelihoods of the potential beneficiaries of the resettlement project. The basic unit of study and analysis in the survey was a household. For purposes of the study, a household was defined as follows: for consumption purposes, a household consisted of members who usually slept under one shelter every night and shared the meals. For income purposes, members usually sleeping and eating elsewhere but contributing to the income of the household were added to the household defined for consumption purposes. Categories of variables covered by the survey included demographic composition of households, level of education of the household members, sources of income, expenditure patterns, and general agricultural information.

2.1.7.1 Selection of participants

A list of beneficiaries for each settlement was obtained from the respective municipal offices, from which the team randomly selected respondents, who were then interviewed face to face. Ideally, the head of the household was the preferred respondent though in some cases spouses or even children of the household would be interviewed, where the head was not available. Also, where the head was too old to understand or recall some of the answers, other members of the household would be asked to assist. A total of 53 respondents were interviewed, which represents almost 12% of the households listed on the beneficiary list of Mt Pleasant farm that was drawn in 1998. The planned sample of 100 respondents could not be realised because at the time when the study was planned and proposed, an assumption was made that the respondents were already living on the farm. It was only realised at the time of conducting the study that this was not so. Considering the time and cost implications, it was decided to reduce the sample size accordingly.

2.1.7.2 List of Beneficiaries

Between the time the list of farm workers wanting to move to Mount Pleasant, was compiled, in 1998, and the time of conducting the study, many changes had occurred. The list had been updated, whereby, some of the people had since passed away and others were no longer interested in moving. In addition, some households had registered the sons and/or daughters separately, despite still staying with parents. This resulted in the list being long, which might also have impacted on the planning of the project.

3. RESULTS

3.1 Identification of boundaries of Mt Pleasant

The sketch maps generated from this exercise are presented in Appendix B.

3.2 Determination of agriculture infrastructure and equipment

3.2.1 Building structures

The farmstead is in very good shape because it bears signs of constant maintenance. All other structures (except two new pigsties provided recently by the Eastern Cape government, Pic1 Appendix C) look badly run down because of neglect and lack of maintenance. These structures include: shearing and holding sheds (Pic 2 Appendix C), garages and several storerooms.

3.2.2 Water dams

There are 12 dams in the earmarked area, however, four re silted up and overgrown with reed plants, which reduce the water holding capacity of the dams. The remaining three are still in good condition and can hold water throughout the year provided there are frequent rains (Appendix C, pic 3 & 4). One of the good dams has a furrow attached and supplies water for irrigation purposes. The land area under irrigation using water from this dam is about 3 ha and the crops grown include: cabbage, spinach, maize, potato and tomato.

3.2.3 Windmills and reservoirs

There are three windmills on the farm, all the three are out of order; as a result, the associated watering points for animals are not functioning. There are four reservoirs on the farm (Appendix C, pics 6, & 7), which were constructed at the time the farm was established. Of the four, three of the reservoirs, each with a capacity of 90 480 litres, supply water for farming and household purposes. The fourth reservoir (Appendix C, pic 5), with a capacity of about 314,16 m^3 or 314 160 litres was built by the Public Works Department in 1999, in anticipation of the settlement plan to supplement existing water resources on the farm. However, the newly built reservoir is currently not in use though it is full of water. According to the farm workers currently living on the land, it will be commissioned for use after the people to be settled on the farm arrive. All the reservoirs are linked through pipes to spring water (in the adjacent mountains) as source of supply of water. Other sources of water supply on the farm are dams and the Kroomie River.

3.2.4 Access roads

The access roads within and around the farm are still accessible but with difficulty due to overgrown grass and bushes. Certain portions of the access roads have developed "small gullies" due to soil erosion.

3.2.5 Tick Control Facilities

The spray race and attached engine are still in good condition and currently in use (Appendix C, pic 8). However, the other dipping structures for the small and large stock are not presently used. For example the dip structure for large stock is used as a refuse dumping ground.

3.2.6 Camps and fences

According to the occupants of the farm, Mt Pleasant farm is demarcated into 30 camps with almost all the camp fences intact except in very few places where the fences have been cut. The wires for the fences though rusty appear strong (Appendix C, pics 9 & 10). However most of supporting poles are rotten and would need to be replaced.

3.2.7 Mechanisation

None of the respondents or the farm workers owns a tractor. They depend on the farm owner who lends them one of his two tractors to plough their lands. There are also other implements that belong to the farmer, such as a maize sheller, a Lucerne baler, plough & planter and a large stock neck clamp.

3.2.8 Projects

There are currently two projects run by the community on the farm, namely the piggery (Appendix C, pic 11) and the vegetable project. The Eastern Cape government built the two pigsties. One sty has an area of 45.15m^2 and the other 79.2m^2. Only two out of the original seven members are still involved in the project, because others wanted to be paid for their input. The entire area (2.5 ha) under

irrigated crop production is fenced off through community contributions of R 60 per household.

3.2.9 Schools

The only primary school (from grade 1-8) in the area is the Yellow woods private school, which is about four kilometres from centre of the farm or the settlement area. Because the private school is too expensive for the children of the farm workers on the Mt Pleasant farm, they have to attend school elsewhere, requiring the children to walk a distance of about eight kilometres. Most of the school children after completing grade eight continue their studies in the nearby towns like Adelaide, Fort Beaufort and Bedford.

3.2.10 Health facilities

The hospitals and clinics are also located in the nearby towns of Fort Beaufort, Adelaide, and Bedford, which are far from the planned settlement area. However, a mobile clinic visits the area every two months and the people are duly informed before such clinical sessions.

3.3 Rangelands Appraisal

3.3.1 The Veld Environment

Mount Pleasant is found in two of Acocks (1953) veld types, namely, the *False Thornveld of the Eastern Cape* and the *Dohne sourveld*. This occurrence is brought about by the fact that the farm has a bottom section that is relatively flat (about 70 % of the total area) and a steep slope, which raises the altitude tremendously resulting in a forested mountain slope and a grassy mountain crest, which is the sourveld. Basically, the farm can be described to be about 30 % sourveld and about 70 % mixed to sweet veld due to its location, whereby, it is wedged between the sweet and sourveld. The large portion of the farm has the savanna type vegetation, which means a livestock production potential which would require a combination of grazing and browsing animals as the best option (cattle or sheep and goats), while the sourveld is largely a dense forest with very low animal production potential and the grassy mountain crest is about 220 ha. The bottom section of the farm is also dotted with portions that are distinctly open grass and are largely regular in shape and most of these turned out to be abandoned old lands, which probably were later, reverted to grazing. This indicates that at some stage cropping was very important in the area but as of which crops and when still requires further investigation.

From a general point of view the farm did show signs of neglect in respect of veld management. This was first evidenced in the abundance of ragwort (*Senecio* spp.), which was peculiarly confined to this property compared to neighboring properties and this could be attributed to probably a heavier grazing pressure and less control over animal movements. From the initial survey and the general appraisal of the farm it was also quite evident that at the moment animal movement was less controlled as those areas close to the settlement showed signs of over utilization while the areas further away also showed signs of under utilization as noticed in botanical composition. The mixed veld nature of the farm and the proximity to the high rainfall sourveld also meant that the farm would be fairly resistant to misuse in respect of soil erosion although the same cannot be said in respect of grass composition and forage

production potential as the composition may easily change to very useless components.

3.3.2 Veld condition and carrying capacities

Twenty-eight vegetation surveys (grass & bush) were conducted at 17 sites on the farm. These sites were located in order to cover as much variations in the vegetation as is possible, while also trying to achieve a representative sample size. The most noticeable variation was in bush density, while such factors as aspect, soils and geology played a minimal role since visually the farm is fairly uniform except for the south facing mountain slope, which is dense forest.

3.3.3 The grass sward

The results of the condition of the grass sward are summarized in Table 1, which confirmed the initial appraisal in that the veld condition scores ranged from 36 % to 83 %, which can be described as ranging from very poor to excellent condition. More than 50 % of the surveyed sites showed signs of overgrazing while about 10 % indicated under grazing with the resultant selective grazing which has a negative effect on forage production potential. The overgrazed sites were the ones in close proximity to water and the residential areas. *Digitaria eriantha* (Finger grass) was the most common grass species followed by *Themeda triandra* (Red grass, *Iqunde*).

The results revealed the mean grazing capacity on the farm to be approximately 5.2 ha/AU. An animal unit has been defined as animal weighing about 450 kg and which gains 0.5 kg per day on forage with a digestible energy percentage of 55 %. With an estimated grazing area of about 2000 ha which excludes prospective residential and arable lands the recommended number of animal units is about 385.

Table 1. Results of the assessment of the grass sward on the farm Mount Pleasant

Site	VCS (%)	GC (ha/AU)	Condition	Grazing Trend
1	54.6	5.5	Fair	Slightly overgrazed
2	57.9	5.2	Fair	Overgrazed
3	46.5	6.5	Poor	Overgrazed
4	76.8	3.9	Good	Correct
5	36.0	8.2	Very poor	Overgrazed
6	59.7	5.0	Good	Moderately selected
7	50.0	6.0	Fair	Overgrazed
8	63.9	4.7	Good	Slightly overgrazed
9	51.3	5.8	Fair	Overgrazed
10	56.0	5.3	Fair	Overgrazed
11	73.4	4.1	Good	Correct
12	44.7	6.7	Poor	Overgrazed
13	72.6	4.0	Good	Correct
14	82.6	3.6	Excellent	Correct
15	50.4	6.0	Fair	Slightly overgrazed
16	70.0	4.3	Good	Correct
17	77.7	3.9	Good	Correct
Mean	**60.2**	**5.2**		

* VCS = veld condition score

* GC = Grazing capacity

Three additional surveys were conducted in the mountain crest. This area which is sourveld is largely grassy with no trees but is heavily encroached by fynbos (macchia) species especially *Cliffortia linearifolia.* The encroachment was estimated to be about 20 % of the surface area. The dominant grass species were *Miscanthidium* species at the forest fringes with *Themeda triandra* increasing in proportion away from the forest, while characteristics of the sourveld there was also a variety of *Helichrysum* species. This area could form a very important alternative grazing during spring and summer months while grasses are still acceptable. The area can also do with some burning as a means of controlling the prolific fynbos encroachment. The results from

these sites indicated a grazing capacity of 5.5 ha/AU which was not so different to that achieved at the low-lying sweetveld area.

3.3.4 Woody vegetation

The results of the condition of the woody vegetation are presented in Table 2 below. With the exclusion of the forest, the bush density on the farm ranges from open grassland to 2400 plants/ha averaging at 1150 plants/ha with *Acacia karoo* contributing about 74 % to the botanical composition. This translates into a good browse production potential as most trees are of the available height while the dominant *Acacia karoo* is also highly acceptable to goats. The high browsing potential results in a browsing capacity of 2.8 ha/SSU, which can be translated to 714 small stock units or goats. Noticeable is the fact that the high bush density is also peculiarly confined to this property and can be interpreted as encroachment, whose greatest drawback is competition with a negative effect on grass production and in extreme cases may hinder animal movement generally lowering the grazing capacity. As part of the recommendations the high *Acacia karoo* percentage would mean that significant adjustment have to be made to the grazing capacity in order to cater for the deciduous nature of this tree since forage (browse) production would be low in winter.

Table 2. Results of the assessment of the condition of the woody vegetation on Mount Pleasant farm

Site	Trees/ha	Browsing Units/ha	ha/SSU	% *Acacia karoo*
1	No Bush	No Bush	No Bush	No Bush
2	1150	725	2.8	39.0
3	700	533	3.75	50.0
4	650	525	3.8	92.9
5	650	408	4.9	100.0
6	1050	766.7	2.6	66.7
7	No Bush	No Bush	No Bush	No Bush
8	500	450	4.4	100.0
9	No Bush	No Bush	No Bush	No Bush
10	No Bush	No Bush	No Bush	No Bush
11	1450	1300	1.5	96.5
12	No Bush	No Bush	No Bush	No Bush
13	1600	883	2.3	37.5
14	2400	1350	1.4	66.6
15	1800	1250	1.2	70.0
16	No Bush	No Bush	No Bush	No Bush
17	1200	883	2.26	91.7
Mean	**1195.5**	**824.9**	**2.8**	**73.7**

* SSU = small stock unit

The forest area, which forms part of the sourveld, was estimated at about 350 ha and no surveys were conducted in this area due to its low agricultural potential. Worthy mentioning is the fact that this forest is a very important natural resource for the farm as it forms a good water catchment area for the farm. It is also felt that it should be left undisturbed as it has a far more important role in water conservation. The forest trees commonly encountered included such forest trees as ironwood, yellowwood, sneeze wood, Wild olive, cabbage tree and many others.

3.4 Soil Survey

A soil survey of Mount Pleasant Farm indicates that most of the farm either has shallow to very shallow soils or is steep lands of little arable value and should be reserved for grazing livestock or left undisturbed. The farm is dissected by a number of streams and rivulets that run in a southerly direction from the Kroomieberg Mountain at the top end of the farm (elevation of 1 167 meters above sea level, m.a.s.l.) down to the main road and railway line at the bottom end of the farm (elevation of approx. 700 m.a.s.l.) (see sketch map in Appendix B). The major part of the farm lies below the mountain at an elevation of between 800 and 700 m.a.s.l., and has relatively gentle gradients. From here there is a very steep escarpment to the mountain crest, making access to the 220 ha of relatively level land there difficult. The steep scarp on the mountainside covers an area of approximately 350 ha and is covered by thick indigenous vegetation. It is important that this vegetation be left undisturbed as it protects the fragile ecosystem, which plays a very important role as the catchment area for the water resources of this and other farms downstream.

There is a great variability of soils within short distances. The major part of the landscape is made up of interfluves between the streams and rivulets and consists mainly of very shallow to shallow soils of the Mispah, Glenrosa, Clovely and Westleigh forms. Soils depths tend to gradually increase from a little as 30 cm or less at the crests to >100 cm towards the stream banks where there is some land with good potential for arable agriculture. Soils in potentially arable lands were classified as Tukulu, Clovely, and Avalon forms (see descriptions of soil profiles in Appendices D, E, F, G and H). In the lower reaches of the streams (bottom end of farm) the stream-bank soils, though still of good depth, tend to be waterlogged and are dominated by Katspruit soil form, which renders them unsuitable for cropping.

3.5 Climatic data

Based on the data gathered, Adelaide as a district receives the highest rainfall in the summer months, with a maximum (85 mm) registered in November. Conversely, the lowest rainfall is received in the winter months, with the lowest (20 mm) being in May and August (Figure 1). The district also experiences the hottest days during

summer months, with the hottest being February with a temperature of 29°C. The coldest period in the district is during the month of July with a temperature of 6°C (Figure 2). On average, Adelaide district experiences a maximum average of close to three frost days, which occur in the month of June. However, the frost days occur in the months from April to August (Figure 3).

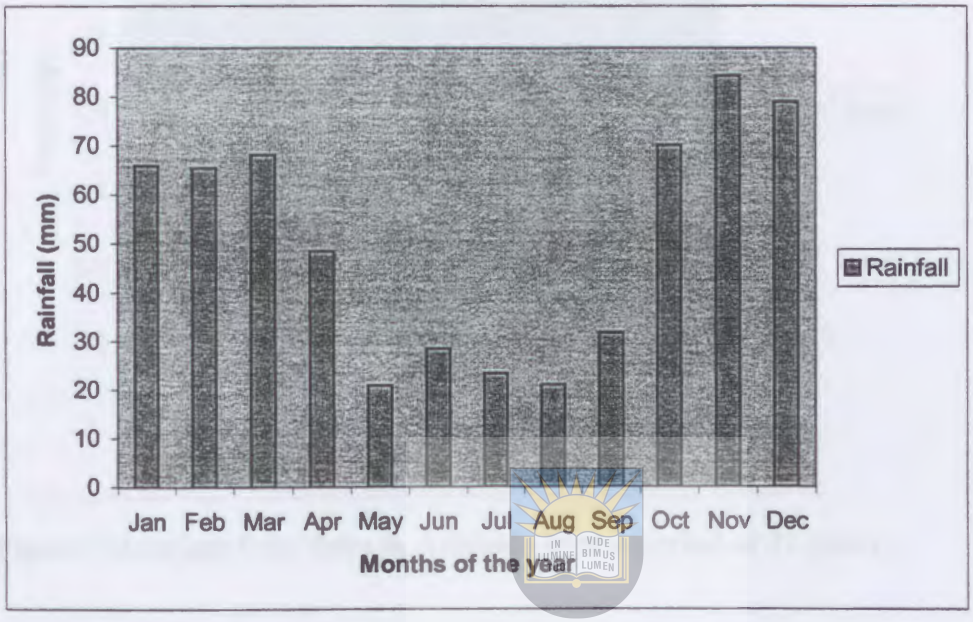

Figure 1 Average monthly rainfall in Adelaide over a period of 22 years

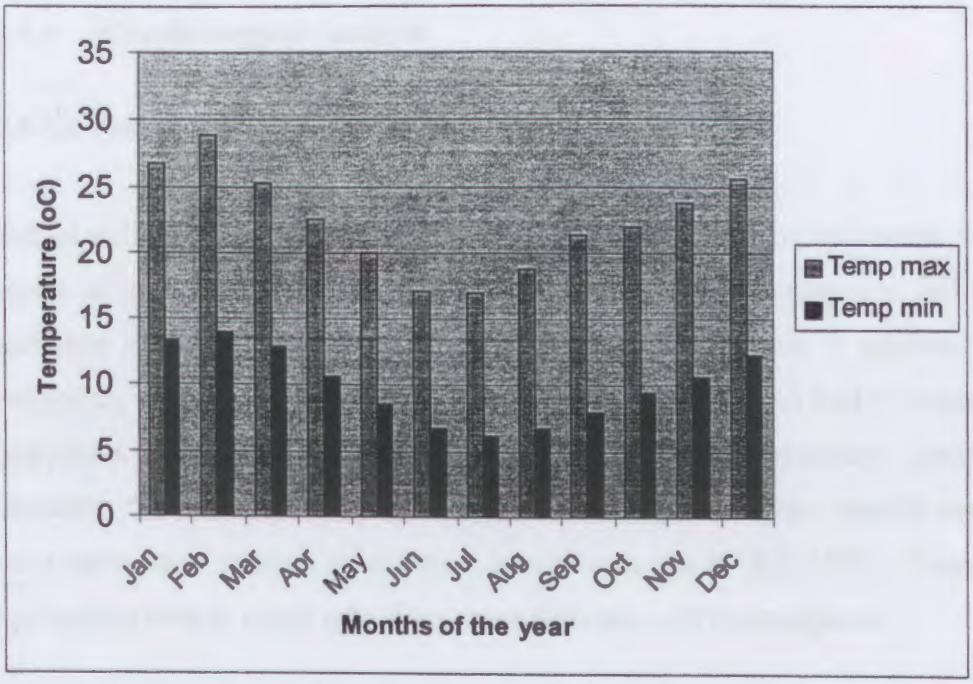

Figure 2 Average minimum and maximum temperatures in Adelaide over a period of 22 years.

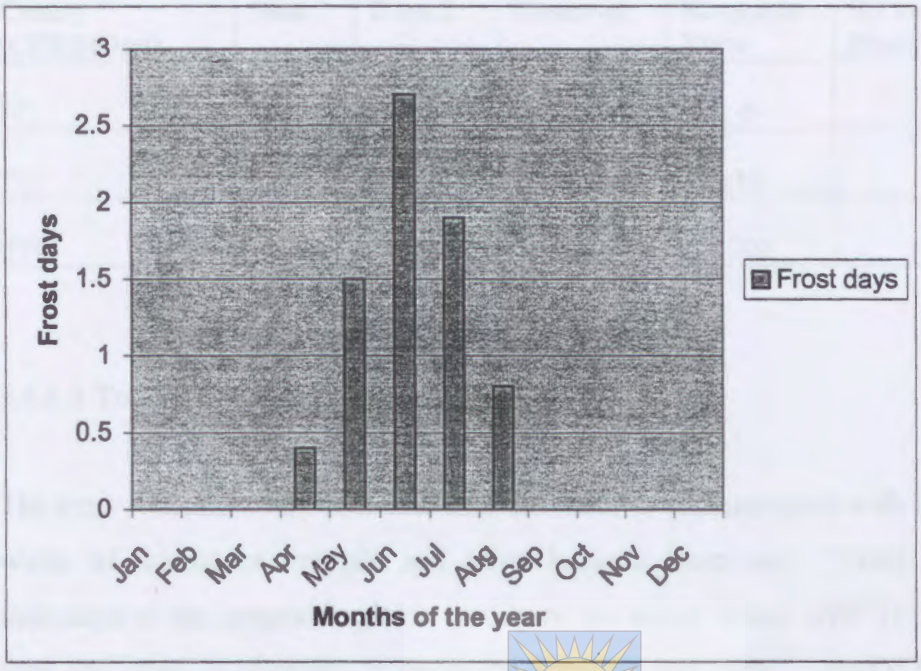

Figure 3 Average frost days in Adelaide over a period of 22 years

3.6 Water Quality

3.6.1 Microbiological Analysis

3.6.1.1 Faecal Coliforms (FC)

Faecal coliforms are bacteria that indicate that water is contaminated with faecal waste of human or animal origin. They are the most commonly used bacterial indicator of faecal pollution. Water from Dam 1 and Dam 2 contains no faecal coliforms, while water from the Reservoir and Krommie River had FC counts of 3-15 organisms per 100ml (Table 3). According to the recommended South African standards for drinking water, counts between 1 and 10 mean the water is marginal and may cause some clinical infections in sensitive people (WRC, 1998). Counts from 10 upward are sure to cause infections, even with once-off consumption.

Table 3: Results from microbiological analysis of water samples from Mt Pleasant

Colony (CFU/100ml)	Dam 1	Dam 2	Reservoir	Krommie River	SA recommended limits
FC	0	0	15	9	0
TC	3	10	34	10	10
HPC	175	406	8	202	100

3.6.1.2 Total Coliforms (TC)

The total coliform count indicates that the water is contaminated with both the faecal waste of human or animals and other bacteria from soil. Total coliforms are indicative of the general hygienic quality of the water. Water with TC counts of less than 10/100ml is regarded as good for domestic use (WRC, 1998). Except for the water from the Reservoir, which was above the SA recommended standard for drinking water, the water from other sites was found to be according to the SA recommended standard (Table 3).

3.6.1.3 Heterotrophic plate count bacteria (HPC)

With the exception of the water from the Reservoir, which meets the SA recommended standard, all the other samples were found to be above the SA recommended limits for drinking water. The heterotrophic plate count (HPC or Standard Plate Count) is the internationally accepted test for measuring the bacterial population in water. The HPC test assesses only a fraction of the bacteria present and does not differentiate between pathogenic and non-pathogenic species. Therefore, HPC levels may not provide direct indication of potential public health consequences High levels of microbial growth can affect the taste and odour of the water and may indicate the presence of nutrients (Table 3).

3.6.2 Physical Analysis

3.6.2.1 Turbidity

Turbidity is caused by the presence of suspended solid matter. The solid matter usually consists of a mixture of inorganic matter, such as clay particles, and organic matter, which again usually consists of both detritus and living organisms. The presence of turbidity in water results in a cloudy or muddy appearance and may also affect the taste and colour of the water.

Table 4: Results from physical analysis of water samples from Mt Pleasant

Parameter	Dam 1	Dam 2	Reservoir	Krommie River	SA recommended limits
PH	7.09	10.32	7.04	7.40	6 – 9
Turbidity (NTU)	39.6	16.5	13.6	17.8	1.1 0.1– 5

Water from all the sample sites was observed to have turbidity greater than the recommended limits, thus making it unfit for human consumption (Table 4).

3.6.2.2 pH

Put simply, pH indicates whether water is sour (pH<7) or soapy (pH>7) to the taste. The recommended pH limits for South African water is 6 to 9 (Muyima & Ngcakani, 1998). The pH of the tested water samples was found to be within the standards except for the water from Dam 2 (10.32), which has the pH higher than the SA recommended standards (Table 4).

3.6.3 Conclusions

As it has already been indicated above that water quality for various uses differs, water at the sampled sites is not fit for human consumption without treatment such as boiling. According to quality of Domestic Water Supplies assessment guide, such water can be classified as Class II (yellow). That means Marginal water quality,

which is conditionally acceptable and may lead to occurrence of negative effects in some sensitive people, such as babies and the aged.

3.7 Socio economic survey

3.7.1 Demography

3.7.1.1 Household heads

The average family size is 5, ranging from 1 to 9 members per household (Figure 4). At least 73% of the members in each household fall in the active population group (i.e. between 15 and 64 years old). The rest (27%) are either children (<15 years) or the aged (65 years and older).

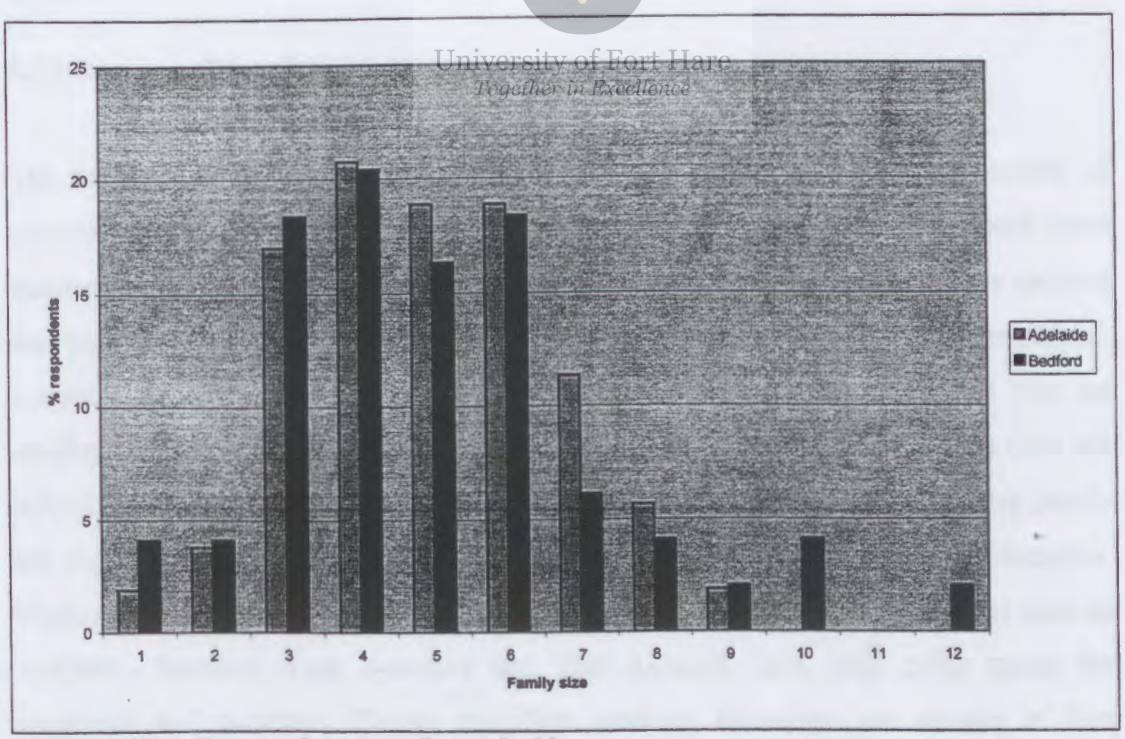

Figure 4 Family members per household

Males head most (83%) of the households sampled, while females heading households are either widows or have never been married. This pattern is a deviation from what is normally found in rural communities, where most men are absent from

their households, working in other cities or towns. The ages of the household heads range from 30 to 100 years, with an average of 53.17 years (Table 5). Most household heads (83%) are married, 11% are widowed and the rest are either single, divorced or living together (2% each). About a third of the heads have never gone to school, while the number of years spent at school by the rest ranges between 2 and 9. Almost two-thirds (62.3%) of the heads are employed fulltime at the various farms, 3.8% are working as casual labourers at the farms, 9.4% are unemployed and 24.5% receive old-age pension. Those that are employed work as labourers (94.3%) or drivers (5.7%).

Table 5: Age distribution of household heads in Adelaide (n=53)

Age group (years)	No of respondents	% respondents
25-44	20	37.7
45-64	21	39.6
65 & over	12	22.6

3.7.1.2 Other household members

The dependency ratio (number of children and the aged divided by the number of economically active people) is 0.51. Children and grandchildren form about three quarters (73%) of the other household members. The rest of the members are spouses and parents. Another third is in the active population category but is unemployed, meaning that they are fully dependent on those members of the household who are employed. Most of these unemployed people are women and young people who left school, some just after passing Grade 7. One of the reasons why these young people are not attending school is the absence of secondary schools in their communities. Many secondary school learners attend school in neighbouring towns or cities such as Adelaide, Bedford, Fort Beaufort and East London, and only come home for weekends and holidays. Family members working elsewhere are mainly in Port Elizabeth, Cape Town or East London. Those working in the study area are labourers at the farms and wives of the household heads working as maids in the farmhouses.

3.7.2 Sources of household income

Income distribution patterns play a pivotal role in evaluating or determining the living standards of households in any community. Analysis of sources of household income (Table 6) in Adelaide showed that, the majority of respondents (75%) earn salaries and wages. The average of salaries and wages is R5 454 per annum, with a range of R720 to R11 400. Agriculture and government grants (in that order) are the next most important sources of income. Majority of respondents derive some income from selling of agricultural products with an average income of R1 898.92. Fewer respondents receive old age pensions (28.3%), and disability grants (5.6%). Local trade activities contribute minimally to household income. Fifteen percent of the respondents are engaged in making and selling of different items, 3.7% in buying and selling while 11.3% engage in odd jobs. Only one of the respondents receives private pensions.

Table 6: Sources of annual income per household in Adelaide (n=53)

External	Average (Rand)	Range	% respondents
Salaries and wages	5 453	720-11 400	75.4
Remittances (cash)	6275	50-66 000	28.3
Remittances (kind)	835.71	50-3 600	26.4
Child maintenance	350	200-500	3.7
Private pensions	3 600	3 600	1.8
Pensions (old age)	7232	6 240-13 680	28.3
Disability grant	6 840	6 840	5.6
Child support grant	1 320	1 320	3.7
LOCAL			
Making and selling	3396.25	350-12 000	15.1
Buying and selling	6420	840-12 000	3.7
Jobbing	1 212	60-4 320	11.3
Livestock (cash)	1 574.74	20-6 000	64
Livestock (kind)	2 620.19	18-27 120	77.3
Crops (cash)	197.72	22-450	67.9
Crops (kind)	119.72	7.5-332.50	16.9
Agricultural products	1898.92	0-27 060	98

Remittances also contribute to household income among the respondents, for example 28.3% of them receive remittances in cash while about the same percentage get remittances in kind.

3.7.2.1 Salaries and wages

Salaries and wages form the biggest component of the total household income. The distribution of salaries and wages are shown in Table 7. Almost a quarter (24.5%) of the respondents do not earn any income from salaries and wages. Income levels range between R0 and R12 000. Out of the total sample, 3.7% earn less than R1000, majority (54.4%) are found in the R 2 000 and R 8 000 income bracket, 16.7% earn between R 8 001 and R 12 000 with nobody earning above R 12 000.

Table 7: Distribution of annual salaries and wages per household (n=53)

Income ranges	No. of respondents	% respondents
Nil	13	24.5
Less than R1 000	2	3.7
1 000 – 2 000	1	1.8
2 001 – 3 000	5	9.4
3 001 - 4 000	7	13.2
4 001 – 5 000	7	13.2
5 001 - 6 000	4	7.5
6 001 – 7 000	2	3.7
7 001 - 8 000	3	5.6
8 001 - 9 000	3	5.6
9 001 - 10 000	1	1.8
10 001 -11 000	4	7.5
11 001 – 12 000	1	1.8
TOTAL	**53**	**100**

3.5.3 Expenditure

The annual expenditure patterns per expenditure categories are reflected in Table 8. Groceries (food and other) take the biggest chunk of total household expenditure. On the average, majority of respondents (98.1%) spend R2 363 on food with a range of R540 and R6 000 a year. A further 69.8% of the respondents spend an average of R512.76 on other groceries (cleaning products and cosmetics) ranging between R120 and R1 200 annually. Furniture, medical expenses and clothing are the next largest expenditure categories. More than 79% of the respondents use an average of R2190.29 on furniture, 57% spend an average of R768.13 medical expenses, while 92.4% spend on the average R709.90 on clothing. Though all the respondents incur agricultural expenses, the yearly average of R133.25 is relatively low.

Table 8: Household Expenditure Per Annum (n=53)

Category	Average	Range	% respondents
Groceries (food)	2 363.23	540-6 000	98.1
Groceries (other)	512.76	120-1 200	69.8
Fuel	559.65	84-1 200	75.5
Education	635.56	0-2 010	67.9
Clothing	709.90	150-3 600	92.4
Furniture	2190.29	0-4 440	79.2
Medical expenses	768.13	0-1 200	56.6
Transport costs	597.70	0-1 920	86.7
Housing rates and rentals	545.38	0-1 800	30.2
Expenses on house	187.55	0-1 920	60.3
Telephone and postage	502.13	0-3 600	66.0
Subscription/membership	120.15	0-1 200	24.5
Church contributions	260.71	0-1 800	96.2
Entertainment	477.81	44-1 800	84.9
Interest on loans	2040	1080-3 000	3.7
Hiring of labour	116.67	50-240	5.6
Agricultural expenses	133.25	0-4 512	100
Savings	744	10-120	18.8
Policy/Insurance	539	295-600	9.4
Burial clubs	345.06	70-1 200	30.1
Mgalelo	600	600	1.8

3.7.4 Livestock and crops

3.7.4.1 Livestock

Table 9 gives an indication of the ranges in the various livestock species kept by respondents in Adelaide farms. The species kept are cattle, goats, pigs and chickens. Most of the respondents keep chickens (83%) cattle (69%), pigs (39%) and (37%) goats. According to the survey, the farm owners allow their employees to keep livestock in their farms, though there are restrictions as to the number each household can keep due to land size. The majority of respondents (95%) graze their livestock with those of the farm owner under a rotational grazing system. Dipping and other health management issues are also applied to all animals despite their ownership. Generally, livestock on the farms drink water from dams (67%) and the rest from the boreholes (15%), streams (15%) and local taps (3%).

Table 9: Average livestock numbers

Species	Mean	Range	Respondents
Cattle	4	1-10	37
Goats	4	1-13	10
Pigs	2	1-6	11
Chickens	11	2-40	44

The respondents keep livestock to earn money from livestock sales. Though the farm owners assist in the selling of their workers' stock, the workers can also sell to various customers directly. Auctions are highly favoured, as 52% of respondents sell cattle and 80% of them sell goats through this outlet. Other market outlets include neighbours and relatives (where 40% of respondents sell their pigs) and buyers from other places (where 57% sell their chickens). Respondents also get other products from their animals, such as milk, meat and eggs. These products are mainly for home consumption, though they sometimes have to give away some, especially milk as it tends to spoil very easily. Milk is either processed into sour milk (*amasi*) or used as feed for pigs.

3.7.4.2 Vegetable gardens

Many respondents (83%) have gardens in their yards. These gardens range from $6m^2$ to $450m^2$, with an average of $148m^2$ in size. At least 60% of respondents had planted between 1 and 10 crops during 2001/2002 season (Table 10). Respondents use taps located on the premises to water their crops. Potatoes are the most commonly grown (49% of respondents) followed by maize and pumpkin (24% of respondents) and onions (22% of respondents). The crops grown are used mainly for home consumption.

Table 10: Average crop yields (kg) from home gardens

Crop	Maize	Potatoes	Pumpkin	Cabbage	Beans	Onion	Spinach
Mean	50.6	52.7	23.8	16.9	14.9	11.4	8.1
Range	10-150	10-120	4-100	3-30	4-50	4-40	3-20
Producers	13	26	15	7	8	12	9

3.7.5 Land issues

Out of the 53 respondents interviewed, 26% were born in white farms, 72% in rural areas and 2% in townships and cities. Despite having stayed in the farms for variable periods, none of the respondents have their own land. The respondents live in small houses surrounded by small yards and for this reason 98% of them would like to get more land, ranging from 0.25 to 20 ha in size. The survey shows that 98% of the respondents feel that the state is responsible for purchasing land for landless people.

Due to the small pieces of land that the respondents are currently occupying, 62% of them think that getting their own land will improve their lives. Reasons for such thoughts include: an opportunity to get more land, getting closer to the markets and having access to water for agriculture.

In terms of land distribution, respondents believe priority should be given to those who are poor, secondly those who wish to farm and thirdly to people who lost land in the past as well as those people who have farming skills. People usually move from

their homes in search of jobs, and this also happened in Adelaide where 66% of the respondents have experienced moving from one place to another. Such movements were attributed to three major reasons; the death of an employer, disagreements with the employer or simply in search of work.

3.7.6 Community projects and infrastructure

The workers at Mt Pleasant farm are engaged in community projects, namely vegetable production and a piggery. Respondents would like to have more projects such as sewing, wool sorting and cattle/goat/poultry to be initiated in the area (Table 11).

Table 11: Needed community-based projects

Needed Projects	No. of respondents	% respondents
Sewing & poultry/piggery	11	22
Poultry & piggery	10	20
Abattoir	9	18
Cattle/sheep/goats	7	14
Wool sorting	5	10
Vegetables	4	8
Sewing	4	8

Respondents have access to infrastructure like water taps, electricity, primary schools and sports grounds (Table 12). More than 70% of respondents expressed a greater need for other infrastructure such as roads, transport, clinics, schools, telephones and community halls.

Table 12. Respondents having access to infrastructure and services

Infrastructure	No. of respondents	% respondents
Water taps	47	89
Good roads	35	66
Electricity	26	49
Sports grounds	20	38
Schools	16	30
Clinics	15	28
Telephones	14	26
Community hall	5	9
Transport	4	8

Although respondents complain about getting low wages, their relationship with their bosses is generally good. Individuals are also in good terms with their fellow workers. They feel that the good relationship with each other should prevail when the beneficiaries move to Mt Pleasant farm.

3.7.7 HIV/AIDS

Respondents are quite aware of HIV/AIDS. This awareness was brought about through radio and television programmes, awareness campaigns often held in the town hall as well as advice from some of the farmers' wives (Figure 5). According to respondents, there are few people in the study area infected with HIV/AIDS. There are few people known to have died because of the disease, something that happened between 1999 and 2000. Many respondents in the survey communities are prepared to treat AIDS victims as normal patients, though some say they would chase away or isolate such patients for fear of being infected.

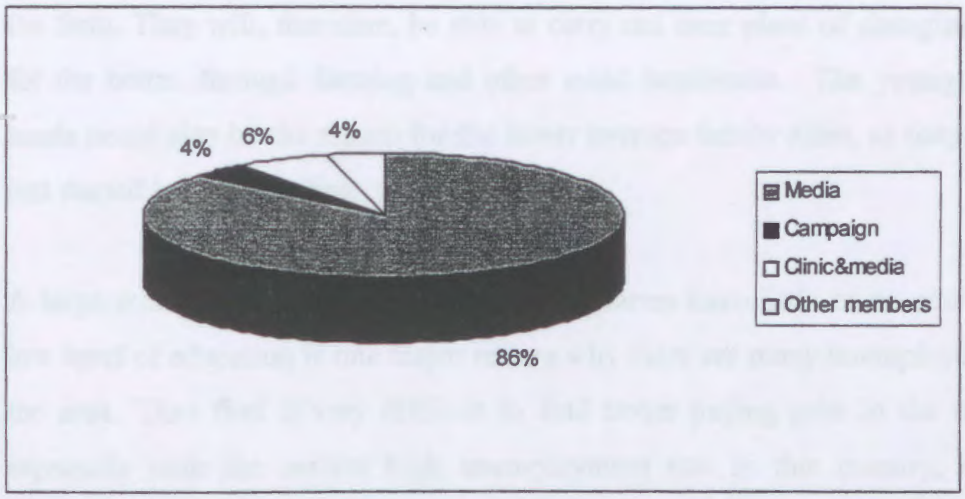

Figure 5: Sources of information about HIV/AIDS

About two-thirds of the respondents (63%) see the use of condoms as the best method to control the spread of the disease. Other preventative measures include sticking to one partner, abstention, provision of medicine by the government and awareness campaigns. According to the respondents, efforts to fight HIV/AIDS are not enough because at present there is no cure and more people are dying everyday. Most of the people interviewed believe that the development of medicine to cure AIDS will be the best effort to fight this horror.

3.7.8 Discussion

From Figure 4, most households have 3 to 6 members, with an overall average of five members per household. This average family size of 5 is a little bit less than what has been observed in other studies (Fabricius & McWilliams, 1991; Van Averbeke et. al, 1998). This could be due to the fact that the current study dealt with farm workers, rather than regular rural households. The houses they stay in belong to the farm owners and are in most cases not big enough to cater for large families and it is difficult to expand such houses without the farmer's permission.

Just over a fifth (22.6%) of the household heads are more than 65 years of age (Table 5). This means the potential beneficiaries of the resettlement project are still energetic to work and provide labour input in the various activities that will be undertaken on

the farm. They will, therefore, be able to carry out their plans of changing their lives for the better, through farming and other small businesses. The young ages of the heads could also be the reason for the lower average family sizes, as they might have just started having families.

A large number of the people in the various farms have little or no education. This low level of education is one major reason why there are many unemployed people in the area. They find it very difficult to find better paying jobs in the urban areas, especially with the current high unemployment rate in this country, where even educated people struggle to get good jobs. Education is very important as it expands a person's basic capacity to choose and opens further options for a fulfilling life (Erasmus, 1998). Currently farm workers and their families feel they do not have fulfilling lives - they are in most cases poor and do not have any land rights. Poverty means as a lack of resources to meet basic needs such as food, clothing, shelter and basic amenities. It is more than a lack of income, as it involves inadequate access to services and poor prospects of employment. Access to social and economic services enables people to participate fully in the economy and the community. Education and training satisfy a basic human need for knowledge and skills and thus influence the welfare of any community.

The target group lives in white farming areas, this offers them the job opportunities as farm hands and in return receive income. Most of the respondents receive salaries and wages; as a result reliance on remittances is not as prominent as shown to be the case in other areas of the province. Fabricius and McWilliams (1991) and other studies confirm that rural dwellers are financially reliant on migrant workers. The situation in Adelaide is a deviation from the norm that rural dwellers depend on migrant workers. Pensions as source of income are also relatively less prominent. This is also the opposite of the findings by Monde *et al* (1997), Ainslie and Ntshona (1997) and Van Averbeke *et al* (1998b) that claims against the state had become the main source of rural income, contributing about 50% of overall cash income among surveyed households in the Eastern Cape.

The mean gross annual expenditure in Adelaide is R8 416. The overall mean monthly expenditure for the target group in Adelaide is R701 and mean household size 5.

Using the national household poverty line based on consumption expenditure at R 800 or less per month – 1996 prices (CSS and World Bank 1999), as yardstick it appears all the respondents in the study group are below the poverty line. According to Wefa (1999), more people (about 67%) in the Amatole municipality live in poverty compared to 63.7% in the whole of the Eastern Cape, using the poverty line based on consumption expenditure of R 800 or less per month (Table 13).

Table 13: Persons in poverty in the Eastern Cape province

District Municipality	Persons in poverty (#)	Persons in poverty (%)
Western	269 913	47.1
Amatole DC	1 064 373	65.7
Chris Hani	613 789	68.5
Ukhahlamba	244 479	65.6
OR Tambo	1 300 618	75.0
Alfred Nzo	419 143	75.2
Nelson Mandela Metro	303 061	35.4
Eastern Cape	4 234 867	63.7

Source: Wefa (1999)

Majority of the workers do not belong to any private pension schemes, which implies that, they would have nothing to fall on at retirement age. In the foreseeable future, most of them are very likely to join the government's welfare grant scheme that is already financially overstretched.

Apart from providing their services mainly as farmhands, involvement in other areas as avenues for jobs is very low. For example, local trade as a job provider is virtually non-existent. This trend could be attributed to among others, lack of abilities to venture into such trades, the remoteness of the study area and the tendency of rural dwellers buying all basics especially food from the towns and cities.

Salaries and wages generally fall in the low-income bracket. This confirms the trend of low earnings in the Amatole District Municipality and the Eastern Cape at large. Wefa (1999) estimates that, 48% of the households in the municipality earn between R 0 – 6 000 (Table 14).

Table 14: A comparison of household income ranges in the District Municipalities and Eastern Cape

District Municipality	INCOME RANGES			
	R 0 – 6 000	R6 001 – 18 000	R 18 001– 42 000	R 42 000 +
Amatole DC	175 079 (48%)	80 537 (22%)	37 335 (10%)	37 534 (10%)
Alfred Nzo	200 (50%)	112 (28%)	44 (11%)	43 (11%)
Chris Hani	98 048 (62%)	37 832 (24%)	13 261 (8%)	10 370 (7%)
OR Tambo	160 083 (44%)	95 690 (27%)	45 862 (13%)	58 116 (16%)
Ukhahlamba	38 242 (48%)	19 940 (25%)	9 630 (12%)	11 266 (14%)
Western	26 939 (31%)	22 273 (31%)	11 627 (16%)	11 689 (16%)
Nelson Mandela Metro	44 163 (17%)	82580 (31%)	42 810 (16%)	92 869 (35%)
Eastern Cape	542 754 (43%)	338 964 (27%)	160 569 (13%)	221 887 (17%)

Source: Wefa (1999)

According to Central Statistical Services (CSS 1998) this trend is attributable to the fact that a high percentage of those employed in the Eastern Cape are found in the lower level occupations. This includes farm labourers, which form the bulk of our target group.

Respondents spend most of their earnings on consumables and furniture. This trend is an indication that almost all incomes are spent outside the study area or in the neighbouring towns and cities. The outward capital flow does not help growth and development of the economy in the rural areas. According to several socio-economic studies by ARDRI in the region, the high proportion of income spent on especially food is an indication that agriculture is not coping in providing food to meet household needs.

Although agriculture is an important source of income, agricultural expenses are very low. This indicates that, they do not plough back some of their earnings into agriculture though income from agriculture is quite substantial. This does not augur well for the future improvements and expansion of Agriculture.

The information gathered from the survey shows that many people who are staying or working in the farms do not have land. In many farms in the Cape, the bigger portion of the land (85%) belongs to the owner of the farm with the remaining small portion of land being rented by the workers (Antrobus et al, 1994). Even though some are not planning to leave their places of employment yet, the people feel that having their own land will give them freedom to farm as they please, which will then improve their livelihoods and give more hope for a brighter future for their kids. The farm workers receive very low wages and that makes it difficult for them to survive, especially when wages are their major source of income. They need to be assisted with community-based projects such as vegetable gardens, poultry, piggery or sewing to supplement their low wages.

The infrastructure in their places needs to be improved, for example in most of the farms people rely on mobile clinics for health related issues. The schools are far from the residential area and the children have to walk long distances and that puts their lives at a risk. In designing of the infrastructure-related services such as electricity and water the people should be consulted to avoid cut-offs due to non-payment because people are earning low income (DBSA, 1998).

The rapid spread of AIDS in South Africa has led to this country experiencing one of the fastest growth rates of the epidemic in the world (Whiteside and Sunter, 2000). It is quite impressive to see that most people in the communities are aware of HIV/AIDS, because this endemic has the potential to have the devastating effect on social, economic and above all human development. According to the results the awareness is through radio and TV programmes, clinics and campaigns. According to McKenzie (1991) because AIDS is a socially transmitted and socially preventable disease, the best way to contain it is probably not through health department flyers, TV messages or doctor's entreaties, but through changing the pattern of interaction within communities. Changing community behaviour also requires changing attitudes, values and power structures.

Outreach alone cannot prevent AIDS, which is why health department advises people to use condoms. However, according to McKenzie (1991), community norms for both men and women are not supportive of condom use. Condoms are free and in

adequate supply but if adequate education is lacking their use is neither safe nor effective. More so powerless women are suffering the consequences because they become confronted with male sexual demands. Therefore effective use of condoms will require three components: greater availability, knowledge on how to use them and the urge to use them. This can be done through community intervention (David, 1996).

It is therefore very important for the people to be cautious about this disease because as more young people are informed of their HIV status, they become more reckless in their sexual forays as they compensate for not having long to live. It is encouraged that studies of this nature be continuous to reach larger part of communities. This will help to know the shortfalls for making people aware of this scary killer in our country.

4. RECOMMENDATIONS

4.1 Recommendations on livestock production systems

As is common knowledge and visually noticeable, the farming area around Mount Pleasant is largely a beef production area with little or no sheep farming evident, while goats form an important secondary component due to the nature of the vegetation. Even then, goat production in the area is not as prominent as cattle farming but will be a necessary component for the above-mentioned farm due to the relatively high level of bush encroachment.

With regards to beef farming there are a number of production systems that one can consider with each system having its merits and disadvantages. These systems include the following: -

(a) Breeding and selling weaners (8 month old) and cull cows
(b) Breeding and selling older animals (between 1 – 3 years of age)
(c) Buying young stock (weaners) and fattening them off veld
(d) Feedlots

Considering the supposedly communal nature of the livestock farming to be undertaken by the beneficiaries on these farms, options (a) and (b) seem to be the most logical. These options will allow individuals to run separate herds thus permitting them to choose the option that best fits their individual objectives or needs. Option (c) could be another viable option but would require a communally agreed upon system as this system if practiced by individuals could be easily interpreted as exploitation of a common resource by those individuals while the costs of such exploitation will be shared by all. Option (d) is out of question due to the supposed communal nature of the future land use and the low potential for crop production. Assuming a calving percentage of 70 % as a minimum acceptable rate the livestock composition for the first two system will be outlined and used as a recommendation.

4.1.1 Breeding and selling weaners and cull cows

Assumed: 70 % calving percentage

Number of breeding cows: The breeding stock is the main important component of an enterprise of this nature; therefore the number of cows determines the size of the herd. In respect of dry matter requirements per year such a system translates to 158 AU (Jones, Arnot & Klug, 1989), which per 100 cows is an equivalent of 1.58 AU/cow. For 2000 ha at a grazing capacity of 5.2 ha/AU the number of AU is 385. At 385 AU the number of cows will therefore be = 385 AU/ 1.58 AU/cow = 243 cows

Therefore for option (a) the number of breeding cows that can be kept = 243. This figure takes into account the recommended grazing capacity and caters for calves, bulls and other non-breeding animals expected in such a system within the recommendation.

At a recommended rate of about one bull per 25 cows, the above system will require 10 bulls.

The profitability of the above system is very much dependent on the calving rate, and the suggested 70 % means that each cow will calve at least 2 times for every 3 years. With the recommended 243 cows one would expect at least 170 calves each year. With a 20 % replacement rate, 48 of the calves will be retained in the herd, while the same number of cull cows will be added to the stock to be sold. Therefore for this system at the recommended stocking rate, about 122 weaners and 48 cows could be sold annually. Generally buyers prefer about 200 kg live mass for steers and 180 kg for heifers.

4.1.2 Breeding and selling older animals (12 – 36 month)

Assumed: 70 % calving percentage

Number of breeding cows: As mentioned before for these systems the breeding stock is the main important component such that the number of cows is the focal point in the determination of the size of the herd. In respect of dry matter requirements per

year such a system translates to 247 AU (Jones, Arnot & Klug, 1989), which per 100 cows is an equivalent of 2.47 AU/cow. For 2000 ha at a grazing capacity of 5.2 ha/AU the number of AU is 385. At 385 AU the number of cows will therefore be = 385 AU/ 2.47 AU/cow = 156 cows

Therefore for option (b) the number of breeding cows that can be kept = 156. This figure takes into account the recommended grazing capacity and caters for calves, bulls and other non-breeding animals expected in such a system within the recommendation.

At a recommended rate of about one bull per 25 cows, the above system will require 6 bulls. With the recommended 156 cows one would expect at least 109 calves each year. With a 20 % replacement rate, 30 of the calves will be retained in the herd, while the same number of cull cows will be added to the stock to be sold. Therefore for this system at the recommended stocking rate, about 79 weaners and 30 cows could be sold annually.

As mentioned earlier each of the two systems has its merits and its disadvantages. Option (a) has a quicker turnover and has fewer age groups of animals. On the other hand animals sold at that age usually get a higher class and fetch a better price per kilogram. The calving percentage plays a vital role in these systems since cows that do not have a calf can be described as non-productive passengers. Considering the fact that it was mentioned that buyers prefer animals in the 180 – 200 kg range, the breed and the size of weaners also play an important role. The disadvantage with the weaner system is that during a bad year the weaners will be smaller when sold and few cows will conceive resulting in a smaller calf crop the following year.

With the second system profitability is less dependent on achieving a high calving rate because all the available animals including "passenger cows" form part of the productive stock, as they are actually saleable animals. Despite the lower number of animals that will be sold annually they will be worth more because they will be larger.

4.1.3 Goat production system

A goat production system is a must for this particular farming unit, which is a result of a heavily, bush encroached veld. The encroachment noticeable at Mount Pleasant is described as such because it is to some extent also strangely confined to this property. The presence of the woody component is also a natural occurrence in the area because the mountain slope that forms a generous part of the farm is forested, so one would expect that the trees would have encroached from that. While open grassland patches are present on the farm the bush density averaged at 1150 plants per hectare, which is moderately high. All the trees in the surveyed sites were acceptable and also available to goats, which indicates a very high potential for forage production. With a derived browsing capacity of 2.8 ha per small stock unit (SSU) the number of animals that could be farmed taken from an assumed potential grazing area of about 2000 ha is 714.

As a recommendation a goat meat production system is suggested due to the suitability and the availability of the Boer goat, which is a prolific meat-producing breed. The potential for goat meat production is currently high if one can develop a good marketing strategy. This aspect was identified by SAMIC who indicated that Eastern Cape producers may not be geographically distant to the major market for goat meat in KwaZulu Natal.

4.1.4 Pig production

Presently, the people in Mt Pleasant are engaged in pig production, using the two existing structures, one with an area of 45.15m^2 and the other one 79.2m^2. This project can be developed t o benefit people in the proposed settlement. Commercial pig production is aimed at any one or a combination of the following systems:

- Weaner production, where farmers run breeding herds but sell offspring shortly after weaning. A weaner producer requires a high level of management and more sophisticated buildings, but less feed.
- Breeding and producing marketable animals as porkers or baconers

- Growing purchased weaners to marketable live weights, where farmers don't keep breeding herds of their own.
- Multiplication of breeding stock

Based on the current situation at the project in Mt Pleasant, fattening of purchased weaners is the recommended option. Market planning is the most important factor when establishing a piggery, and this should always be borne in mind irrespective of which production system is chosen.

4.1.4.1 Weaner production

There is currently one boar and two sows (with 12 and 7 piglets) at the project site. The boar is not being used to its potential because one boar should be kept for a unit of at least 15 sows/gilts. Considering an average litter size of 10 piglets/sow, this will give 150 piglets per breeding season. Each sow can rear about 2.2 litters or 20 piglets per year, with feed intake of about 1.2tons/year. The boar eats about 2.7kg per day, i.e. 985.5kg per year. A quarter of the sows (~4) should be replaced every year and these replacement sows will come from the piglets born by the 15 sows. The rest of the piglets will be sold as weaners at 35 days of age, to other producers for either meat production or breeding.

4.1.4.2 Fattening for slaughter

There's no need for sophisticated buildings, less disease problems to deal with, no costs of maintaining a breeding herd, no losses due to neonatal deaths and operation can even be seasonal or can be suspended and resumed as conditions permit. The total area of the two structures is 124.35m^2, which can cater for 96 weaners to be fed for sale as porkers at 50kg live weight or as baconers at ~90kg. Porkers fetch more money than baconers, so it would be wise to go for porkers. Also, the porkers will only be fed for about 2.5 months compared to 4 months for baconers.

4.2 Crop production

The following crops can be successfully grown with good soil fertility and irrigation management: maize (probably more viable as green mealies), potatoes, butternut, pumpkins and vegetables like cabbages, spinach, carrots and onions. There is need, however, to assess the viability of markets in nearby towns like Alice, Fort Beaufort, Adelaide, etc. for profitable production and marketing of these crops. Long term cropping plans can take into account citrus (oranges, naarjties, lemons) and stone fruit (peaches, prunes) production. There already is a well-established citrus marketing cooperative in nearby Fort Beaufort that can be used as an outlet. However, it should be borne in mind that orchard management is more demanding than short–term (annual) crop cycles in terms of skills and financial resources.

4.3 Socio-economics

4.3.1 Education and training

A large number of the people in the various farms have little or no education. This low level of education is one major reason why there are many unemployed people in the area. Education is very important as it expands a person's basic capacity to choose and opens further options for a fulfilling life. Education and training satisfy a basic human need for knowledge and skills and thus influence the welfare of any community. There are many young people of school going age who are currently sitting at home with nothing to do because of a lack of easily accessible schools. Building of a school is therefore very important. Such school will be of great benefit to these kids' parents, as the parents can have ABET (Adult Basic Education & Training) classes after school. From ABET parents will learn basic literacy and numeracy skills and thus be able to enrich their knowledge by attending courses such as those offered at the Mpofu Training Centre.

Most of the workers do not belong to any private pension schemes, meaning that when they reach retirement age they will have to join the government's welfare grant scheme that is already financially overstretched. This could be avoided by arming

these people with skills that they can use to derive other means of income and thus not live miserable lives, as is currently the case with most people in the rural areas.

4.3.2 Health issues

People working on the Adelaide farms rely on mobile clinics for health related issues. This means when people get sick outside the usual monthly visits by the mobile clinic, they have to go to Adelaide or Fort Beaufort. Since more people will be moving into the Mt Pleasant farm, the need for an easily accessible health centre will be high. Such centre could be erected at a point that will be central and thus easily accessible even to the neighbouring farms.

AIDS spread so rapidly in South Africa such that South Africa has experienced one of the fastest growth rates of the epidemic in the world. It is encouraged that more campaigns are conducted to reach larger part of communities, to make more people aware of this scary killer in our country.

It is recommended that the enterprises (crops, cattle, small stock, pigs, etc.) should be run on a cooperative rather than on an individual basis, i.e. the people to be settled on this farm, need to organize themselves into a cohesive unit with command structure consisting of a general manager (or small committee acting as such), committees responsible for different activities/enterprises, workers/owners for day to day farm operations, and so forth.

Another possible enterprise is the production of good quality charcoal from acacia trees/shrubs abundant in the area, and/ or selling of firewood.

Because of the expenses involved, it is recommended that orchard crops such as citrus, peaches, etc. be established first on trial basis on small plots of about 1 ha each before large-scale expansion. This will serve as training for the people to be settled on the farm, as well as observation plots for monitoring their performance. New crops like olives, hemp and chillies could also be tested on small plots.

For projects to take off, settlers would need to be given an external capital injection. This will be quite large to cater for: building of decent houses for accommodation, construction of a school (Yellow Woods too expensive) and clinic, improvement of farm buildings (sheds, storerooms, etc.), fences and dams, installation of irrigation systems, acquisition of farm machinery (tractor, trailers, bakkie/lorry, ploughs, discs, harrows, etc.), crop inputs (seed/seedlings, fertilizers, pesticides, etc.), livestock inputs (breeding stocks, handling facilities, veterinary supplies, etc.). With such a big need for start-up capital, it is inevitable that Government would have to continue playing a major role in fund raising and project monitoring.

It is recommended that housing development be done around the existing settlement on the farm as this convenient site in relation to farm buildings, arable lands, livestock handling facilities. A decision has to be taken on a suitable location for the school, clinic, playing fields and other community requirements.

5. FARM MANAGEMENT PLAN

5.1 Introduction

The settlement project has a total area of 2300 ha out of which 50 ha are irrigable. It has been confirmed that crops such as green maize, potatoes, cabbages, butternut, and pumpkins can be grown on the 50 ha irrigable land.

With regard to livestock production, the remaining 2000 ha of grazing land is suitable mainly for beef cattle production. The area is also suitable for goat production.

The main objective of the farm management plan in the context of these settlement farms is to determine the actual number of households that can be settled on the two farms. In determining the ideal number of households that can be settled on the farm, one has to have a criteria or a benchmark. For this exercise, the criterion we intend to use is the national household poverty line. The national household poverty line based on consumption expenditure of R800 per month per 5-member household is R9600 per annum (CSS and World Bank, 1999).

In order to arrive at the national household poverty line figure, one has to know the various sources of income and the income from each source. As indicated above, the two major sources of income are crops and livestock. Consequently, enterprise budgets are prepared for the various crops and livestock activities identified as suitable for the settlement farm.

5.2 ASSUMPTIONS

The said enterprise budgets are generated on the basis of the following assumptions:

1. Green maize and all horticultural crops will be produced on irrigable land.
2. The amount of irrigation water from the 8 water dams will be enough to produce green maize and other horticultural crops on the 50 ha of irrigable land.

3. Ploughing, harrowing, ridging, ripping – all these operations are done either by animal traction or by tractor. Hence the availability of draft animals and tractor services will not be a limiting factor
4. As the production of green maize and other horticultural crops is sensitive, due to their perishability to marketing problem, we assume that there will be no marketing problem in the future.
5. It is assumed that each household on the settlement farm practices average management system for both crops and livestock. This system requires the farmer to have a reasonable knowledge in crop and animal husbandry.
6. There will be only one cropping for all crops and livestock activities.
7. Marketing/transport cost is excluded as we assume this cost will be borne by the buyers. Consequently prices used are farm gate prices for all crops and livestock activities.
8. The farm family will do harvesting of crops.

5.3 Gross margins

5.3.1 Gross margin analysis for green maize using animal traction or tractor

Gross Income /ha:		
Yield: 30 000 plants / ha @ 1 cob per plant @ R1-00 per cob		30 000.00
Variable costs/ha:	Animal traction (a)	Tractor (a)
Ploughing	136.00	374.50
Harrowing	20.00	374.50
Planting/ripping	15.00	374.50
Cultivating (3 tines)	135.00	1123.50
Maize seed (18.5 kg @ R25/kg)	462.50	462.50
Fertilizer: 2:3:4 500kg/ha	2100.00	2100.00
LAN 500kg/ha		
Stock borer control	125.00	125.00
Cutworm bait control	150.00	150.00
Irrigation*	2100.00	2100.00
Total variable cost	5243.5	7183.50
GM/ha to labour & Management	**24756.50**	**22816.50**

* The land will be irrigated 3 times and the cost per irrigation is R700.00

a) The figures are obtained from the Animal Traction Centre at the University of Fort Hare

5.3.2 Gross margin analysis for grain maize using animal traction or tractor (a)

Gross Income /ha:

Green maize yield / ha @ 2 tons @ R3000/ton

		60 000.00
Variable costs/ha:	Animal traction (b)	Tractor b)
Ploughing	136.00	374.50
Harrowing	20.00	374.50
Planting/ripping	15.00	374.50
Cultivating (3 tines)	135.00	1123.50
Maize seed (18.5 kg @ R25/kg)	462.50	462.50
Fertilizer: 2:3:4 500kg/ha	2100.00	2100.00
LAN 500kg/ha		
Stock borer control	125.00	125.00
Cutworm bait control	150.00	150.00
Total variable cost	3143.50	4335.50
GM/ha to labour & management	**2856.50**	**1664.50**

a) This gross margin analysis is only suggestion as the economic variability of dry land maize production is questionable.

b) The figures are obtained from the Animal Traction Centre at the University of Fort Hare

5.3.3 Gross margin analysis for cabbage using animal traction or tractor

Gross Income /ha:		
Yield: 18 000 heads / ha		
@ R1-40 per head		25 200.00
Variable costs/ha:	Animal traction a)	Tractor a)
Ploughing (twice)	272.00	749.00
Harrowing (twice)	40.00	749.00
Planting (by hand)	270.00	0.00
Weeding (by hand)	15.00	749.00
Cabbage seedlings 20 000		
@R80/ 100 seedlings	1600.00	1600.00
Fertilizer: 2:3:4 500kg/ha	2100.00	2100.00
LAN 500kg/ha		
Insecticide – biotit		
500 grams/ha	330.00	330.00
Irrigation (3 times)	2100.00	2100.00
Total variable cost	6727.00	8377.00
GM/ha to labour & management	**18473.00**	**16823.00**

a) The figures are obtained from the Animal Traction Centre at the University of Fort Hare

5.3.4 Gross margin analysis for potatoes using animal traction or tractor

Gross Income /ha:

Yield: 16 TONS/ ha: 1600 pockets

@ R15 per pocket		24 000.00
Variable costs/ha:	Animal traction a)	Tractor a)
Ploughing	136.00	374.50
Harrowing	20.00	374.50
Planting (by hand)[b)]	0.00	0.00
Weeding + ridging	30.00	374.50
Potato seed:75 bags @ R51/ bags	3825.00	3825.00
Fertilizer: 2:3:4 500kg/ha	2100.00	2100.00
LAN 500kg/ha		
Fungicide: 250 grams/ha	75.00	75.00
Irrigation	1000.00	1000.00
Harvesting [c)]	136.00	0.00
Pocketing (1600 X o.75)	1200.00	1200.00
Total variable cost	8552.00	9323.50
GM/ha to labour & management	**15443.00**	**14676.50**

a) The figures are obtained from the Animal Traction Centre at the University of Fort Hare

b) Planting will be done by the family labour

c) Harvesting will be done by animal traction and family labour

5.3.5 Gross margin analysis for butternuts (r/ha)using animal traction[a] or tractor

Gross Income /ha:

Yield: 15 TONS/ ha or 7500 butternuts

@ R3 per butternut 22 500.00

Variable costs/Ra:	Animal traction [b]	Tractor [b]
Ploughing	136.00	374.50
Harrowing	20.00	374.50
Planting/ Ripping	100.00	0.00
Weeding	15.00	374.50
Butternut seed: 3 kg/ha @ R70/ kg	2100.00	2100.00
Fertilizer: 2:3:4 500kg/ha	2100.00	2100.00
LAN 500kg/ha		
Irrigation (3 times)	2100.00	2100.00
Total variable cost	6571.00	7423.50
GM/ha to labour & management	**15929.00**	**15076.50**

a) Harvesting will be done by animal traction and family labour

b) The figures are obtained from the Animal Traction Centre at the University of Fort Hare

5.3.6 Gross margin analysis for pumpkin using animal traction or tractor [a]

Gross Income /ha:

Yield: 12 TONS/ ha: or 2400 pumpkins

@ R5 per pumpkin		12 000.00
Variable costs/Ra:	Animal traction [b]	Tractor [b]
Ploughing	136.00	374.50
Harrowing	20.00	374.50
Planting/ Ripping	100.00	0.00
Weeding	15.00	374.50
Pumpkin seed: 6 kg/ha @ R70/ kg	420.00	420.00
Fertilizer: 2:3:4 500kg/ha	2100.00	2100.00
LAN 500kg/ha		
Irrigation (3 times)	2100.00	2100.00
Total variable cost	4891.00	5743.50
GM/ha to labour & management	**7109.00**	**6256.50**

a) Harvesting will be done by animal traction and family labour

The figures are obtained from the Animal Traction Centre at the University of Fort Hare

5.3.7 Gross margin analysis for meat type boer goats (R/doe lifetime) Mt pleasant farm with a maximum capacity of 714 goats

a. Number of lactations per doe per lifetime

1. Doe is assumed to first breed at age of 7 months
2. Doe is assumed to mate every 5 months on the average and are culled when 8 years old
3. Death rate is assumed to be 10% per annum or 4.2 % per lactation
4. The number of lactations per lifetime is estimated to be 7

b. Kid production per ewe lifetime

• Number of lactation's	=7
• Number of kids per lactation	=1.5
• Total number of kids reared per lifetime 7 *1.5	=10.5
Less death rate (which is 0.85)	=8.21
Less replacement to maintain constant flock size (15 % of the female goat) = 9.65 * 15%	=1.99
Therefore, the number of surplus kids on which returned are based equals	8.21

c. Computation of returns from sale of kids and culled does

• No. Of kids available for sale per doe lifetime	=8.21
• Price per kg live weight of kids	=R15.00?
• The average weight per kid at the time of sale	=20kg
• Return ones 8 years = 8.21 *15*20	=2463.00
• Culled doe (40kg live weight) at R300/head	=300.00
Return from sale of kids and culled ewes	=2763.00
Gross return /year/doe lifetime	=345.38
Variable costs/ewe/year:	=25.00
Veterinary and sundry costs =R25/year	
Feed costs/year	=100.00
Gross margin to labour management/doe/year	**=220.38**

*Average management is considered. It is a system where the farmer has a reasonable knowledge in goat husbandry

5.3.8 Gross margin analysis for porkers at 50kg live weight (Rand/year)

	Per cycle	Per year
Output returns		
Sale of a porker (50kg) @ R15/kg	750	2250
Input costs		
Purchase of a weaner	150	450
Feed costs to market weight (270kg@70c/kg)	189	567
Veterinary costs	5	15
Marketing costs		
Inspection & grading fees	20	60
Transport costs @ R5/porker	5	15
Total input costs	**369**	**1107**
Gross margin to labour & management	**381**	**1143**

ASSUMPTIONS

1. Project members will use the existing piggery structures and keep a maximum of 95 weaners per production cycle
2. Each group of weaners will be kept for 2-3 months, resulting in at least 3 production cycles per year.
3. Weaners will be purchased at an initial weight of 15kg and be fed up to porker market weight of 50kg.
4. Feed will be purchased from feed companies or input suppliers.
5. The porkers will be sold to butcheries in Adelaide and Fort Beaufort

5.3.9 Gross margin analysis for a self-sustaining beef cow unit with a maximum herd size of 243

Internal structural coefficients:

Calving percentage = 0.70 (no. Calves born, 85 males and 85 females

Bulls: Cow = 0.04 (1 bull for 25 cows

Beef cow and bull replacement rate (keep 10 male calves to replace bull and sell 75

= 0.20 (keep 38 females and sell 47 females)

Activity budget	Rands
Input costs:	
Replacement and Bulls	(bred)
Replacement and old cows	(bred)
Feed (supplement)	16 000.00
Veterinary	3 000.00
Total Input Costs	19 000.00

Output Returns:

Cull old cows (48 of them) and sell @ R1 500	R72 000.00
Male calves (75 of them) and sell @ R 2 000.00	R150 000.00
Female Calves (47 of them) and sell @ R2 500	R117 500.00
TOTAL RETURNS	R339 500.00
Gross Margin / 243 beef cows	R320 500.00
Gross Margin / Beef Cow	R 1 318.93

5.3.10 Assumptions used to estimate the gross margin analysis for beef cow

1. The beef farm considers breeding and selling weavers (of months old) and culled cows.
2. 1.58 all/cow is required and this is 5.2 ha /all.

3. For 2000 ha at a grazing capacity of 5.2 ha (all, the number of all is 385.
4. At 385 all, the number of cows will therefore be 385 all 11.50 all/ cow = 243 beef cows.
5. This recommended grazing capacity cater for calves.
6. It is recommended that one bull is enough for 25 cows
7. Calving percentage is assumed to be 70%. This means that each cow will calve at least 2 times for every 3 years. With the recommended 243 cows one would expect at least 170 calves each year, which is 0.70 calf per cow per year.
8. With a 205-replacement rate, 48 of the calves will be retained in the herd and the same number of culled cows will be sold. Thus about 122 weaners and 48 culled cows will be old annually.
9. It is assumed that buyers prefer about 200 kg live mass for steers and 180 kg for heifers.

5.3.11 Determination of no of households

This farm has 50ha of irrigable land and 2000 ha of grazing land suitable for large and small stock production. The socio-economic survey of the area indicated that a 5-member household requires R9600 per annum to subsist. This figure fairly corresponds with the national household poverty gross margins for the various crop and livestock activities. The following scenarios are generated:

5.3.11.1 Scenario 1 (50 households are settled on the farm)

Suppose a household is allocated 7 ha of irrigable land and the land is equally allocated to the 5 crops (green maize, cabbage, potato, pumpkin and butternuts.

Crops/livestock	Land allocation (ha) and livestock allocation (no)	Income derived (Rand) Animal traction	Tractor
Green maize (ha)	0.20	7169.30	6992.90
Cabbage (ha0	0.20	3334.60	3004.60
Potato (ha)	0.20	3035.60	2875.30
Pumpkin (ha)	0.20	1373.80	1203.20
Butternut (ha)	0.20	3111.80	2941.30
Beef cattle (no)	4.86	6309.98	
Goats (no)	14.28	3147.03	
Total income per farm household		27482.11	26474.31

5.3.11.2 Scenario 2 (100 households)

Suppose a household is allocated ½ ha of irrigable land and this land is equally allocated (0.10ha) to each the 5 ha agricultural crops (green maize, cabbage, potato, pumpkin and butternuts)

Crops/livestock	Amount of land/ Livestock allocated	Income derived (Rands) Animal traction	Tractor
Green maize (ha)	0.1	3584.65	3796.40
Cabbage (ha)	0.1	1667.30	1502.30
Potato (ha)	0.1	1517.80	1437.60
Pumpkin (ha)	0.1	686.90	601.65
Butternut (ha)	0.1	1555.90	1470.65
Beef cattle (No.)	2.43	3154.99	
Goats (No.)	7.14	1570.80	
Total income /household		R13738.34	R13234.39

Following the producers in scenario in 1 and 2, the following options are generated for a household size of 150, 200,250 and 300.

Household size	Income/household Animal traction	Tractor
150	8905.75	8481.00
200	6475.03	6171.68
250	5180.02	4937.28
300	4044.31	3862.31

6 ACTION PROGRAMME

Based on findings of the survey, the following action plan is suggested. This plan is not cast in stone and is subject to change depending on prevailing market and other conditions.

3 Year Operational Plan

YEAR	ACTIVITY
1	Repair fences according to homogenous vegetation units, apply grazing management for recovery of camps
2	Clearing dams, repair of windmills and dips
3	Repair roads, firebreaks and other structures

6.1 Capital Expenditure Plan

1. Repair of farm fences including camp fences (± 150 kilometre @ ± R30.00 / kilometre) = R 4 500

2. Clearing of dams (12*R 1 500), repairs to Windmills (4 * R 20 000) and dips (2 * R 5 000) = R 108 000

3. Repair access roads (within and around farm ± 150 kilometres @ R 300 / km) = R 45 000

4. Repair firebreaks (within and around) (± 150 kilometres @ R 3 km/day * 50 days * R 60.00) = R 9 000

5. Repairs farm buildings = R 100 000

6. Livestock – (243 Beef cattle @ R 2 500 each) = R 607 500

7. Livestock – (714 Boer goats @ R 300 each) = R 249 900

8a. Animal Traction {AT} (10 pairs of oxen @ R 2 500 each per 100 households) = R 50 000

8b. **OR** 1 New 285S Massey Ferguson Tractor 55KW {T} = R 190 000

$TOTAL_1$ = R 1 172 500 (with AT)

$TOTAL_2$ = R 1 312 500 (with T)

6.2 * Annual operational cost per 100 households

1. Green Maize	= R 49 400
2. Cabbage	= R 64 150
3. Potatoes	= R 82 410
4. Pumpkin	= R 45 800
5. Butternut	= R 62 600
Medication (243 beef cows @ R 150.00 per animal per year)	= R36 450
Medication (714Boer goats @ R 100.00 per animal per year)	= R71 400
Supplementary feeding (243 beef cows @ R 10.00 per animal per 4 months of the year)	= R 9 720
Supplementary feeding (714 Boer goats @ R 5.00 per animal per 4 months of the year)	= R 14 280
$TOTAL_3$	**= R 436 210**

GRAND TOTAL (1+3)	**= R 1 608 710**
OR (2+3)	**= R 1 748 710**

*** Assuming that only 100 households will be settled on the farm and each will be entitled to 0.5 ha of irrigable land. The operational cost is only for the first year because investments should generate substantial income in the second and subsequent years *cert par*.**

6.3 Three-year labour management programme

- Establish a farm management committee chosen by the community.
- Draw on existing expertise and experience within the farming community to train more farm hands
- Acquire the services of a farm manager/s in the long term. The prospective manager/s should be experienced in the following:

    1. General management of livestock and crops (including disease diagnosis and treatment)
    2. Human resource management
    3. Financial management
    4. Monitoring, coordination and evaluation of the general farm process

- The farm manager reports to the farm management committee.

Among others, the following should also be considered:

1. Mentoring of this farming community by the surrounding commercial farmers, who have already indicated their willingness to assist,
2. Training in various production systems

In addition

A holding company could be established for the purposes of being the ultimate controlling body of the farm. It should be a company that will have a legal person attributes. It would control funds received funds received from donor organisations or financial institutions. It serves as a shell company to control the pool of funds.

A management committee (board of directors) would then be elected for the company and who with the community make strategic decisions in terms of the operation of the project and usage of funds.

The commercial farmers would work closely with the management team and the managers.

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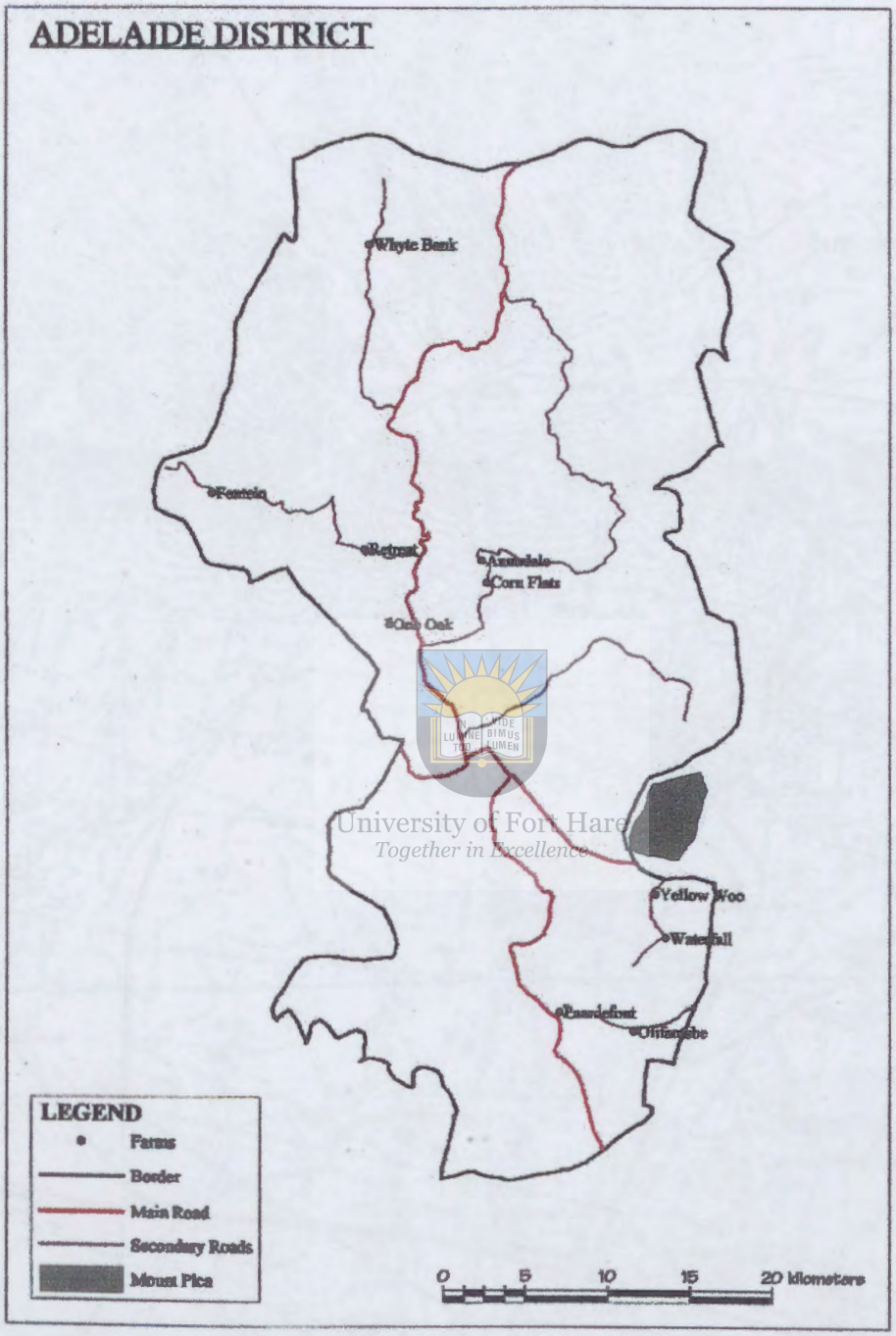
Appendix A Map of surveyed farms in Adelaide district



Appendix B Sketch map of Mt Pleasant farm

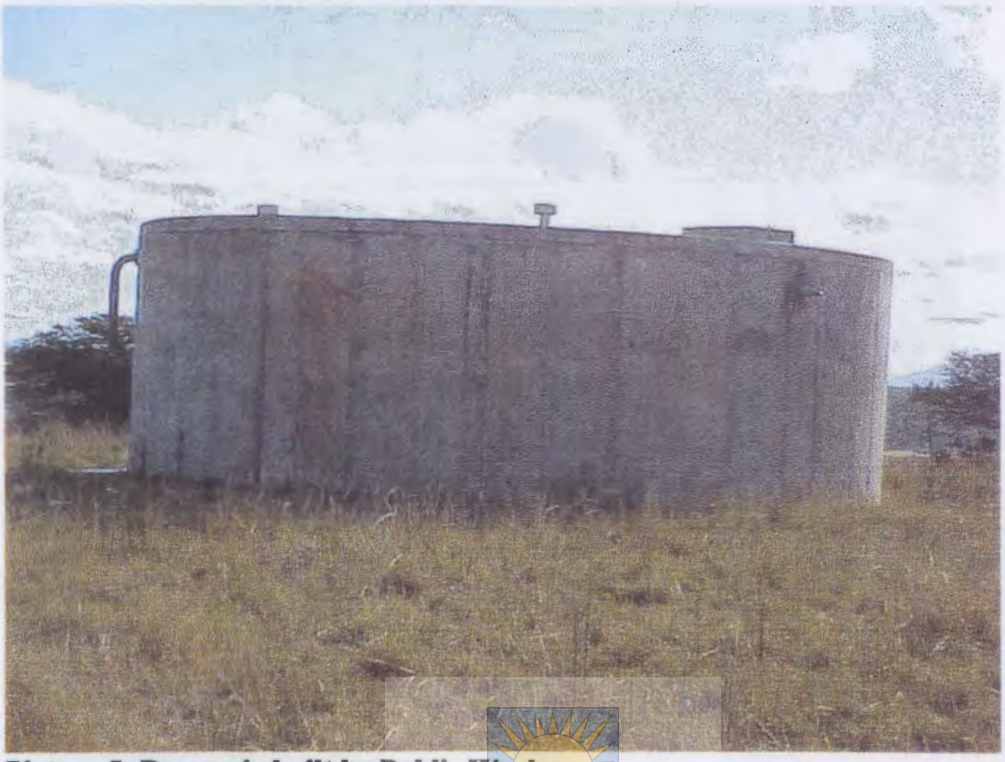
Appendix C

Picture 1: Piggery

Picture 2: Tools and machinery shed

Picture 3: Dam 1

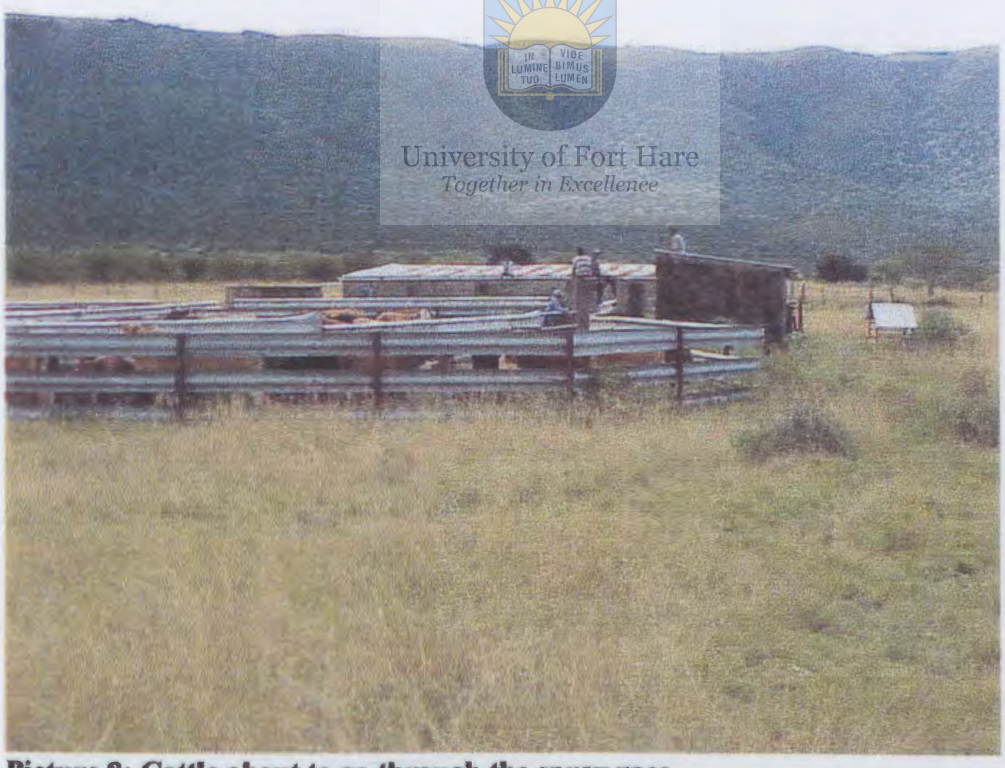
Picture 4: Dam 2



Picture 5: Reservoir built by Public Works

Picture 6: Reservoir 1 established with the farm

Picture 7: Reservoir 2 established with the farm



Picture 8: Cattle about to go through the spray race

Picture 9: Fence line 1

Picture 10: Fence line 2

Picture 11: Foundation stock of the piggery project

Appendices D-H
Description of soil profiles

Appendix D **CLASSIFICATION:** **FORM:** Avalon - Av **FAMILY:** 3100 Kameelbos

LOCALITY: Mt. Pleasant Farm : Land no. K10 **Grid ref.:** Lat.: 32 deg. 44' 06" S
Map no.: 3226CB KROOMIE Long: 26 deg. 25' 56" E

CLIMATE: Semi-arid (Ann. pptn. c. 450 mm)

Factors

PARENT MATERIAL **Mode of Accumulation:** Colluvial
No. & kinds : Mixed
of **Underlying material:** Unknown **Lithology:** Unknown
Degree of weathering: Unknown

Soil **TOPOGRAPHY:** **Terrain morph. unit:** 3 - Upper midslope
Slope: 6% **Kind:** Straight
Aspect: South **Altitude:** 780 m.a.s.l.

Formation

VEGETATION/LAND USE: Open Thornveld

HORIZON	DEPTH,cm	DESCRIPTION OF PROFILE
Ap	0 - 36	Light brown grey (10YR 6/2) dry; brown (10YR 3/2) moist; horizon undisturbed; loam; moderate medium angular blocky; slightly hard; many very fine pores; few medium sesquioxide concretions; many fine roots; gradual smooth transition **Diagnostic Hor.: Orthic A**
Bt1	36 - 73	Brown (10YR 5/3) dry; very dark greyish brown (10YR 3/2) moist; horizon undisturbed; loam; moderate medium angular blocky; hard; common fine pores; few fine roots; common medium sesquioxide concretions; diffuse smooth transition **Diagnostic Hor.: Yellow-brown apedal B**
Bt2	73 - 130+	Yellow (10YR 7/6) dry; very pale brown (10YR 7/3) moist; horizon undisturbed; clay; massive; slightly hard; common medium sesquioxide concretions; few fine roots. **Diagnostic Hor.: Soft plinthic B**

ANALYTICAL DATA

Horizon		Ap	Bt1	Bt2
Depth (cm)		0 - 36	36 - 73	73 - 130+
Fine earth (%)				
Particle size disrtibution (%)				
	co. Sand	0.6	1.9	4.2
	me. Sand	0.4	0.5	1.0
	fi. Sand	31.0	34.1	11.7
	Silt	51.2	45.3	27.9
	Clay	16.8	18.2	55.2
Organic C (%)		2.50	0.75	0.25
pH (H2O)		6.55	7.50	8.08
pH (KCl)		6.12	7.24	6.83
Exchangeable cations (cmol(+)/kg soil)				
	Na	0.02	0.00	0.42
	K	1.59	1.29	4.16
	Ca	11.38	2.00	6.55
	Mg	1.77	2.03	4.90
C.E.C. (cmol(+)/kg soil)				

Appendix E **CLASSIFICATION:** **FORM:** Westleigh - We **FAMILY:** 1000 Helena

LOCALITY: Mt. Pleasant Farm : Land no. K18 **Grid ref.:** Lat.: 32 deg. 44' 14" S
Map no.: 3226CB KROOMIE Long: 26 deg. 26' 30" E

CLIMATE: Semi-arid (Ann. pptn. c. 450 mm)

Factors

PARENT MATERIAL **Mode of Accumulation:** Solid rock weathering in situ
No. & kinds : Single
of **Underlying material:** Shale **Lithology:** Shale
Degree of weathering: Advanced

Soil **TOPOGRAPHY:** **Terrain morph. unit:** 3 - Midslope
Slope: 8% **Kind:** Straight
Aspect: West **Altitude:** 786 m.a.s.l.

Formation

VEGETATION/LAND USE: Abandoned field

HORIZON	DEPTH.cm	DESCRIPTION OF PROFILE
Ap	0 - 30	Light brown grey (10YR 6/2) dry; very dark greyish brown (10YR 3/2) moist; horizon undisturbed; silty loam; moderate coarse angular blocky; extremely hard; many very fine pores; very few fine sesquioxide concretions; many medium roots; gradual smooth transition **Diagnostic Hor.: Orthic A**
Bt1	30 - 55	Dark greyish brown (10YR 4/2) dry; very dark greyish brown (10YR 3/2) moist; horizon undisturbed; loam; moderate coarse angular blocky; extremely hard; common very fine pores; common fine roots; many fine sesquioxide concretions; clear smooth transition **Diagnostic Hor.: Soft plinthic B**
C	55 - 125+	Yellow (2.5Y 8/6) dry; olive yellow (2.5Y 6/6) moist; horizon undisturbed; shale weathering to loam; massive; slightly hard; rock structure visible from 90 cm; few fine roots. **Diagnostic Hor.: Saprolite**

ANALYTICAL DATA

Horizon		Ap	Bt1	C
Depth (cm)		0 - 30	30 - 55	55 - 125+
Fine earth (%)				
Particle size disrtibution (%)				
	co. Sand	1.2	3.9	0.4
	me. Sand	1.0	0.4	0.3
	fi. Sand	25.9	23.2	35.1
	Silt	52.2	47.3	42.5
	Clay	19.7	25.2	21.7
Organic C (%)		0.87	0.72	0.12
pH (H2O)		5.73	5.99	6.50
pH (KCl)		5.60	5.71	5.30
Exchangeable cations (cmol(+)/kg soil)				
	Na	0.11	0.00	0.06
	K	0.40	0.12	0.07
	Ca	4.66	7.22	7.00
	Mg	1.11	1.84	3.46
C.E.C. (cmol(+)/kg soil)				

Appendix F **CLASSIFICATION:** **FORM:** Tukulu **FAMILY:** 1110 Entunja

LOCALITY: Mt. Pleasant Farm : Land no. K32 **Grid ref.:** Lat.: 32 deg. 44' 55" S
Map no.: 3226CB KROOMIE Long: 26 deg. 25' 45" E

CLIMATE: Semi-arid (Ann. pptn. c. 450 mm)

Factors

PARENT MATERIAL **Mode of Accumulation:** Alluvial
No. & kinds : Mixed
of **Underlying material:** Unknown **Lithology:** Unknown
Degree of weathering: Unknown

Soil **TOPOGRAPHY:** **Terrain morph. unit:** 5 - Valley bottom
Slope: Flat **Kind:** Flat
Aspect: n/a **Altitude:** 728 m.a.s.l.

Formation

VEGETATION/LAND USE: Abandoned field

HORIZON	DEPTH,cm	DESCRIPTION OF PROFILE
Ap	0 - 56	Dark greyish brown (10YR 4/2) dry; very dark greyish brown (10YR 3/2) moist; horizon undisturbed; silty clay loam; apedal massive; very hard; very few fine pores; many infilled earthworm channels; common medium roots; diffuse smooth transition **Diagnostic Hor.: Orthic A**
Bt1	56 - 100	Brownish yellow (10YR 6/6) dry; dark brown (10YR 4/3) moist; horizon undisturbed; clay; weak angular blocky; extremely hard; many fine pores; many infilled root channels; few fine roots; discontinuous faint clay films on ped faces; diffuse smooth transition **Diagnostic Hor.: Neocutanic B**
Bt2	100 - 160+	Very pale brown (10YR 7/4) dry; brown (10YR 5/3) moist; horizon undisturbed; clay; apedal massive; slightly hard; common fine to coarse pores; many medium grey and yellow mottles of reduced Fe oxide; few lime and sesquioxide concretions /nodules; very few fine roots **Diagnostic Hor.: Unspecified material with signs of wetness**

ANALYTICAL DATA

Horizon	Ap	Bt1	Bt2
Depth (cm)	0 - 56	56 - 100	100 - 160+
Fine earth (%)			
Particle size disrtibution (%)			
co. Sand	0.3	0.2	0.3
me. Sand	0.3	0.3	0.8
fi. Sand	16.1	16.1	18.9
Silt	44.3	37.6	34.3
Clay	39.1	45.7	45.7
Organic C (%)	1.11	0.40	0.21
pH (H2O)	6.46	7.16	8.56
pH (KCl)	5.63	6.06	7.68
Exchangeable cations (cmol(+)/kg soil)			
Na	0.18	0.28	0.50
K	0.37	0.37	0.23
Ca	5.81	3.82	6.41
Mg	1.77	2.46	2.78
C.E.C. (cmol(+)/kg soil)			

Appendix G **CLASSIFICATION:** **FORM:** Tukulu - Tu **FAMILY:** 1120 Olivedale

LOCALITY: Mt. Pleasant Farm : Land no. L11 **Grid ref.:** Lat.: 32 deg. 44' 05" S
Map no.: 3226CB KROOMIE Long: 26 deg. 26' 05" E

CLIMATE: Semi-arid (Ann. pptn. c. 450 mm)

Factors

PARENT MATERIAL **Mode of Accumulation:** Colluvial
No. & kinds : Mixed
of **Underlying material:** Unknown **Lithology:** Unknown
Degree of weathering: Unknown

Soil **TOPOGRAPHY:** **Terrain morph. unit:** 3 - Upper midslope
Slope: 6% **Kind:** Straight
Aspect: South east **Altitude:** 772 m.a.s.l.

Formation

VEGETATION/LAND USE: Abandoned field

HORIZON	DEPTH,cm	DESCRIPTION OF PROFILE
Ap	0 - 27	Light brown grey (10YR 6/2) dry; very dark greyish brown (10YR 3/2) moist; horizon undisturbed; silty loam; moderate coarse subangular blocky; slightly firm; few very fine pores; few earthworm channels; few medium sesquioxide concretions; common medium roots; diffuse smooth transition **Diagnostic Hor.: Orthic A**
Bt1	27 - 51	Greyish brown (10YR 5/2) dry; very dark grey (10YR 3/1) moist; horizon undisturbed; silty loam; moderate coarse subangular blocky; firm; many very fine pores; few fine roots; few medium sesquioxide concretions; diffuse smooth transition **Diagnostic Hor.: Neocutanic B**
Bt2	51 - 84	Light brown grey (10YR 6/2) dry; very dark greyish brown (10YR 3/2) moist; horizon undisturbed; silty clay loam; moderate coarse subangular blocky; firm; few fine pores; common medium sesquioxide concretions; few very fine roots; diffuse smooth transition **Diagnostic Hor.: Neocutanic B**
Bt3	84 - 145+	Pale yellow (2.5Y 7/4) dry; yellow (10YR 7/8) moist; horizon undisturbed; silty clay loam; moderate coarse subangular blocky; very firm; few fine pores; many coarse prominent grey and yellow mottles; very few very fine roots. **Diagnostic Hor.: Unspecified mat. with signs of wetness**

ANALYTICAL DATA

Horizon	Ap	Bt1	Bt2	Bt3
Depth (cm)	0 - 27	27 - 51	51 - 84	84 - 145+
Fine earth (%)				
Particle size disrtibution (%)				
co. Sand	0.2	0.1	0.2	0.1
me. Sand	0.4	0.2	0.4	0.2
fi. Sand	24.5	22	19.2	17.7
Silt	57.4	52.9	51.8	49.5
Clay	17.5	24.7	28.5	32.5
Organic C (%)	1.34	0.64	0.33	0.00
pH (H2O)	5.96	6.44	6.80	7.26
pH (KCl)	5.49	5.58	5.60	5.61
Exchangeable cations (cmol(+)/kg soil)				
Na	0.08	0.13	0.15	0.29
K	0.23	0.12	0.15	0.12
Ca	5.35	6.54	5.96	5.38
Mg	2.08	2.66	4.72	5.82
C.E.C. (cmol(+)/kg soil)				

Appendix H **CLASSIFICATION:** **FORM:** Clovelly - Cv **FAMILY:** 3100 Setlagole

LOCALITY: Mt. Pleasant Farm : Land no. L40 **Grid ref.:** Lat.: 32 deg. 45' 10" S
Map no.: 3226CD ADELAIDE Long: 26 deg. 25' 50" E

CLIMATE: Semi-arid (Ann. pptn. c. 450 mm)

Factors

PARENT MATERIAL **Mode of Accumulation:** Alluvial
No. & kinds : Mixed
of **Underlying material:** Unknown **Lithology:** Unknown
Degree of weathering: Unknown

Soil **TOPOGRAPHY:** **Terrain morph. unit:** 5 - Valley bottom
Slope: Flat **Kind:** Flat
Aspect: n/a **Altitude:** 730 m.a.s.l.

Formation

VEGETATION/LAND USE: Abandoned field

HORIZON	DEPTH,cm	DESCRIPTION OF PROFILE
Ap	0 - 40	Very dark greyish brown (10YR 3/2) dry; very dark grey (10YR 3/1) moist; horizon undisturbed; clay loam; moderate coarse angular blocky; friable; few fine pores; common mole and earthworm channels; many fine roots; clear smooth transition **Diagnostic Hor.: Orthic A**
Bt1	40 - 86	Yellowish brownish (10YR 5/4) dry; dark brown (10YR 3/3) moist; horizon undisturbed; clay loam; weak medium subangular blocky; very hard; many medium pores; few angular lime nodules; few fine roots; diffuse smooth transition **Diagnostic Hor.: Yellow-brown apedal B**
Bt2	86 - 150+	Light yellowish brown (10YR 6/4) dry; dark brown (10YR 4/4) moist; horizon undisturbed; clay loam; weak fine subangular blocky; extremely hard; many fine pores; many medium angular lime nodules; very few fine roots **Diagnostic Hor.: Yellow-brown apedal B**

ANALYTICAL DATA

Horizon		Ap	Bt1	Bt2
Depth (cm)		0 - 40	40 - 86	86 - 150+
Fine earth (%)				
Particle size disrtibution (%)				
	co. Sand	0.2	0.3	0.3
	me. Sand	0.3	0.2	0.4
	fi. Sand	19.5	22.8	26.0
	Silt	44.3	37.6	37.6
	Clay	35.7	39.1	35.7
Organic C (%)		1.29	0.37	0.17
pH (H2O)		6.56	8.68	8.91
pH (KCl)		5.74	7.13	7.65
Exchangeable cations (cmol(+)/kg soil)				
	Na	0.00	5.02	6.57
	K	0.28	0.19	0.17
	Ca	3.02	2.58	1.57
	Mg	2.25	3.34	3.14
C.E.C. (cmol(+)/kg soil)				