CHAPTER 4

MADLIKI: A STUDY IN COMMUNITY-BASED SOIL CONSERVATION

4.1 SELECTION OF THE STUDY AREA

From Chapters 2 and 3 it is evident that soil erosion is a very serious and widespread problem in the traditional rural areas of the Eastern Cape. Conventional approaches to soil conservation have had little or no success in the province, as highlighted in Section 3.3. It was consequently decided to conduct a study to see whether a community-based approach to soil conservation could achieve success in the province and to develop a community-based approach, which could be used as a model in the province.

Preliminary studies were conducted in a number of communities in the Eastern Cape in order to find a suitable community in which to conduct a study testing a community- based approach. The ideal community had to have at least the following two characteristics:

a. It had to be an area with severe soil erosion problems.
b. It had to be a community that realized that they had a soil erosion problem.

After completing the preliminary investigations it was decided to select the Madliki tribal area for the study. The area was selected because it met both the above-mentioned requirements and in addition had two other advantages. Firstly, the conventional approach to soil conservation failed in the area, enabling a comparison between the two approaches. Secondly, although it was quite some distance from the researcher's office on a bad road, it was closer and easier to reach than other potentially suitable areas.

4.2 GENERAL OVERVIEW OF MADLIKI

Madliki is one of the rural villages of the Eastern Cape, in the former Ciskei homeland. This village falls within the boundaries of former Zwelitsha district - now part of King William's Town district. It is one of the most remote villages in the district, approximately 36 km from King William's Town on a bad gravel road. The mode of transport to town is mainly Mayibuye bus services or taxis.

As is a common characteristic of the Eastern Cape rural areas, it is overpopulated, with a low literacy rate and high a level of poverty, which is due to a very high unemployment rate. About 80% of the population is unemployed. (Refer to Appendix A - PRA summary). Most households are women headed due to labour migration, i.e. able-bodied men are working and looking for employment in cities in industries or in mines. However, many of them are currently being retrenched from mines and the unemployment rate may increase within the next few years. The main sources of income in the community are old age pensions and disability grants, both of which are not reliable due to the revisions that are being carried out by the Department of Health and Welfare. The level of poverty is visible in young children as most of them show clear signs of malnutrition.

Madliki is one of the villages that have been adversely affected by the betterment scheme. Through this process people were placed closer together, thus denying them flexibility in terms of access to the resources and thereby concentrating the utilization of the limited resources in certain areas.

According to the community, Madliki, was once a tribe under the chieftanship of chief Gcwabe and when Madliki, chief Gcwabe's son, was crowned as chief, the village was named after him. However, at the time of study the community no longer recognized the chief and the chairperson (a councillor, according to the new local government structures) was the head of the community.

Madliki is in a quite steeply undulating area. The village is situated on top of a relatively flat hill, where it was placed by the "betterment" plan for the area. The grazing camps and croplands are on all sides around the village.

The grazing camps are heavily overgrazed, eroded and denuded of vegetation. Overgrazed, degraded and denuded as they are, their grazing camps are still overstocked, continuously aggravating the situation.

Agricultural production is through dryland cropping. Poor yields are a norm due to poor resources (see Section 4.3) and bad farming practices. The croplands are typical of the drier areas of the Eastern Cape, i.e. severely eroded (with dense networks of big gullies), despite the fact that "betterment planning" determined their locality and contouring was done. As outlined earlier, this is due to the fact that the planners had inadequate knowledge of soils and did not adapt land suitability evaluation to the specific qualities of the different soils. Most people stopped ploughing and abandoned their arable lands due to soil erosion (Plate 4.1)

Plate 4.1 – Abandoned cultivated area, demarcated by planners for cultivation, at Madliki. Note contouring still visible (Photograph: N.N. Maswana)

The main problem in the village is soil erosion, which is prohibiting the keen community members from crop farming. Soil erosion is the threat to progress in this community no matter how hard they try. Since the highest percentage of the community are unemployed, subsistence farming is the only option to provide the basic staple food for them, but due to soil erosion they don't have enough land to

farm. Moreover the present study found that soil erosion is also threatening cultural beliefs or respect of the Xhosa nation. (See section 4.6.1).

4.3 NATURAL RESOURCES OF MADLIKI

4.3.1 Climate

The climate of this area is typical of the "coastal plateau" of the central Eastern Cape (former Ciskei). It is a summer rainfall area with low and erratic rainfall and a mean annual rainfall of only about 500 mm (Marais, 1978). It is not a true summer rainfall area, with rainfall peaks in spring and late summer/early autumn, with a decided midsummer drought because of low rainfall and high evaporation. This is a very unfavourable scenario for maize production (Mbatani, 2000). The rain mainly falls in highly irregular intervals with long dry spells in-between. The rain always falls in the form of thunderstorms, which are extremely erosive. The variability of rainfall has a negative impact on livestock rearing and dryland cropping.

4.3.2 Soil

The soils of the area are very poor and unstable, hence highly erodable. The parent materials are sandstone and dolerite. Generally, the soils of the area are young and very shallow with poorly developed structure, as is clearly shown by the gravelly nature of the soil and the presence of pebbles. This is closely related to the low rainfall in the area, combined with the hard rock parent materials, which resulted in slow rates of weathering or soil formation.

In high rainfall areas, where chemical weathering predominates, both these rock types (especially dolerite) give high quality deep soils, as is, for example in the case of Mdantsane (Section 3.1). Under low and inefficient rainfall, like in Madliki, it is a totally different scenario.

Shallow soils are highly erodable, because they are easily saturated with water during a rainstorm, after which runoff starts (D'Huyvetter and Laker, 1985). These poorly structured soils are also very prone to crusting (surface sealing), thus having low water infiltration, excessive runoff and erosion. This is aggravated by the very low

organic matter contents of the soils. In most areas the topsoil has been totally washed away (Plate 4.2).

Plate 4.2 – Area with total topsoil loss through sheet erosion at Madliki. Rills and gullies starting to develop. (Photograph: N.N. Maswana)

In addition huge dongas (gullies) have developed throughout the area (Plates 4.3 and 4.4).

Plate 4.3 – Gully erosion in rangeland (left) and cultivated area (right) at Madliki. Note virtual total destruction of the area on the left. (Photograph: N.N. Maswana)

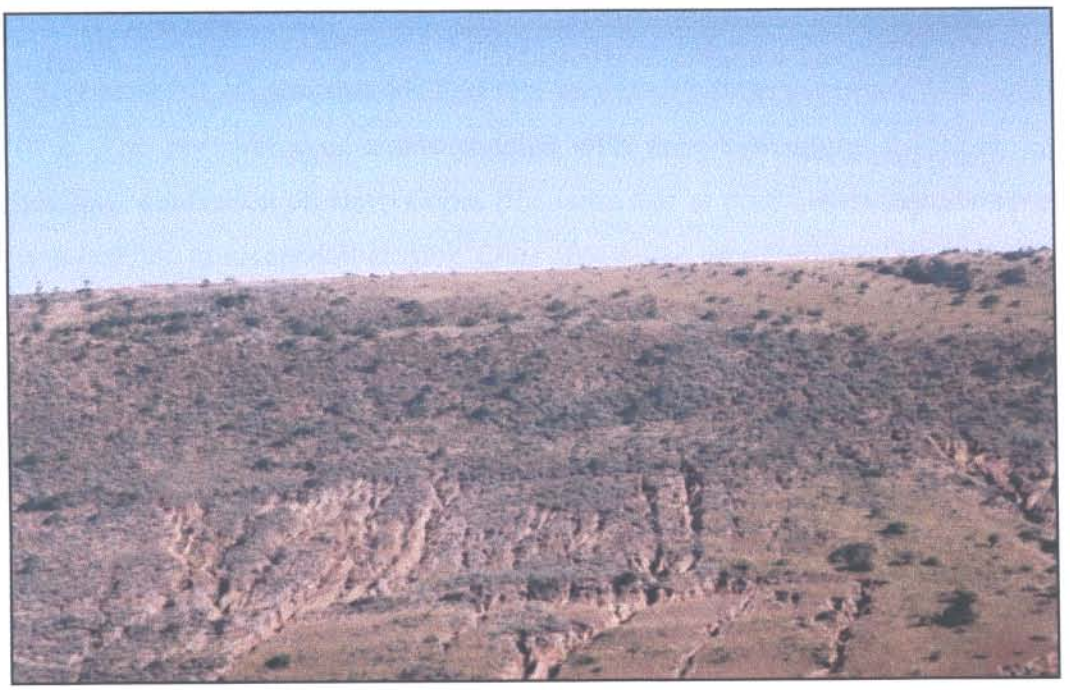

Plate 4.4 – Very dense network of gully erosion at Madliki. (Photograph: NN Maswana)

4.3.3 Natural vegetation

The vegetation of the area is mainly sweetveld grassland, with very few shrubs. Because of the low degree of leaching of the soils the grass is very palatable (even in winter) and highly nutritious, but because of the shallowness of the soils the amount of grass produced is low. This is the "ideal" combination for causing extreme overgrazing. The consequence is that the area is very highly overgrazed, resulting in a grass cover that is generally poor, i.e. the area is almost bare.

The poor vegetation cover results in less soil protection and therefore exposure of the soil to the erosivisity of raindrops. Overgrazed unstable soils with poor vegetation cover are easily washed away through thunderstorms. The combination of semi-arid climate, shallow soils, steep land and poor vegetative cover represent some of the worst attributes of fragile land.

4.4 PROBLEM STATEMENT AND OBJECTIVES

From Section 4.3 it is clear that Madliki is a very poor village in terms of its natural resources. The poor resource status coupled with poor agricultural practices, e.g. overstocking, cultivation on steep slopes (the latter due to poor betterment planning), etc. have resulted in severe soil erosion. Over 50% of the area has been lost due to soil erosion. Erosion is a problem in grazing camps, arable land and graveyards.

A second problem was that shortly before the commencement of the present study a previous attempt to bring about soil conservation in Madliki failed badly.

The objectives of this study were then to:

a. Establish reasons why the previous attempt of soil conservation at Madliki failed.
b. Establish whether a community-based approach to soil conservation could be developed which could be applied successfully and could possibly serve as a model for other areas in the Eastern Cape.

4.5 RESEARCH PROCEDURES

The research procedures followed a community-centered approach. This was done to ensure that the community's views were heard and the project focused on resolving their problems. Amongst other things, the ownership of the programme by the community was seen as key to its success and sustainability.

4.5.1 Information gathering regarding the previous failed approach to bring about soil conservation at Madliki

Two meetings were held and individual interviews were conducted at household level. This was done in order to get first hand information from as many people as possible. Household interviews were carried out to ensure a full coverage of individuals who do not attend meetings due to cultural barriers (e.g. youth, boys and girls), ill health, etc. and to get the opinions of those who are scared or shy to talk in meetings.

From this process a lot of information was gathered on the failed previous approach and the views of the members of the community were unanimous in all respects. The community felt that:

a. The government officials imposed the project on them because their priority area was not considered despite their plea to the officer concerned to start at the graveyard.
b. The initiative of the project was perceived as job creation since people were employed to do the job and hence there was no continuity. However, the community expressed concerns with regard to the unsustainable nature of the project.
c. Lack of ownership. The community didn't take ownership of the project due to (a) and (b) above.

4.5.2 Approach/ method used to develop a community- based strategy for soil conservation

The approach used in developing a community-based strategy was Participatory Rural Appraisal (PRA) and it was through this process that the needs of the community were identified and prioritized. This approach was found useful as it ensures active participation of the community and also ensures that first hand information from the community is heard.

Rapid Rural Appraisal (RRA) was also used as a research tool. Through this process 10% of the households in the community was sampled and interviewed. This was done to ensure that the views of the individuals who couldn't attend the PRA workshop and those who couldn't speak in public were heard.

The soils of the area were studied and classified through soil profiles from open gullies. The vegetation was also studied using the veld condition assessment. The grasses were studied using the nearest plant method, that is, the plants within 1,5m on each side of the line transect were recorded. For bush a line transect method was used, recording every plant within the 30m radius. Climatic records were obtained from the officers from the Department of Agriculture and Land Affairs in Zwelitsha.

4.6 PREVIOUS CONVENTIONAL APPROACH TO SOLVING THE SOIL EROSION PROBLEM AT MADLIKI

4.6.1 The initiative from the community

The initiative for the soil conservation exercise came from the Madliki community. In April 1996 the Madliki Community approached the Eastern Cape provincial Department of Agriculture and Land Affairs (soil conservation section) about their soil erosion problem. They needed an immediate and urgent solution to the soil erosion problem in their graveyard. At the time of the study they were using a third graveyard, the reason for that being the fact that the first and the second ones are badly eroded. The community's main concern and fear was that the skeletons of their ancestors were going to surface and be washed away.

They further stressed that despite the unacceptable exposure or experience (the surfacing of human skeletons, seen by particularly children), it is also unacceptable culturally since the graveyard is regarded as a respected place.

4.6.2 The reaction from the soil conservation officers of the Eastern Cape provincial Department of Agriculture and Land Affairs

According to the information provided, the whole background to the request from the Madliki community was discussed with the soil conservation officers from the Eastern Cape Department of Agriculture and Land Affairs (DALA). However, the officers ignored the community's priority (the reclamation of the graveyard) and unilaterally decided to start a soil reclamation project in the grazing camps.

This is a typical attitude of many government officials working in the less developed tribal areas of South Africa, namely, that they consider themselves to be the sole decision-making powers and that the communities are simply told by them what to do, without listening to inputs from the communities.

4.6.3 The reaction of the community

The community was not pleased by this as everything was imposed on them despite the fact that their request was specifically for technical advice and funds to reclaim their graveyard. In the process some of the community members were paid for work done through temporary employment by the DALA. Hence they allowed the project to go ahead. Even though they were happy with the 'jobs', they didn't take ownership of the project. Instead, they perceived it as only a job creation project in line with the Reconstruction and Development Programme (RDP). After two months the funds were exhausted and the project couldn't continue even though the work was not complete. (Only 83 holes for fencing were dug and one stone pack was constructed and this didn't even cover a quarter of the area to be reclaimed, let alone its effectiveness in addressing the problem.)

The community was very devastated by the approach and the short life span of the project. They were particularly concerned about the funds that were 'wasted' without achieving the desired outcome. They went back to DALA, but all in vain, as they were told that there were no funds.

In September 1996 an officer from the Community Forestry Section of the Department of Water Affairs and Forestry (DWAF) visited the community in connection with a school greening project at Langa Liphumile High School. The people became very interested when they heard about the tree-planting project. They expressed their grief about the condition of their soils, particularly the situation at their graveyard. The officer concerned was very sympathetic of the situation and approached me for assistance. At the time I was desperately looking for a suitable area in which to study the possible development of a community-based soil conservation approach for the Eastern Cape, so I decided to take Madliki as a study area.

4.7 APPROACH AND METHOD USED IN THE DEVELOPMENT OF A COMMUNITY- BASED APPROACH FOR SOIL CONSERVATION

Because of the community's previous negative experience I had to spend a lot of time working out an appropriate approach to tackle the problem. The members of the community at the stage were very suspicious and uncomfortable with outsiders and government officers. Hence I had to spend a lot of time in building their trust and ensuring acceptability to them. This was a tough challenge and I had to be patient.

Firstly, I had a meeting with the community leaders and I gathered as much information as possible. A general meeting was later held with the entire community. The high attendance rate was very encouraging, as this proved that the people were keen and committed to the reclamation of their denuded land, particularly the graveyard. Both these meetings were regarded as information sharing sessions.

At the second meeting it was agreed that a needs assessment must be conducted in order to gain a good understanding of the community, their needs and their activities.

The needs assessment methods used were participatory rural appraisal (PRA) and rapid rural appraisal (RRA) to ensure full coverage of all aspects that are important to the community. (See Appendix A.)

4.7.1 The actual participants

The Madliki community, like any other community, is divided into various interest groups. For example, a small percentage of the community, predominantly men, are working as migrant labourers in cities and therefore could not have a direct contribution to the soil conservation project. Another group is focusing on business related activities like selling fruit and vegetables in King William's Town, etc., and therefore do not have a direct interest in natural resource conservation. Only people who have a direct interest or the actual resource users could show full commitment to the process.

In view of differences in interests within the community, it was realized that we should focus on a user group for the following advantages:

a. To maintain focus and ensure that all participants are interested and this enhanced participation.
b. To encourage participation of women who were always left behind.
c. To ensure that direct benefits will go directly to the people who have actually worked.

4.7.2 Determination of priority areas for soil conservation

During the PRA exercise the community made it clear that their priority areas for soil reclamation are the graveyard sites and of the three existing sites work must start on the graveyard number two as the open gullies were extending at a very fast rate by eating their way up towards the graves. Both parties (extension officers from DWAF and the community) further confirmed this through site visits.

Graveyard No. 2 was really in severe danger, more so than the other two, and it was on this basis that this site was chosen as priority area for soil conservation in the village.

4.7.3 Reaction and participation of the community

The community was very relaxed and open in the meetings and individual interviews. Despite the fact that on the day of the PRA workshop it was raining, the turnout was very encouraging. This proved how desperate the community was to have their problem solved.

The reclamation method and species to be used were discussed and later agreed upon in meetings. The actual implementation strategy was also debated by all and people were assigned tasks with time frames. It was quite interesting to see active participation of women. Fortunately the conditions were conducive for their participation since meetings were held in a school hall (public place) and not next to a kraal at the chairman's place. In the Xhosa tradition women cannot go next to the kraal, as it is taboo to see a married woman next to a kraal.

The community took the lead in deciding on the actual species and methods to be used. All possible options were presented to them, including engineering techniques. However, they insisted that they prefer simple and straightforward methods. They were not keen to use stone packs because they felt that it was:

a. Costly, as stones were not readily available in the vicinity of the reclamation area, which meant that they had to be transported at high costs.
b. Labour intensive.
c. Time consuming.

Opinions b and c above were based on their resent experience with DALA 's soil conservation project.

4.7.4 Funding

Having had an understanding of the community's financial status, that is, the fact that they are very poor, a motivation was submitted for funding from the Department of Water Affairs and Forestry. It was, however, made clear to the community that funding was not meant for job creation or salaries, but to purchase material that was needed for the implementation of the project. The community welcomed the idea and when the actual funding of ± R10 000 was approved, an activity-based budget was compiled and agreed to (Table 4.1).

Table 4.1 Activity-based budget agreed to for community-based soil conservation in Madliki

Amount	Activity	By whom
R2 800	Purchase fencing poles	DWAF and the Community's Forest Committee
R5 000	Purchase fencing wire	DWAF and the Community's Forest Committee
-	Soil preparation	Community under the guidance of DWAF
-	Provision of seedlings and transport	DWAF
-	Provision of tools	Community
-	Planting	Community

The bulk of the money (R7 800-00) was used to purchase fencing material, i.e. poles and fencing wire. The remainder of the funds (R2 200) was kept for other small projects. This motivated the people to work harder. The fence was up within a week and only five men were responsible for the job.

4.7.5 Soil conservation techniques

The main objectives for the process were to:

a. Protect the soil from erosion.
b. Maintain and improve soil fertility.
c. Control rainwater so that it is absorbed into the soil so as to reduce runoff volume.

The following conservation methods were agreed to:

a. Exclusion of livestock.
b. Reduction of overland flow/runoff.
c. Stabilizing existing dongas in the graveyard.

4.7.5.1 Exclusion of livestock

It was agreed to fence off the Graveyard No. 2 area in order to exclude livestock, as overstocking was identified as one of the major causes of soil erosion. Fencing material (through the funding), seedlings and transport were supplied by the Department of Water Affairs and Forestry whilst the community provided manpower ***without demanding payment*** for it. This showed good working relationships between DWAF and the community and ***willingness of the community to contribute something towards the conservation of their resources if they have decision-making powers regarding priorities and methodologies.***

Because this was a decision by the community and not something imposed from outside, they assumed the responsibility to ensure that all members of the community adhered to the decision. Problems like the cutting of fences to let livestock in, therefore, do not occur. When grass is available community members are allowed to cut it and feed their animals outside the protected area. This type of "cut-and-carry" zero grazing technique is also applied successfully where it is a community-based decision making in other parts of Africa, e.g. in Burkina Faso (Kinwa, Ainslie, May, Ntsaba, Poonan and Fakir, 1996) and West Usumbara in Tanzania (Ngailo and Baruti, 1997).

Elimination of grazing due to exclusion of livestock encouraged natural growth of shrubs and grasses, i.e. it increased the amount of livestock fodder produced in the area, resulting in a tangible benefit to the community from excluding livestock from the area, apart from the erosion control of the sensitive graveyard area (Plate 4.5).

Plate 4.5 – Dense growth of grass and shrubs due to exclusion of livestock from the graveyard No 2 area at Madliki. (Photograph: N.N. Maswana)

4.7.5.2 Reduction of overland flow / runoff

The area is full of footpaths and small vehicle tracks leading to the graveyard. These footpaths and tracks form ideal channels for concentrated water flow. These accelerate soil erosion in two ways:

a. The concentrated flow in the footpaths and wheel tracks greatly accelerate the formation of big gullies (dongas) where they are.
c. The water flowing from these incipient gullies merge into bigger streams down-slope, which flood the graveyard areas and cause huge dongas.

The first step was to slow down the runoff by reducing the overland flow on all such routes. This was done by packing leaves from *Agave americana* longitudinally in the incipient gullies, pinning them down with stones and slightly covering them with soil.

Agave americana leaves have a strong fibrous network, which decompose extremely slowly (Laker, personal communication). The fibrous "nets" remaining after the soft material has been removed by decomposition, strongly resemble some of the synthetic "geotextiles" which are widely used for erosion control. Holding them in place by covering with soil and stones not only slowed down water flow through a direct action, but also resulted in a good substrate that enhanced grass growth.

Apart from its good and long lasting effects, the use of *Agave americana* also had the following advantages:

a. *Agave americana* trees were available in Madliki very close to the problem areas, which had to be reclaimed. It was, therefore, available free of charge. The only input required was the labour to cut the leaves and carry them to the gullies and put them in position.
b. *Agave americana* is well known amongst the Xhosa people of the central Eastern Cape (former Ciskei) as being a good "fertilizer" to apply to soils (Laker, personal communication). The Madliki community consequently were very comfortable with using it.

A year later, the community raised concerns with regard to too much water still flowing through the graveyard. I visited the area and discussions were held on-site. From my own observations I realized that the excess water was coming from the gravel road passing through the village. I shared my opinion with the community. However, they disagreed. I did not argue with them, but asked them to monitor the area when it rains again. A month later they phoned me and confirmed that they observed that the water was coming from the road. They then used *A. americana* leaves to reduce the water flow (as described above). This experience outlines the importance of giving the community an opportunity to make their own observations and decisions as that ensures that the idea is planted in their minds, thus ensuring continuity and sustainability of the programme after the researcher has left the area.

Contouring was seen as one of the effective ways of reducing runoff, whilst enhancing absorption of water. An 'A' frame, with a plumb line attached to its

horizontal bar and a stone as plumb bob was used to mark level contour lines (Plate 4.6).

Plate 4.6 –The community in action, measuring out contours. (Photograph: N.N. Maswana)

The work began from the top of the hill, working downwards to construct contours.

4.7.5.3 Stabilizing the existing dongas in the graveyard

It was discovered that the dongas were being extended by erosion as the soil was collapsing from their sides and they were also eating upslope. Then it was decided to plant *Agave americana* seedlings in such vulnerable areas to stabilize the dongas. This was very successful in stabilizing the soil (Plate 4.7).

Plate 4.7 – Establishing of *Agave americana* seedlings to stabilize vulnerable areas (Photo: NN Maswana)

4.7.6 Plant species selection

Species selection was done together with the community. The community stressed that ***"no edibles may be planted in the graveyard".*** Species were selected based on their potential to rehabilitate the soil and usefulness to the community. After long discussions it was agreed that the following species could be planted.

4.7.6.1 Vetiver grass (Vetiveria zizanoides)

Planting of this grass along contours in continuous hedges gives rainwater enough time to infiltrate the soil and reduces runoff. It takes a maximum of three growing seasons for the vetiver grass to be well established and thoroughly protect the soil. Vetiver grass offers the following advantages:

a. When young it can be cut and fed to the livestock (fodder).
b. It gives a good mulch to enrich the soil.
c. It does not invade cropped areas when planted in a crop field.

d. It forms a dense hedge, which traps the silt, thus enriching the soil (Ouattara *et al.*, 1993).

4.7.6.2 Agave americana

Agave americana is widely used in erosion control in the Eastern Cape and it has shown good results. It has the following advantages:

a. It is drought hardy.
b. It grows on very poor quality soils, especially shallow soils.
c. It can be used as fodder during drought.
d. It regenerates very easily (Le Houerou, 1994).
e. It is a very efficient and cheap means of erosion control (Le Houerou, 1994).
f. It is well known to the traditional rural people of the Eastern Cape, including Madliki community.

4.7.6.3 Saltbush (Atriplex spp.)

Various saltbush species are drought hardy fodder plants used for soil conservation in many arid and semi-arid areas in Africa, including many parts of South Africa (Le Houerou, 1994). Semi-arid areas of the Eastern Cape (e.g. in the vicinity of Middleton and Somerset East) are amongst the important areas where especially "old man salt bush" is used successfully. One of the advantages of saltbush is that it increases the carrying capacity of the semi-arid and arid rangelands, thus reducing over-grazing in such areas.

4.7.6.4 *Sour fig (Carpobrotu edilis)*

Sour fig is a creeper that can be planted between the lines of vetiver grass. It remains green throughout the year. Because it is a creeper and remains evergreen, it gives a very good protective ground cover. It is easy to propagate, spreading quickly but unlikely to become a weed, as it is indigenous. The fruit can be eaten by humans. It can also be dried and used for making jam. The juice from the leaves has medicinal properties (Haig, 1992).

4.7.6.5 *Trees*

" Too little emphasis is paid in South Africa on the value of trees and shrubs for the prevention and control of soil erosion. The judicious planting of trees can do much to arrest the advance of dongas by binding the soil and protecting its surface with mulch or litter. However where erosion is progressing very rapidly, tree planting should be undertaken in conjunction with other means of control such as construction of barriers and dams" (Poynton, 1984).

The following tree species were selected:

- HONEY LOCUST (*Robinia pseudoacacia*)
- BLACK LOCUST (*Gleditsia triacanthos*)

Both species have the following advantages:

a. Whenever their roots are exposed by erosion they throw up suckers and form new trees.
b. They are drought hardy.
c. They are fodder trees.