ALFRED NZO DISTRICT

ENVIRONMENTAL MANAGEMENT PLAN

PLAN FINAL REPORT

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Compiled by

ENVIRONMENTAL & RURAL SOLUTIONS cc

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CONTENTS

LIST OF ACRONYMS

ACBAs	Aquatic Critical Biodiversity Areas
ANDM	Alfred Nzo District Municipality
CBA	Critical Biodiversity Area identified in the ECBP
ACBAs	Aquatic Critical Biodiversity Areas
ANDM	Alfred Nzo District Municipality
CBA	Critical Biodiversity Area identified in the ECBP
CFCs	Chrorofluorocarbons
CMA	Catchment Management Association
DAFF	Department of Agriculture, Fisheries and Forestry
DEDEA	Department of Economic Development and Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWEE	Department of Water, Environment and Economics
ECBAs	Estuaries Critical Biodiversity Areas
ECBP	Eastern Cape Biodiversity Plan (Berliner & Desmet 2007)
EGS	Environmental and Geographic Solutions cc
EMP	Environmental Management Plan
EWTSA	Endangered Wild Life Trust South Africa
GIS	Geographic Information System
IDP	Integrated Development Plan
IWMP	Integrated Waste Management Plans
KZN	Kwa Zulu Natal
MDTP	Maloti Drakensburg Transfrontier Project
MDTFCA	Maluti Drakensberg Transfrontier Conservation Area
MONR	Malekgalonyane Ongeluksnek Nature Reserve
MNR	Matatiele Nature Reserve
NEMA	National Environmental Management Act
PA	Protected Areas
PU	Planning Unit
REIA	Rapid Ecological Integrity Assessment
SDF	Spatial development Framework
SEA	Environmental Assessment
CFCs	Chrorofluorocarbons
DAFF	Department of Agriculture, Fisheries and Forestry
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EWTSA	Endangered Wild Life Trust South Africa
GIS	Geographic Information System
KZN	Kwa Zulu Natal
NEMA	National Environmental Management Act
PU	Planning Unit
REIA	Rapid Ecological Integrity Assessment
RSA	Republic of South Africa
SA	South Africa
SANBI	South African National Botanical Institute
ULM	Umzimvubu Local Municipality

ABSTRACT

The Story: "The man and the taxi"

Once upon a time, there was a man who owned a taxi and supported his family with the income from driving people around. He had a large family with many children to feed, clothe and send to school. As his family grew, he needed to make more and more money to support them, so he worked harder and harder as a taxi driver, doing more and more kilometres of driving.

One of the problems was that he never had time or enough money to do the proper maintenance on the taxi. He did what he could but, because he wasn't a mechanic, he didn't really know how to fix things properly. Over time, he patched different parts of the minibus as best he could, using whatever parts he could afford at the time. He knew he should be investing more in the vehicle, but it didn't seem possible because he had to use all his money on his growing family.

Over time the minibus grew more and more unreliable, and started to show signs of major problems. It would not start properly and the steering wheel had broken off. The man hadn't been able to afford a new one and so he just used a large spanner where the steering wheel had been. The brakes were a bit sloppy and tired, but still seemed ok. The man was worried about the brakes but he had developed a way of pumping them so they could begrudgingly stop the taxi when he needed to.

One day, the man loaded his whole family into the minibus because they were all going to a wedding of one of his nieces. It was a very exciting day and everyone was looking forward to the celebration. On the way they had to go over a small mountain pass and the minibus just managed to wheeze its way up to the top, coughing out clouds of grey smoke as the tired engine gave its best.

As they started down the other side, the man recalled his concerns about the brakes, but there wasn't time to do anything as they were already late for the wedding. As he had done many times before, he promised himself that he would attend to them the next time he had some money. During the descent, the man jumped the gears and couldn't get into a low enough gear to slow the vehicle. A bit concerned, he started to pump the brakes as he normally does, but the minibus was overloaded and too heavy for the steep descent. Faster and faster they went, with the worn brakes leaking fluid onto the uneven and now red-hot brake drums. Smoke billowed from behind as the brake system collapsed altogether and the minibus careened over the edge of a cliff by its own momentum.

No-one survived the horrific accident and the traffic police concluded the cause of the accident was due to an unroadworthy vehicle, one of many they had seen that year. What a waste, they all thought. If only the man had thought beyond his immediate needs and attended to the maintenance of his taxi; all this could have been avoided.

If only …

This sobering story can also be called the 'human and his livelihood base'..... if one reads between the lines, parallels can be seen, and warning bells start to ring. Our vehicle is in poor shape, overloaded, exploited, unmaintained.....just like our environment. It urgently needs maintenance...now.

Before we say "if only".....

1. EXECUTIVE SUMMARY

The National Environmental Management Act of 1998 makes provision for all local authorities to develop and implement a strategic **environmental management framework**, often colloquially referred to as an EMP, or Environmental Management Plan.

The Alfred Nzo District commissioned this plan in December 2009, to be developed by a local environmental and planning consortium. The process was guided by and closely consulted with a project steering committee comprised of representatives from the District, the two local municipalities in Alfred Nzo District, relevant Departments in the District, including Environment Affairs, DME, Agriculture, Health and other stakeholders such as the Working for Water programme implementers.

The purpose of the Plan or framework is to provide the district with a comprehensive picture of the status of the environment, and give strategic direction and structure for addressing problems, and identify opportunities concerning environmental matters, especially related to resource management.
It must be noted that the District is largely rural, with over 85% of the mainly Xhosa population residing in rural settlements with limited services. The three main towns of Mt Frere, Mt Ayliff, and Matatiele, plus the two smaller towns of Maluti and Cedarville, comprise the areal extend of the EMP, and as such the document thus produced needs to take account of the range of landscapes, resources and the requirements of the people in the District.

The process consists of four main tasks, namely inception, a status quo assessment and report (concerning physical and desk top findings and precedent studies), compilation of the Plan/Framework itself (reflected in this document) , and development of an action plan and budget for implementation of the Plan. The latter task includes support and capacity building for target groups, and will be implemented once the content of the Plan/Framework is endorsed by the Municipality.

The EMP will provide a **strategic tool for promoting sustainable development** both throughout the municipality and for specific developmental and economic programs. In this context, the EMP is the **foundation for responsible decision making** and management of ecological and cultural resources.

1.1 LEGISLATIVE FRAMEWORK

It must be noted that the national policies and legislation governing both municipal level services and responsibilities, as well as the use and management of natural resources such as water which sustain many of these services, are well developed and comprehensive, and the onus for compliance lies with local authorities and the communities in their jurisdiction. Water service provision in particular is the responsibility of the District, and DWA is a guide and authorization authority, with an important regulatory and 'watchdog' function.

Waste management is also an important basic service, and is not as well recognized or 'institutionalised' within the District as the often more urgent issue of water supply.
The status quo report (outcome of task 2) includes an outline of relevant legislation pertaining to environmental planning and management for the District.

1.2 SUMMARY OF ENVIRONMENTAL STATUS QUO

- Eighty-five percent (85%) of the district population live in rural settlements and are at least partially dependent on the natural environment for their livelihoods;
- The majority of these people are grant dependent vs actively productive;
- Most of the able-bodied and educated people leave the district and seek employment elsewhere as the district's economy is not able to absorb the present labour force;
- Passive land use ie. use of land with little or no regulation, management or maintenance by the users and authorities has resulted in extensive overgrazing and degradation;
- The recent introduction of the "Massive Food" method of production at the expense of environmentally and socially sustainable production methods is threatening sustainable production and moving the district towards a "welfare state";

- The degraded resource base in lower-lying areas is resulting in lower yields for the same inputs;
- Failure of the natural resource base will result in massive problems resulting in the constituency looking to district leadership to provide solutions;
- Growing populations in towns face resource shortages, aging and inadequate infrastructure and quality issues e.g. sewage into rivers due to overloaded systems.

The vital factor here is that ENVIRONMENTAL RESOURCES UNDERPIN RURAL LIVELIHOODS. Without appropriate custodianship of the landscape and its resources, the economy and associated society cannot persist without very expensive inputs from the district governmental systems.

Please refer to the task 2 Status Quo report for details.

1.3 PRINCIPLES UNDERPINNING AN ACTION STRATEGY

RESOURCE MANAGEMENT AS PRIMARY FOCUS

- Focus on sustaining healthy ecosystem function where possible (e.g. in intact areas), with particular emphasis on making degraded areas more productive, e.g. converting wattle jungle into managed plantations.
- Use a Community-Based Natural Resource Management (CBNRM) approach combined with poverty relief activities to rehabilitate unproductive land and maximise spread of returns. The approach must have an economic basis with long term returns, not just reliant on an 'input' of capital and poverty relief.
- Sustainability must take precedence over short-term political appearance and expediency.
- The District leadership must take a bigger-picture approach (geographic and timescale) to their decision-making and consider the cumulative impacts of local action.

BE APPROPRIATE

- Actions must be appropriate for the specific area, taking cognisance of the environmental and socio-economic context (within capacity of social & physical resources, suitable for local situation e.g. urban vs rural, lowlands vs mountains)
- Any interventions should make use of local role models and 'champions' and indigenous knowledge systems; building on local knowledge & best practice e.g. conservation agriculture.
- Use locally driven forums rather than any national 'programme'.
- Focus should be on areas where progress can be made and seen as an example of success.
- Take impacts & demands of HIV pandemic into account.

SOUND MANAGEMENT

- Timeframes and targets must be practical & realistic to avoid disappointment and non-delivery. Rather commit to a few achievable projects and do them well, than promise a lot and not deliver.
- Projects must enjoy sound management and facilitation with a focus on cost-effectiveness and accountability for the use of public funds.
- Increase awareness and capacity of target groups through effective outreach to meaningfully participate, not just be labourers.

A summary table in the section 7 provides an outline of suggested actions to address the issues identified in the status quo report , which can be immediately planned and executed, and which warrant consideration for inclusion in the District's Integrated Development Plan (IDP).

2. INTRODUCTION, PURPOSE & OBJECTIVES

The objectives of the ANDM EMP/ Framework should include:

- Ensuring compliance with the national regulatory framework, and following international guidelines especially treaties and protocols that South Africa is a signatory of.
- Ensuring that there is sufficient allocation of resources on the municipality budget so that the key actions that have been identified by the EMP are implemented and the necessary monitoring, mentoring and evaluation is implemented with no interruptions in order to achieve sustainability.
- Having in place a verification mechanism for implementation of agreed actions, and an environmental performance management system.
- Being able to respond to unforeseen events; and
- Providing feedback for continual improvement in environmental performance.

In order to achieve the above objectives, the scope of the EMP will include the following:

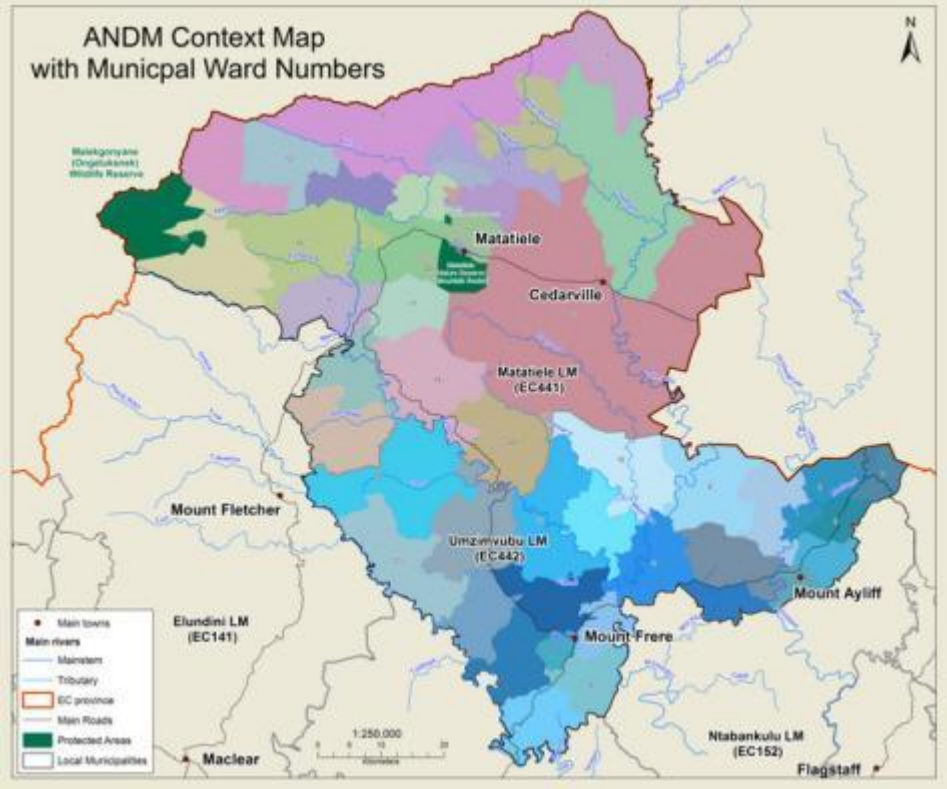
- Definition of the environmental management objectives to be realized in the short-, medium- and long-term to enhance benefits and minimise adverse environmental impacts.
- Description of the detailed actions needed to achieve these objectives, including:
    - how they will be achieved,
    - by whom,
    - by when,
    - with what resources,
    - with what monitoring/verification, and
    - to what target or performance level.
- Mechanisms to address changes in the project/programme implementation, emergencies or unexpected events, and the associated approval processes.
- Clarification of institutional structures, roles, communication and reporting processes

required as part of the implementation of the EMP.

- Description of the link between the EMP and associated legislated requirements.
- Description of requirements for record keeping, reporting, review, auditing and updating of the EMP.

3. OUTLINE OF THE STUDY AREA

The focus area is the Alfred Nzo District, which is more than 6700 square kilometres in extent and consists primarily of rural settlements in a largely undeveloped landscape.
The district comprises two local municipalities, Matatiele and Umzimvubu, and 24 wards. The boundaries and main urban centres are shown in the map on the right.
Further descriptions can be found in the task 1 and 2 reports.



4. OUTLINE OF PROCESS & METHODOLOGY

This report is the third in a series provided to Alfred Nzo District Municipality as part of preparation of the District Environmental Management Plan. The first was the Inception Report that provided a summary of the issues relating to the environment in the district, and introduced methodologies that were to be used in the generation of the EMP, focussing on the assessment of biodiversity and ensuring sufficient relevant community participation was achieved. A revised programme of action was submitted to the ANDM with the Inception Report which indicated the sections that would be covered by the Status Quo Report, including:

- Field data analysis
- Social consultation
- Compilation of legislation
- GIS mapping and environmental analysis
- Capacity building

The Status Quo Report covered all of the above, and had preliminary analyses of the environmental issues which will be presented in the Environmental Management Plan (EMP), and recommendations that will be the basis of the main body of the EMP. The following components were included as part of the EMP to ensure it became a tool for environmental management in the District, with informed participation of the identified stakeholders:

a) Stakeholder engagement

The stakeholder engagement identified the following stakeholder groups based on their different needs, understanding of the environment and utilization patterns of environmental resources.

- Traditional rural communities
- Urban dwellers
- Commercial farmers
- Officials
- Authorities

These groups constitute the interested and affected parties; the people that have a stake in the environmental performance of Alfred Nzo District Municipality. They are all either directly affected by the district's decisions regarding development and utilization of the environmental resources, or actively concerned with the District's environmental performance.

b) Budgets

The EMP is a tool that will assist the district to integrate environmental management into improved livelihoods strategies, increased economic security and income opportunities for the rural poor. Environmental management should be as mainstream in the district and local municipal budget frameworks as other development programmes, and be an integral part of sector and local government planning and priorities.

Alfred Nzo District's corporate performance in environmental management has to be measurable against specific targets. Progress against these measurable targets is a demonstrable indication of progress towards set environmental management goals. To achieve measurable success, the district has to allocate resources and be able to track the utilization of those resources against set targets.

c) Analysis of precedent studies

An analysis of the documents produced for development planning and implementation for the district was necessary in order to determine efficacy when it comes to environmental management in the district. This way, the EMP will be prepared in a manner that it incorporates sustainability issues for the existing plans and programmes.

d) Policy analysis

It is important that the District gauges its position when it comes to compliance with the national policies governing maintenance of the environment. Depending on the position that the District is in, there are at

least three categories of measure that can be implemented to move to a better place when it comes to managing the environment.

The District can improve its environmental standards by reviewing them through internal audits, performance management reviews, and implementation of corrective actions to actual problems that have been identified.

e) Environmental management capacity building

Building environmental management capacity for the district will enable staff, authorities and residents to achieve sustainable development. The training should be responsive to the needs of the district and its people, locally relevant to identified issues, functional ie. made to work consistently, as well as action driven.

The objective is to build capacity at the local government level for implementation and application of the Environmental Management Plan as an effective and strategic tool for improving the local environment. There should be tangible improvements in the state of environment through municipal activities. Capacity building is a middle- and long-term strategy for motivating, training and supporting local government to use and implement the EMP. In addition, the environmental management capacity building program aims to support good governance, local sustainable development and stakeholder involvement.

5. STATUS QUO SUMMARY AND REMEDIATION MEASURES

5.1 SUMMARY OF MAIN FINDINGS

- The majority of the people of Alfred Nzo, being predominantly rural, depend on natural and ecosystem services to provide for a decent, healthy, and secure life.
- In the quest to accelerate delivery of services and development for the communities, the environment and its capacity to sustain itself have been severely compromised.
- National laws are being flouted without due regard to the implications of our actions on future generations.
- In the last few decades, people have made unprecedented changes to the ecosystems in the region — largely to meet rising demands for food, fresh water, fiber, and energy, but also through lack of structured management of the ecosystems and resources.
- The capacity of ecosystems within Alfred Nzo to continue to provide for the growing population is declining. The environment's ability to deliver key services such as good topsoil, grazing, clean air and water and protection from floods, disease, and other disasters is weakening. These losses dis-proportionately affect the rural population who rely on the environment the most .
- The majority of resources, both terrestrial and aquatic, are being degraded at a high rate as they are used or abused in ways that cannot be sustained.
- Pressures on the land and water resources will grow significantly worse unless human attitudes and actions change, and capacity of the local communities is build to improve their understanding of the consequences of their actions on resources on which they rely to live.
- We have the know-how at local and national levels to build the capacity that will lead to the changes necessary to protect our ecosystems for human well-being.
- Nature's goods and services are not free and limitless. We need checks and balances in place to take stock of our actions and consequences thereof, so that we address issues in time to avoid an increase in environmental catastrophes.

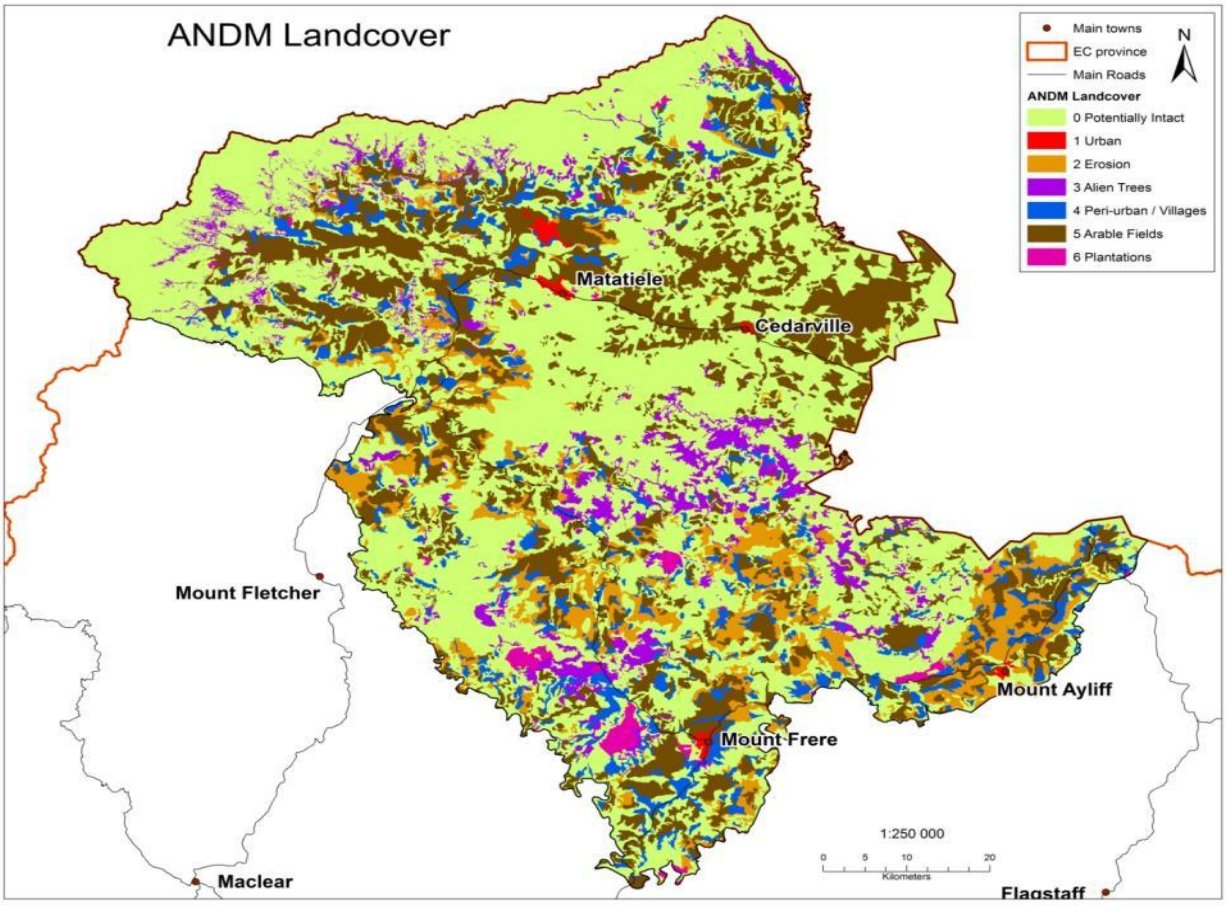
The vital factor here is that LANDSCAPE RESOURCES UNDERPIN LIVELIHOODS. Without appropriate custodianship of the landscape and its resources, the economy and associated society cannot thrive.

The following table provides a summary of the status quo of the environment in the District. The key issues are SOIL and WATER as primary resources upon which all other processes are dependent in varying degrees. The impacts of problems with these resources are unpacked as they affect the environment, people, government and the economy. The tables thereafter unpack some of these issues, outlining their main causes, how they manifest themselves , and what type of interventions could be explored for addressing and mitigating their impacts.

5.2 MAIN ISSUES AND STRATEGIC MANAGEMENT OBJECTIVES

The descriptions below provide some detail on each issue identified during the status quo assessment, providing the foundation for a remedial action framework to begin addressing them. The issues detailed in the status quo report (task 2) have been merged into a more simplified structure of four main "issues", which include all the cross-cutting causes and manifestations. Each issue has an objective and basic strategy for addressing its main impact. This provides the basis for the framework for address environmental concerns in the District. Specific project interventions are then unpacked to commence tackling these issues over the short, medium and longer term.

The map below provides a general land cover classification, to provide a spatial reference for these tables. What stands out of the land cover analysis is the amount of land that has essentially been transformed from a natural state to some non-natural state. Moreover, there are few large portions of intact land remaining, with very many being small isolated patches that have probably suffered significant biodiversity and function loss.



Code	Landcover class	Hectares	% of Total
0	Potentially Intact	380 585.3	55.5
1	Urban	2 593.0	0.4
2	Erosion	60 031.9	8.8
3	Alien trees	38 073.7	5.6
4	Per-urban / villages	46 616.5	6.8
5	Arable fields	152 562.0	22.2
6	Plantations	5 429.2	0.8
	TOTAL	**685 891**	100.0

A striking result of the land cover assessment is the very high levels of erosion (8.8%) and alien plant infestation (5.6%). These give an indication of the degree to which the district has become degraded and the importance of this EMP is thus elevated.

The tables are ordered as follows:

- ISSUE: SOIL EROSION - LOSS OF TOPSOIL & FERTILITY, SILTATION OF RIVERS
- ISSUE: UNCONTROLLED ALIEN PLANT INFESTATION
- ISSUE: LOSS OF GROUND COVER & BIODIVERSITY
- ISSUE: WATER QUALITY DEGRADATION AND QUANTITY SHORTAGES
- ISSUE: CLIMATE CHANGE INDUCED EXTREME EVENTS

5.2.1 SOIL EROSION - LOSS OF TOPSOIL & FERTILITY, SILTATION OF RIVERS

- Soil fertility depletion and declining agricultural productivity, with reduced renewable resource base
- Loss of natural habitat and species, and negative aesthetic impacts
- Water quality deteriorates and this has impacts on the riverine biodiversity and water quality.
- Where water is treated for human consumption, the costs of cleaning the water escalate significantly where it has large amounts of sediment.

Furthermore, the cost to pumping equipment (e.g. irrigation systems) due to increased wear and tear, and to filtration equipment, leads to increased costs to the end users.

MAIN CAUSES

- Poor arable agricultural practices that lead to erosion of arable fields, e.g. no contours, no fallow, limited organic matter replacement
- Poor range management practices, linked to the breakdown of communal grazing system, leading to overgrazing; uncontrolled burning and groundcover removal.
- Uncontrolled livestock movements with daily movement of animals between kraals and grazing areas.
- Stock theft, which forces stock owners to kraal their animals at night.

Construction methods which ignore environmental guidelines for soil conservation e.g. poorly placed culverts.

OBJECTIVE:

- Reduce accelerated soil loss and siltation of rivers in key areas.
- Improve productivity of arable lands and food security.
- Improve aesthetic quality of landscape.
- Implement a range management system for key areas that includes rotational grazing, resting and best-practice use of fire.

STRATEGY:

- Identify areas where interventions are likely to be successful (i.e. where there is strong local leadership and where there is a financial incentive to intervene).
- Promote conservation through production (conservation tillage) techniques in arable systems.
- Promote best-practice range management through an extension service.
- CBNRM approach to encourage ownership of improved resources.

Work through local leaders to promote better range management techniques.

REMEDIAL ACTIONS / INTERVENTIONS:

- Initiate an extension programme within the ANDM to promote best-practice range management and catchment protection.
- Implement an educational programme amongst communities about the damage caused by activities such as dragging firewood and daily movement of animals along the same paths.
- Where practical and important (e.g. near rivers that are used for potable water), implement reclamation projects to stabilise and reclaim erosion gullies
- Diligent implementation of environmental assessment recommendations
- Establish a team to provide conservation farming, rangeland management and CBRNM extension to the various projects and communities.



5.2.2 UNCONTROLLED ALIEN PLANT INFESTATION

- Productivity of rangelands reduced through being overrun by invasive weeds which are not palatable
- Elevated consumption groundwater reduces stream flow and blocking of stream banks and crossings
- Accelerated soil erosion under mature stands of invasive trees, especially after fires or clearing.
- Destruction of wildlife habitat and reduced biodiversity, with displacement of many Threatened and Endangered Species
- Reduced opportunities for hunting, fishing, camping and other recreational activities.
- Reduced plant and animal diversity.
- Massive immediate and long-term clearing costs.

MAIN CAUSES

- Overgrazing and poor range management practices that lead to a depressed ecosystem integrity that allows alien plant infestation to establish.
- Daily movement of animals between kraals and grazing areas disperse seeds into damaged areas, where they establish easily.
- Use of permanent kraal sites in the upper catchments that allows establishment of infestations from which they easily spread.
- Seeds dispersed from existing infestations by water, wind, birds, sleds and livestock.
- Absence of alien plant control programmes in the early stages of infestation.

OBJECTIVE:

- Implement a district-wide alien plant clearing programme, with good spatial data and a process to identify priority areas.
- Implement a coordination mechanism to manage all efforts to clear alien plants, starting in priority areas.
- Contain emerging alien plant infestations within five years.

Reduce area of alien plant infestation in District by 20% in 5 years, along riparian areas and upper catchments, to liberate ground water and grazing lands.

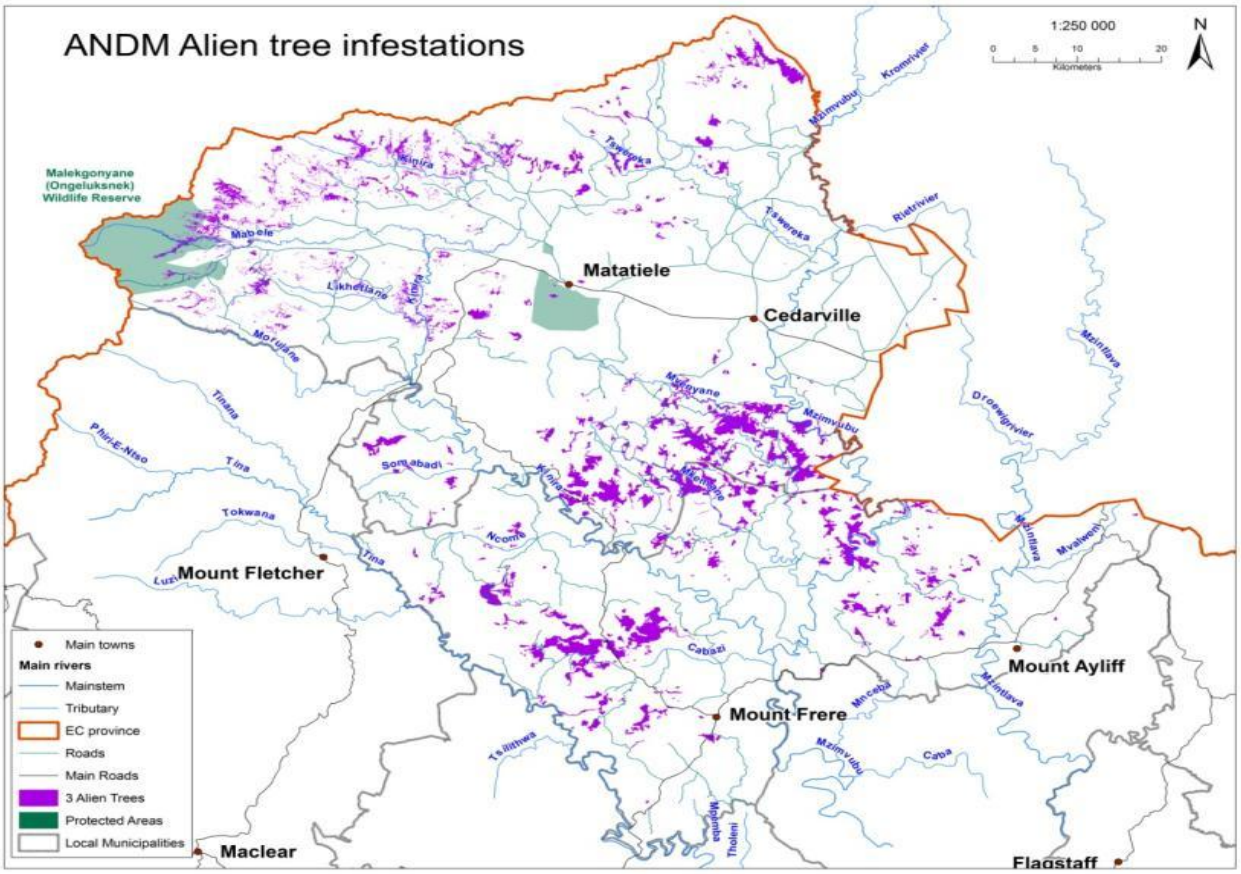
STRATEGY:

- Apply creative ways to generate income from clearing alien plants (e.g. formalising jungle to plantation, making charcoal or fuel pellets, etc).
- Infestations must be prioritised in a logical manner to ensure expanding and new infestations are tackled first, while established ones are contained.
- Target areas which can be more easily managed.
- Convert dense infestations to managed plantations / woodlots if feasible (more cost effective and achievable than clearing).
- No clearing can be started without a follow up plan and sufficient budget for follow up.

REMEDIAL ACTIONS / INTERVENTIONS:

- Produce a detailed and spatially-explicit alien plant intervention plan for the district.
- Implementation to be done in close collaboration with existing programmes (e.g. DWA Working for Water). Focus should be on those areas that will give the greatest return in terms of water release for human consumption (in place of other initiatives such as new dams). Clearing must be part of a medium term funded plan, to allow for follow up. Initial clearing alone can create more damage than good.

A landscape-level approach to range management that includes fire and grazing management to prevent areas deteriorating to the point where they are susceptible to infestation



The above map shows the extent of alien tree infestation, which covers an area of approximately 38 000 ha in the district. This is a huge area of what was once productive rangelands and arable fields. The photographs below show the reality on the ground (below left, Ludidi). Note how groundcover in wattle jungle is almost non-existent. This leads to increased vulnerability to erosion.

5.2.3 LOSS OF GRASSLAND GROUND COVER AND BIODIVERSITY

- Basal cover of the grasslands shrinks over time, exposing the soil to erosion forces, resulting in extensive sheet erosion over large areas.
- Loss of productive plant biomass as palatable, nutritious species are replaced by unpalatable, non-nutritious species.
- Alien plants invade ecologically depressed grasslands.
- Carrying capacity diminishes over time and quality and productivity of livestock deteriorates (lower calving rates, lower annual growth of individuals, lower wool returns).
- Significant loss of plant diversity, especially of the palatable grasses and forbs (and presumable associated invertebrate and vertebrate species).
- The reduced biomass associated with such over-grazing means that more pressure is placed on remaining grasslands and the process accelerates over time, leading to run-away erosion and further loss of plant material.
- Changes in plant community structure from a diverse resilient composition to a depauperate vulnerable plant community composition unable to withstand climate change.

Significant impacts on the rural economy as productive land gradually becomes unproductive and fewer families are able to subsist on the land.

MAIN CAUSES

- Uncontrolled/unmanaged livestock with limited or no rotational grazing system.
- Little or no fencing or use of trained herders to control where and when livestock graze.
- Different types of grazers, i.e. cattle, sheep and goats, are found together with no control over where they and when they graze.
- The communal system of grazing has broken down and is replaced by open-access grazing.
- Inappropriate burning regimes with no control or management: Annual burning to create a 'green flush' followed by intense grazing, preventing effective growth and reducing grassland vigour.

OBJECTIVE:

- Arrest or slow down loss of vegetation cover and plant biodiversity at the scale of the district.
- Rehabilitate key grasslands into productive land units that can support livestock on a sustainable basis.
- Formally protect some areas that still retain their assemblage of plant diversity.

REMEDIAL ACTIONS / INTERVENTIONS:

- Establish a team to provide conservation farming, rangeland management and CBRNM extension to the various projects and communities.
- Design and resource an extension programme for five years, with sufficient staff and capacity to implement all the actions described in this section, including the CBNRM approach.
- Identify areas where there is leadership control to implement good range management practices and where there is a reasonable chance of reversing the trend.
- Use extension officers to interact with those communities to develop sound range management practices that promote rotation, rest and good fire practice.

Partnership with EC Parks and DEAET to formally protect key areas through stewardship or other mechanisms within the priority biodiversity areas.

STRATEGY:

- Initiate an extension programme within the ANDM to promote best-practice range management (fire & grazing)
- Develop a formal partnership with the relevant conservation agencies to promote formal protection mechanisms within the priority biodiversity areas.

Use a CBNRM approach to encourage ownership of improved resources

5.2.4 WATER QUALITY DEGRADATION and quantity shortages

CAUSES (quality impacts):
Rivers and wetlands in a balanced system have a natural ability to 'clean' themselves (diluting, processing, filtering, storing and releasing clean water). Due to human modification, this function has been damaged, through over loading of contaminants (sewerage and toxins) and abstraction beyond critical ecosystem reserves, resulting in the loss of dilution and natural flushing capacity. This is attributed to the following factors:

- **lack of sanitation facilities**, as well inappropriate, poorly designed and badly located facilities.
- **poor asset maintenance**: obsolete and overloaded infrastructure, discharge of poorly treated effluent, contamination of river and wetland systems, and reduced dilution capacity of these systems. This occurs in all the towns in the District.
- **poor solid waste management**: blocked stormwater drains and polluted aquatic systems from run-off borne litter constrain effective functioning, leading to flood damage, physical impacts and water borne diseases. Again, all the towns are susceptible, especially Matatiele, much of which is located at the base of a steep slope in a catchment, and within the 1:100 flood line.
- **technology choices** : the failure of waterborne sanitation systems also poses a much higher pollution threat than the dry sanitation systems. Failures typically include blocked sewers with overflowing manholes, breakages of sewer pipes and ineffective sewage treatment. Inappropriate choices are often based on lack of understanding, ranging from inappropriate design by decision makers, to use of incorrect materials, e.g. newspaper, in water borne systems by domestic end users.
- **excessive nutrient, chemical and silt load** from fertilizer run-off, poor land management, and litter loads from poorly planned and unmanaged developments.
- **capacity constraints**: technical, managerial and human resource skills shortages, combined with inadequately skilled contractors and operators, and lack of monitoring and accountability.

CAUSES (quantity impacts):
The two main culprits here are **poor catchment management** and **bad planning.**

- Catchments can be damaged and their vital 'water catchment function' compromised through:
  - **Loss of groundcover and good grassland** through overgrazing, frequent burning and plantations.
  - Infestation of streams and grasslands by alien plants e.g wattle, which utilise more than their share and hinder natural water system function, reducing recharge of water resources.
- Poor planning is often caused by:
  - **fast tracking and politicisation of service delivery** to address back logs, often at the expense of sustainability, e.g. projects not designed with future demand and growth in mind (due to funding shortages or in order to deliver on time for budget compliance or electioneering).
  - Incompetent technical and design staff, or lack of monitoring and record keeping to make informed decisions regarding water delivery based on sound data.
  - Failure to register water use and assist DWA with sound reserve determination and catchment planning.
- **Illegal water use** through unauthorised abstraction, connections and non-compliance with license conditions. This leads to inability to understand and manage the reserve in sub-catchments.

IMPACTS: quantity

- The above causes impact negatively on the ability of the upper catchment to absorb and release rainwater, mitigate flood run-off and recharge groundwater. This can result in increased severity and frequency of floods, with resultant damage to infrastructure and increased soil erosion.
- Water supply shortages for domestic, commercial and agricultural use, leading to decreased productivity and health related issues linked with poor sanitation.
- One of the bigger long term impacts is reduced groundwater recharge capacity – grassland acts like a sponge to absorb and store moisture. Prevention of this recharge through extensive plantation forestry, reduced groundcover and alien infestation reduces the flow of springs and boreholes during the dry season, which could be exacerbated by climate change.
- It should be noted that a 100 hectare Eucalypt plantation at maturity will utilise the water demand equivalent to a town the size of Mt Frere on a daily basis. This volume will thus not be available for groundwater and stream recharge, reducing the available water in boreholes and rivers over the medium to long term.

Water shortages result in the need for increased infrastructure to source, transport and deliver water to needy communities and businesses. This will burden local government and the WSA further. Limited budgets destined for maintenance will need to be used for new capital development, with a disastrous long term prospect for sustainability of current supply systems.

IMPACTS: quality

- Excessive sewage effluent concentrations can result in cholera breakouts and cyanobacterial bloom.
- Purification costs become high when water is silt laden and polluted. This can also have negative health consequences such as chlorine accumulation.
- Surface water resource pollution can impact on resource functioning and related biodiversity, reducing the ability of resources to withstand extreme droughts.
- Water borne diseases can include typhoid, cholera, diarrhoea, hepatitis etc, all of which are debilitating and can be life threatening, putting pressure on poorer families who are often most vulnerable.
- Surface water resource pollution can impact on resource functioning and related biodiversity, reducing the ability of resources to withstand extreme droughts

REMEDIAL / MITIGATION MEASURES:

Quality related

- Appropriate design, and observation of the groundwater protocol with regard to location, of rural sanitation such as pit latrines, to avoid contamination of water resources.
- Awareness campaigns to change solid waste disposal attitudes and reduce waste in the landscape, which will reduce the impacts on surface water resources and borehole quality.
- Proper planning and impact assessment for any housing and sanitation infrastructural development to avoid overload of sewage systems and consequent overflow into water resources. All sewage is now regarded as 'hazardous' waste under the new waste Act activated 1 July 2009, and must be licensed.

Quantity / volume related:

- Note that the amount of water on the earth remains the same – it is the available and usable quantity for domestic, agricultural and industrial use in an area which will change. This depends on management.
- Water Services Authority should actively participate in the Catchment Management Association the Umzimvubu catchment, currently led by DWA as the proto-CMA, to develop a strategy for the district.
- ALL water use activities, including forestry, MUST be registered with DWA, and if need be authorized, to allow appropriate management of the quaternary catchments in the District.
- URGENTLY prioritise alien clearing in critical sub-catchments such as those feeding major dams and spring-supplied water schemes to ensure reliability of supply. This must be done by an appropriately skilled team under excellent management, with a minimum of an 8 year budget in order to be effective.
- Establishment of a catchment management system to co-ordinate all interventions and developments.

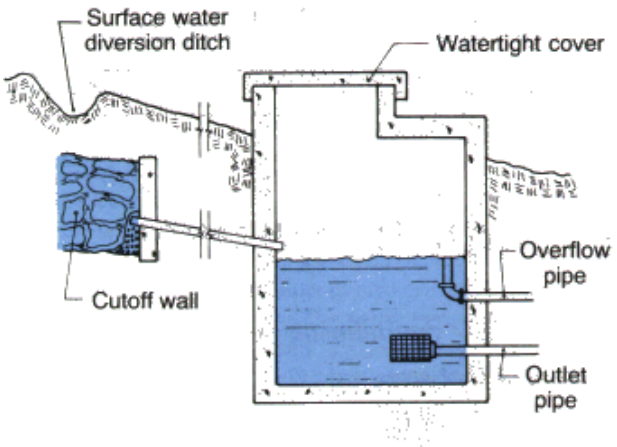
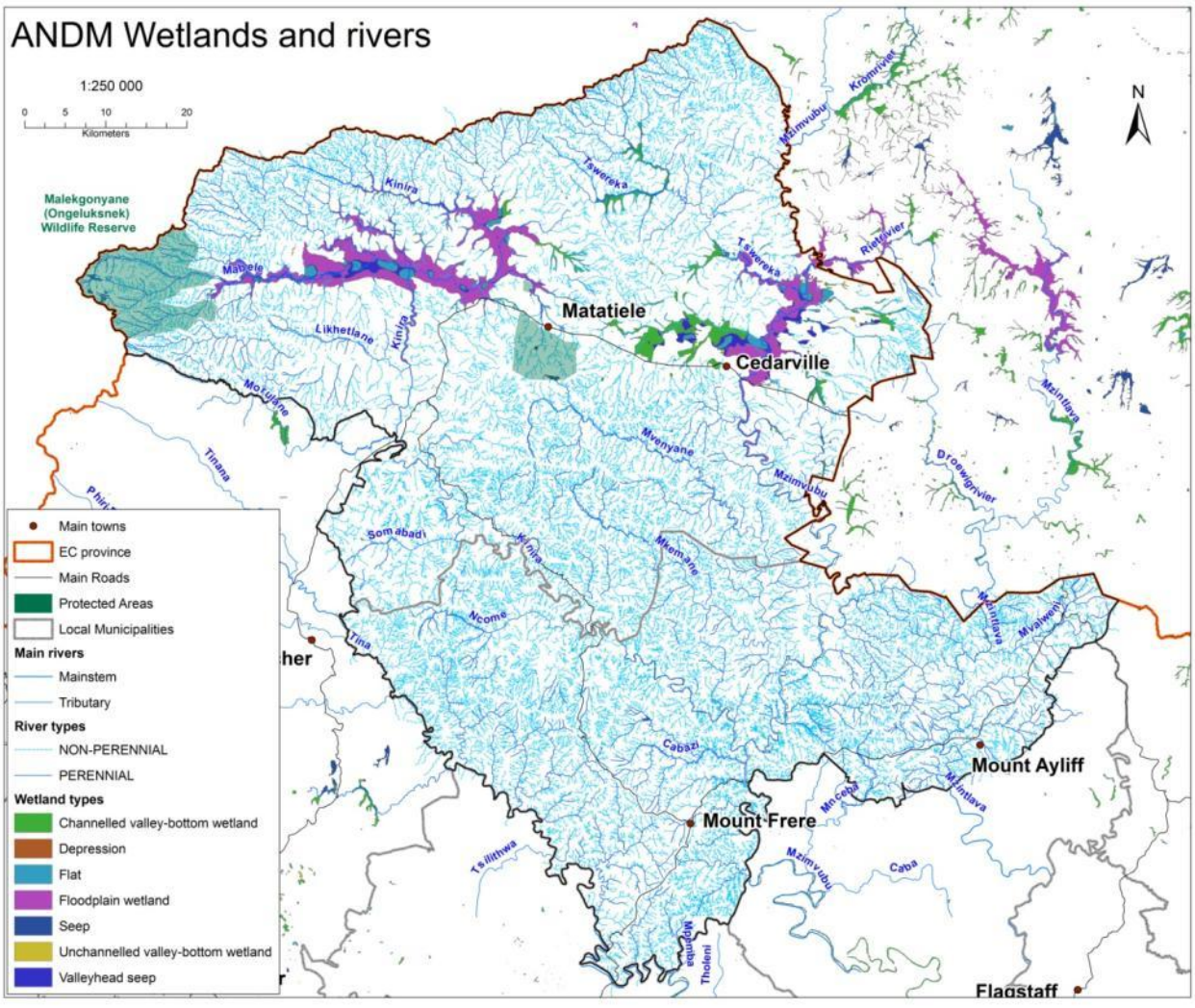


Figure 1a. Cut-away view of a concentrated spring.

Left: appropriate design of water resource usage, such as spring capture –for village supply, must consider ecosystem needs and future use, and should allow resources to function unimpeded. High tech solutions are not always the best or most sustainable, requiring huge capital input and maintenance budgets.



The ANDM has a many river systems that originate in its upper catchments and flow out to serve large portions of the Eastern Cape. The Mzimvubu catchment is an example of this, and the downstream users of this river are greatly affected by the management decision taken by the ANDM.


Above left: pristine water quality and all season flow in the upper catchment (Jordan river in the Ongeluksnek Nature Reserve fed by high altitude wetlands). Above right: water quality released from leaking sewage lines in Matatiele, 45km south.
Below left: Matatiele town dam in mid winter, unable to supply increased and uncontrolled demand, with decreased supply from a struggling alien infested catchment. Below right: village residents collecting water form an unprotected spring, subject to contamination from run-off and livestock, and drying in winter due to water absorption by wattle.


5.2.5 CLIMATE CHANGE INDUCED EXTREME EVENTS

Severe and extreme weather events e.g. storms, combined with vulnerable landscapes, will lead to possible scenarios as follows:

- Increased silt loads, which will reduce the storage capacity and life span of dams and wetlands.
- Currently bare and eroded areas will become worse, with an accelerated and exponential loss of soil, and inability to cultivate the land, with decreased yields and increased area of unproductive land, putting pressure on the remaining 'good' parcels of land.
- Decreased productivity may lead to famine, increased poverty and increased dependence on the state for assistance.
- Damage to infrastructure such as houses, buildings, sewer systems, bridges, roads, etc. This has disastrous economic implications for repairs and rebuilding.
- Loss of grazing land, and consequent pressure on remaining land, with possible conflicts for scarce resources and increased land degradation.
- Danger to humans and livestock, with potential loss of life and livestock through weather related disasters
- Possible scarcity of water, and excessive costs to access, transport and purify water for users.

MAIN CAUSES

- Climate change is a global phenomenon, with all users of energy and producers of air pollution being contributors. The District is a small contributor, but will be major victim due to the vulnerability of the degraded landscape.
- Climate change leads to changes in 'normal' weather patterns and trends, leading to a possible increase in the frequency and severity of weather events including tornadoes, heavy winds, thunderstorms, hail, snow and extreme temperatures.
- Possible increase in frequency and severity of droughts and floods
- Inability of ecosystem functions to cope or withstand extreme events through reduced biodiversity, vigour, groundcover and 'buffer' of natural resources, such as wetlands to absorb and mitigate floods and slowly release water.
- Just over half the District land area (55%) is classified 'intact' and is thus more resilient to withstanding severe weather events. This means just under half the landscape is vulnerable to extreme weather events.

OBJECTIVE:

- Reduce accelerated volume loss and siltation of rivers
- Improve productivity and improve aesthetic quality of landscape

Improve the district's resilience to extreme weather and climate events

STRATEGY:

- Identify vulnerable areas that are likely to be prone to natural disasters such as floods and damaging storms, and limit further development there.
- Protect and rehabilitate ecosystems that provide some mitigation against climate change effects in key areas, e.g. wetlands and grasslands.

REMEDIAL ACTIONS / INTERVENTIONS:

- Establish a team to provide conservation farming, rangeland management and CBRNM extension to the various projects and communities.
- Conduct an assessment to identify which communities (people) and habitats and species are most vulnerable to climate change and how can their vulnerability be reduced.
- Roads and bridges must be properly designed for minimum 1:50 year flood events, and constructed according to specification.
- Manage burning and improve range land management to increase ground cover, biodiversity and resilience to extreme weather events.
- Facilitate labour intensive projects for donga repair and clearing alien infestation e.g. wattle
- More protection for existing water resources (wetlands, dams, springs and rivers) to support their natural function and resilience.
- Improve quality of sewage systems through appropriate design, location, monitoring, maintenance and upgrading to prevent floodwater infiltration and consequent damage and contamination
- Improved management of surface run-off through appropriate drainage design to reduce storm water damage and impacts on outfall areas e.g. rivers adjacent to towns becoming filled with solid waste after storms from run-off, and side drains becoming incised from storm run-off.
- Increase public awareness about the need for resilient landscapes and infrastructure design, and possible alternative agricultural production strategies.

Above left: alternative subsistence production methods can assist homestead gardeners to increase food security and reduce their vulnerability to climate change induced crop failures.
Above right: a damaged, fragile landscape with limited groundcover, soil moisture and biodiversity has less chance of withstanding extreme weather events than a healthy intact ecosystem, which has a natural buffer against extreme conditions (below left and right) through good groundcover, healthy wetlands and relatively intact biodiversity.

5.2.6 Identification of priority areas for environmental and agricultural interventions

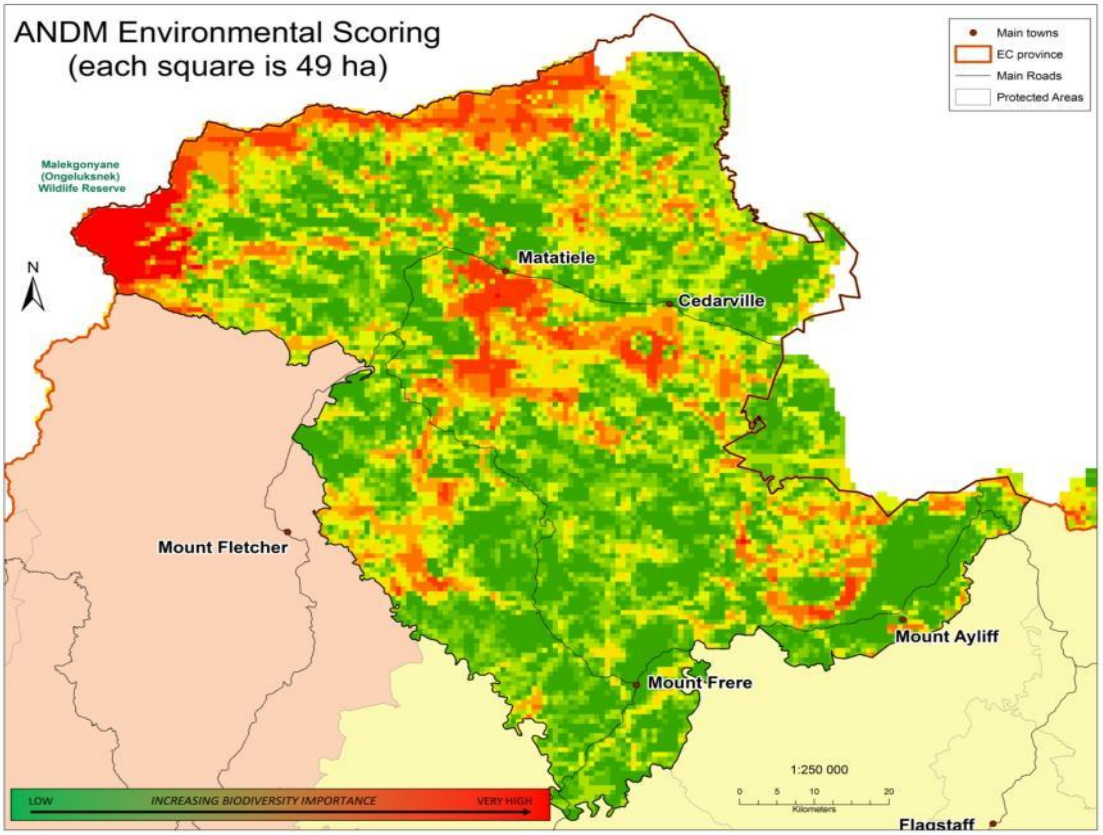
The following maps provide an initial spatial representation of important areas of biodiversity, which should be retained and protected if the short and long term desired state of the environment is to be achieved. The maps are based on various data sources including the ECBCP (EC Biodiversity Conservation Plan), SANBI grasslands and biodiversity data, and augmented with field verification and assessment carried out during the status quo assessment. Only a sample of this data is shown here - the electronic data is being made available to the District's GIS unit to assist with 'screening' for possible developments at a planning stage. It is also useful to share such data with authorities responsible for environmental authorization and licensing, such as DEAET and Water Affairs.

These data were used to spatially assess the importance of the environment. The detail of the methods used is described in a separate report attached as an appendix. Only the final results are presented here. The first map shows the results of the environmental scoring, which is based on all the under-lying biodiversity data. Each square in the map is a 700m x 700m planning unit (49ha) that is scored according to its biodiversity features and degree of habitat loss. Areas coloured in yellow or red are important for environmental purposes. Areas that are more green have already lost their biodiversity features and can be considered for appropriate development.

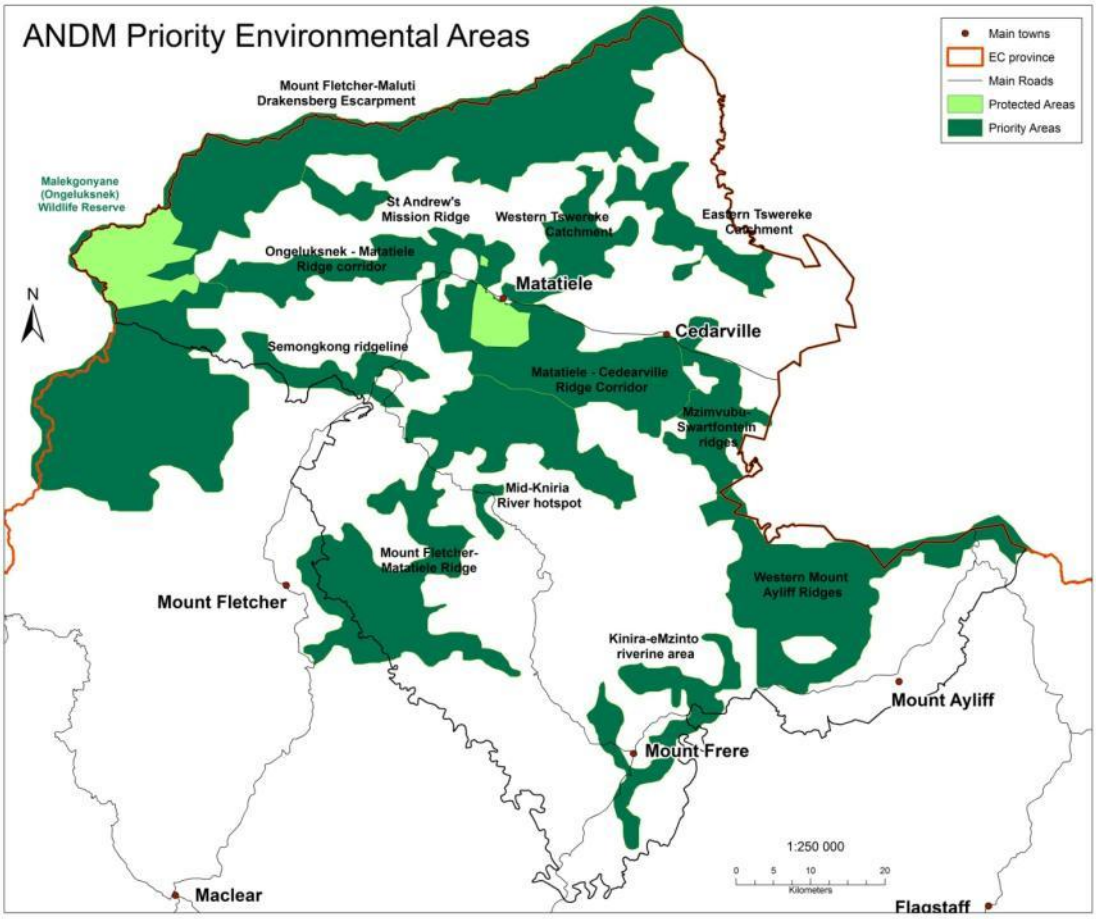
This assessment was used to delineate priority environment areas (PEAs) that show where environmental interventions should be focused. These areas represent the last opportunities to secure the environment into the future. Based on analysis of the above data sets, 24 priority biodiversity areas were identified as part of a district-

wide biodiversity analysis. These should form the basis of decision making with respect to geographical selection for the interventions outlined in section 7, especially catchment management.

These PEAs represent a total of about 360 000 ha of the district. The boundaries of these areas are not designed as strict real-life boundaries, but rather an indication of where it is important to focus biodiversity-related interventions. In essence, they show where there is opportunity to preserve natural systems with some degree of success, and where there are significant underlying biodiversity features. These PEA's should enjoy preferential environmental investment in terms of alien plant control, erosion rehabilitation, protected area expansion and others. The specific interventions per PEA will depend to a degree on the natural biodiversity and biophysical features they contain and their socio-economic and agricultural context.



Priority Environment Area	Hectares
Mount Fletcher-Maluti Drakensberg Escarpment	145 083
Western Tswereke Catchment	11 718
Mount Fletcher-Matatiele Ridge	57 008
Western Mount Ayliff Ridges	39 681
Kinira-eMzinto riverine area	15 146
Semongkong ridgeline	8 509
Ongeluksnek - Matatiele Ridge corridor	17 483
St Andrew's Mission Ridge	3 848
Matatiele - Cedarville Ridge Corridor	36 059
Eastern Tswereke Catchment	11 303
Mid-Kniria River hotspot	1 727


ANDM Priority Environmental Areas
Main towns
EC province
Main Roads
Protected Areas
Priority Areas
Mount Fletcher-Maluti Drakensberg Escarpment
Malekgonyane (Ongeluksnek) Wildlife Reserve
St Andrew's Mission Ridge
Western Tswereke Catchment
Eastern Tswereke Catchment
Ongeluksnek - Matatiele Ridge corridor
Matatiele
Cedarville
Semongkong ridgeline
Matatiele - Cedearville Ridge Corridor
Mzimvubu-Swartfontein ridges
Mid-Kniria River hotspot
Mount Fletcher-Matatiele Ridge
Mount Fletcher
Western Mount Ayliff Ridges
Kinira-eMzinto riverine area
Mount Ayliff
Mount Frere
1:250 000
0 5 10 20
Kilometers
Maclear
Flagstaff
N

6. UNDERLYING PRINCIPLES FOR TAKING ACTION

Once the status of the area is understood and can be geographically defined in terms of landcover, land use, needs and problems, a framework for action begins to emerge. The following principles are provided as a foundation for action in the framework:

RESOURCE MANAGEMENT AS THE PRIMARY FOCUS

- Focus on sustaining healthy ecosystem function where possible (e.g. in intact areas), with transformation of degraded areas to become more productive, e.g. converting wattle jungle into managed plantations and rehabilitating old and unproductive fields into useful arable lands.
- Use CBNRM approach combined with poverty relief activities to rehabilitate unproductive land and miximise spread of returns. Have economic basis with long term returns, not just 'input' of capital and poverty relief.
- Sustainability must take precedence over short term political appearance and expediency.
- See the big picture (geographic and timescale) and cumulative impacts of local action.

BE APPROPRIATE

- Actions must be appropriate for area (within capacity of social & physical resources, suitable for local situation e.g. urban vs rural, lowlands vs mountains)
- Make use of local role models and 'champions' and indigenous knowledge systems. Build on local knowledge & best practise e.g. conservation agriculture.
- Use locally driven forums rather than national 'programmes'
- Target areas where progress can be made and seen i.e. have an impact rather than demoralize target groups. This means focus on manageable 'chunks or areas of work, e.g. upper quaternary catchments for implementation of proposed projects.
- Take impacts & demands of HIV pandemic into account when planning labour requirements and capacity building interventions.

SOUND MANAGEMENT

- Practical & realistic timeframes and targets to avoid disappointment and non-delivery
- Sound project management and facilitation
- Increase awareness and capacity of target groups through effective outreach to meaningfully participate, not just be labourers.
- Cost effectiveness and accountability for the use of public funds for any actions

STANDARD REQUIREMENTS FOR IMPLEMENTATION OF THE EMP

- Commitment of top management to long term objectives must be reflected in the budget allocations.
- Buy-in and co-operation from all stakeholders, especially regional and provincial Departments.
- Designation of a manager / driver and establishment of a PSC to monitor implementation of the EMP and compile necessary documentation and records.
- Holding workshops for managers and members of the PSC to agree to implementation standards and expectations.
- Determining plans, implementation methods based on the legal framework.
- Defining the environmental policies of the District to inform existing and future programmes and plans.
- Implementing training for employees of all levels.
- Implementation of the designed environmental management plans.

If the EMP it is to contribute to a change in the way the environment in Alfred Nzo District is managed it will need the following main features:

Comprehensive: The EMP was prepared by people who have a lot of experience with environmental and social issues in Alfred Nzo. A combination of local knowledge, research and a comprehensive and explicit process to draw on local knowledge and communities were conducted and the information interpreted and synthesized to produce a report that balances science, value of resources by local people, and application of legislation.

Integrated: There are several reports and guideline documents that have been produced at different times and scales to guide development in the district. The EMP will weave these plans and programmes together to present an integrated plan that applies sustainability principles, while not losing sight of the implications for human well-being.

Authoritative: The EMP has to operate within the legal framework, and ensure that government and experts have a similar understanding of the issues, their impact, and corrective measures that have to be applied in order to implement development that takes care of the needs of the people but at the same time does not compromise the quality of the environment.

Inclusive: The EMP preparation process drew on the experience and knowledge of the local people including traditional rural communities, town dwellers, farmers and governance structures to ensure that issues impacting on these different communities are incorporated for future monitoring.

People-centered: The EMP does not view nature as separate from human systems — rather, it underlines the *urgency of finding a new relationship between the two*. The EMP, if applied well, has potential to contribute significantly to human well-being in the District— to health, prosperity, and social and cultural identity.

7. POTENTIAL ACTIONS TO ADDRESS CURRENTLY DEGRADED STATUS

7.1 STATEMENT OF DESIRED STATE OF THE ENVIRONMENT

Targeting the issues identified in the status quo findings, and integrating the guiding principles above, the following short, medium and long term actions are suggested.

Short term (1-5 years): Actions to be included in IDP as part of 5 year strategy

- Clearing of alien plants in priority catchment to secure water sources.
- Stabilising erosion problems in priority arable and range lands.
- Capacity building and mentoring programme for target groups
- Reduce the high rate of ecosystem function, habitat and biodiversity loss in upper catchments.
- Use of existing spatial plans in implementing developments
- Ensure that all proposed activities have authorization, and the conditions of the authorization are closely followed, and that all water use is registered with DWA.
- Establishment of a catchment management system to co-ordinate all interventions and developments.

Medium (5-7 years): 5 year plans supported beyond initial IDP stage,

a. Monitoring and revision of strategy to link with longer term management of original issues and any changes / impacts of short and medium term.

- Restoration of ecosystem functions in the 'potentially intact' land area in the upper catchments to enhance water security.
- Reduce the area of alien plant infestation by a further 10% and contain all emerging infestations, ensuring that all past clearing efforts have had their follow-up.
- Convert a further 10% of unproductive arable land back to a productive state through use of conservation farming techniques.
- Declare new protected areas.
- Rehabilitate priority erosion areas where they threaten water (rivers and wetlands) or arable resources.

Long term (8-15 years):

- Food security annual time-span increase for rural homesteaders.
- Waste recycling in all urban centres, decreased pollution by solid and liquid waste affecting rivers and water sources.
- Increased resilience to climatic events and decreased disaster management demands and expenditure.
- Payment for ecosystem services (PES) system developed and functioning to augment municipal tax base and support implementation of EPWP projects.

Long term (7-15 years)

- Institutionalizing of projects to become 'programmes' and embedded environmental management strategy, e.g. catchment management and payment for ecosystem services.

7.2 OUTLINE OF POSSIBLE INTERVENTIONS TO ACTIVATE FRAMEWORK

The following five areas of intervention are proposed, as a practical and achievable means of "turning around" the current accelerated rate of resource degradation. Their possible action plan timeframe is indicated in the table below this outline.

Each land rehabilitation and management element is unpacked in the sections below the summary table, while the capacity building strategy is detailed in section 8.

1. **Capacity building and training:** this is a cross cutting issue required to support all the physical project and programme interventions.
2. **Catchment management:** interventions can be practically sub-divided into the following:
   a. Rangeland management (fire and grazing)
   b. Alien plant / Wattle eradication and land rehabilitation in upper catchment and riparian zones.

c. Produce a ANDM alien plant management strategy to provide the framework for coordinated alien plant control that will guide all EPW programmes and other interventions.
d. Identify priority alien plant clearing opportunities that will enhance water security for vulnerable communities.
e. Reduce the area of alien plant infestation by 20% and contain all emerging infestations.
f. Management of wattle jungle through conversion into productive units.

3. Conservation through production (include traditional/indigenous agricultural production systems mainly targeting homestead owners and subsistence farmers).
    a. Convert at least 10% of unproductive arable land back to a productive state through use of conservation farming techniques.
    b. Conduct a review of all rural gravel roads to assess where culverts are causing massive erosion gullies. Produce a strategy to address this damage and prevent it happening in the future.
    c. Use an explicit process to identify communities that are vulnerable to environmental catastrophes that could occur due to degradation and climate change.
    d. Develop a district-wide plantation development plan to guide all such development into the medium term.

4. **Protected areas:** Identify areas for formal protection and initiate institutional arrangements to secure them, including mapping, defining boundaries, biodiversity listing, development of Integrated Management Plans (IMP), with identification of status and potential for tourism and income generation, proclamation. Community and stakeholder consultation to establish Tenure security.

5. Climate change vulnerability mapping

a. Identify which human communities are most vulnerable to climate change and why.
b. Identify which plant and animal communities are most vulnerable to climate change and why.
c. Design strategies to intervene in these areas to reduce their vulnerability.

6. Waste management
a. Implement based on District Waste Management Plan
b. Augment with rural interventions identified in this framework

PROPOSED ACTIONS FOR EMP IMPLEMENTATION

FOCUS / ISSUE	SHORT TERM 1- 5 YRS POSSIBLE PROJECTS	MEDIUM TERM 6-8 YRS SUCCESS INDICATORS & FURTHER	LONGER TERM 9-15 YRS SUCCESS INDICATORS & FURTHER NEEDS
1. CATCHMENT MANAGEMENT	1.1 co-operative range management (CBNRM based, fire and grazing management)	improved grassland & stock productivity	Incorporate Payment for Ecosystem services
	1.2 formalising wattle areas to become economically productive (EPWP plus SMME development for processed goods)	no increase in alien spread; jungle converted to productive stands	Wattle / commercial stands managed and producing income for land righst holders
	1.3 clearing & rehabilitation of sensitive areas in upper catchment (EPWP with WfW)	infestation reduced by 50% in source areas; follow up control in place	no infestation in upper catchment; increased water release?
	1.4 conservation through production (subsistence food production, indigenous methods, low external input, CBNRM approach)	increased yields / ha and extended food security; decreased soil loss	no dependence on external inputs; year round food security; increased reslience to droughts and disasters
2. PROTECTED AREA DEVELOPMENT	2.1 identify potential areas (biodiversity value, land tenure, tourism potential, etc) and draft overall strategy for proclamation process (boundary definition, consultation, etc)	tourism potential and products in protected areas developed; increased biodiversity value amnd ecosystem services e.g. water quality and quantity; increased employment and revenue through tourism	self-sustaining tourism industry in and around protected areas as part of EasternCape protected areas network and biodiversity corridors
	2.2 Ntsizwa mountain and surrounds: consultation, boundary and IMP	AS ABOVE	AS ABOVE
	2.3 Ongeluksnek valley wetlands: consultation, boundary and IMP	AS ABOVE	AS ABOVE
	2.4 Goxe cliffs, river and surrounds: consultation, boundary and IMP	AS ABOVE	AS ABOVE
	2.5 Cedarville farms conservancy: consultation, boundary and IMP	AS ABOVE	AS ABOVE
	2.6 Tina valley and Qwidlana / Ncome springs area: consultation, boundary and IMP	AS ABOVE	AS ABOVE
3. CLIMATE CHANGE VULNERABILITY MANAGEMENT	3.1 Mapping of threatened, sensitive vulnerable areas: biodiversity, biophysical (water stress and demand, flood line location, upstream status, slope, groundcover, etc), combined with socio-economic, livelihoods, etc	Clear spatial reference system for assessing development parameters in all areas of District to mitigate potential disasters; system user-friendly for Municipal, consulting and Departmental planning staff.	Decreased disaster incidence and decreased expenditure on damage control and mitigation
4. WASTE MANAGEMENT	4.1 Implementation of District waste management plan (separate plan)	Waste plan on track. Recycling / buy back centres in all towns.	
	4.2 Establish rural waste collection system with value adding incentive through buy-backfor recycling as pilot in Matatiele area	Rural areas have waste collection system as part of free basic services, with ward centres acting as collection points, with SMME involvement	

7.2.1 CATCHMENT MANAGEMENT:

The integrity and functioning of the upper catchments is central to good resource management, particularly for a district like Alfred Nzo which is located at the head of the Umzimvubu catchment. It is currently under threat, as described in section 5, from over-grazing, inappropriate fire regimes, alien plant infestations, inappropriate arable and plantation development and unsustainable harvesting, which in turn leads to groundcover and biodiversity loss and soil erosion. Well managed catchments can perform their important ecological services in a far more effective and resilient manner than those which are under stress from development pressures.

7.2.1.1 RANGE MANAGEMENT

Livestock in the Alfred Nzo is kept for both commercial and traditional uses. In general, the privately-owned farmlands are maintained in relatively good condition while the communal rangelands experience various levels of degradation. There are many reasons for this degradation, but this EMP will focus on fire and livestock management.

In many areas, most of the livestock are not owned by the individual families in the area, but rather by a few owners (some of whom may be absentee owners) who are using the communal rangelands for commercial gain. In some cases, these people will be the more wealthy members of the community who have the most decision-making power. Generally, the small number of livestock owned by households is for traditional affairs and not for economic gain.

Interventions that can halt and reverse the land degradation taking place due to the lack of management of the livestock will be required.
The following recommendations are measures that will integrate the environmental, social considerations and incorporate the guidelines as provided for in the legislation.

The specific project goals are to employ and train up a team of people to act as liaison and extension officers to work into the priority communities that will be focus of the interventions. This team will require technically capability environmental and agricultural staff who can communicate with the local communities.

- **Determination of the stocking rates based on carrying capacity**

The ANDM should work with the department of Agriculture to delineate community grazing areas and to determine the appropriate grazing capacity of these areas. There are standard methods for doing this, and they are essential for range management. Importantly, this process must involve participation by the communities in question to ensure that local dynamics are accounted for. A rotational grazing system must be designed and implemented for these areas to ensure that sufficient rest is granted to the rangelands. Each targeted community should have the equivalent of a farm management plan that guides all agricultural development and management for a five year period.

The local leadership will need to ensure that the community agrees to abide by the livestock carrying capacity, rotational grazing system and fire regime. Without the support of the leaders AND the community, such efforts will fail (as they have done in many times in the past in other areas).

- **Building community institutions**

This step will involve mainly resuscitation of traditional range and livestock management institutions, complemented by new information that will come out of the training. This is only likely to succeed in those few communities where there is strong traditional leadership that has the political ability and will to implement what may be unpopular decisions.

- **Farmer training in husbandry practices**

Practical training implemented by competent training institutions is the cornerstone of success of the training programme. This however should incorporate the use of local land classification systems to identify key resources with full participation of local traditional and elected authorities into formal management committees. Study tours to other areas where agricultural reform has been successfully implemented in communal lands should be encouraged.

- **Application of legislation**

There is need to educate the public about their rights and obligations according to law, and implications and penalties if the law is broken. Enforcement authorities and mechanism have to be applied coupled with consultation with the communities.

- **Planning for dry seasons and to cater for climatic fluctuations**

This will involve cultivated planting of fodder and stoverage, and will require the control of animal movements. Revival and training in customary tenure arrangements, especially those which provide for the intermittent or seasonal use of a wide variety of ecological resources
Coordinate movement and regulate access by different user groups, rather than restrict movement. Again this will need capacity building.

Another complementary strategy is to develop agro-forestry for the provision of feed resources which are less susceptible to climatic fluctuation than natural grazing. Maintenance of fall-back grazing reserves for use in periods of exceptional stress is essential. For this, a participatory planning process which emphasizes consultation with livestock owners and users of the associated natural resources is important.

- **Restrictions on use of fire as a management tool.**

An appropriate fire regime, with fire-breaks and rest periods should be designed and implemented for each community area.

- **Range management policy reform and implementation**

A balance between conservation and production has to be achieved if the grazing lands are to recover and continue to produce for the numbers of livestock kept in the ANDM rural areas. There is a need for a modified approach to the grazing land rights with livestock owners taking some of the responsibility for the management of the land on which their livestock feeds.

- **Livestock marketing programmes**

Marketing has to be integrated into the overall livestock management programme and has to be coupled with capacity building through a system incorporating rangeland administration, extension work, and range and livestock research. The marketing system introduced should be designed to absorb large shifts in levels of throughput.

7.2.1.2 ALIEN PLANT MANAGEMENT

This intervention has two primary aims:

1. The conversion of certain alien plant infestations (which are a liability) into an economic opportunity (charcoal, biofuel, poles, firewood, etc), and in so doing provide an economic vehicle for SMMEs / local micro enterprises to generate income through value adding activities. This is an ambitious but possible intervention, requiring excellent technical and management skills, and well structured partnerships between role players, including the private sector, the District, and relevant government departments. There are other such projects elsewhere in South Africa and the Eastern Cape which have been successful.
2. The control of existing alien tree infestations where they do not present an economic opportunity as per point 1 above.

The projected time frame requires at least 8 years of focussed support, commencing with starter financial grant support, moving into facilitation support, with a constant trend towards self-sustainability.

The specific project goals are to:

1. Conduct an assessment of all alien plant infestations in the ANDM and use this to develop a 15 year strategy to bring them under control. This is primarily a GIS and strategic planning exercise, but is crucial for the successful implementation of this intervention.
1. Development and implementation of economic opportunities from existing unproductive alien plant infestations.
2. Conversion of unmanaged alien vegetation into self-sustaining woodlots in appropriate areas (with EIAs and water use licensing to formalise such areas) to control the spatial spread of invasive infestations.
3. Encourage appropriate agriculture and forestry opportunities through the conversion of infestations.
4. Clearing of infestations in targeted upper catchment and riparian zones (wetlands, rivers, streams) with rehabilitation of grasslands and water source areas.
5. Additional support to environmental improvement programmes.

The main thrust is the *development and implementation of economic opportunities from regional bio-mass resources*. This would require the following tasks:

- Evaluate bio-mass reserves, alien infestation extent and density and regional project clustering possibilities, through comprehensive mapping linking biomass with access routes, labour resources and potential markets, making use of and updating SANBI and DWAF databases. This should indicate which areas should be earmarked for:
    - *Clearing and rehabilitation* (Working for Water / EPWP method) in upper quaternary catchments of the Kinira catchment, including T33A, B and D, plus T31 C and E.
    - *Management of existing wattle jungle to* formalise areas for controlled harvesting through observing riparian and forest margin buffers, water licenses, planting permits and environmental authorisation, and facilitating lease of such areas for private sector partnerships as per Forestry Protocol guidelines.
- Identify and compare (detailed feasibility) ALL possible income generation / value adding options based on use of cleared and harvested biomass as a raw material:
    - Bio-diesel
    - Chipping
    - Pellets
    - Coal
    - Poles and creosoting
    - Community utilisation
- Develop business plans with clear short and longer term timeframes, role players, targets, budgets and strategies
- Network with Public Sector funding Institutions to gain implementation support (DWA, DAFF, DWEA, ECDC, ASGISA, etc)
- Identify private sector investors / operational partners for sustainability beyond initial funding support (Commercial Forestry companies)
- Implementation of multiple regional opportunities
- Project management and capacity building of local participants
- Ensure initiatives are sustainable and a clear exit strategy is in place to allow biomass management to continue as a viable industry in the District

Such an intervention has the potential to achieve multiple goals including control of alien spread, improvements in surface and groundwater reserves, decreasing biodiversity threats and impacts, and it should be prioritised!

7.2.1.3 CONSERVATION THROUGH PRODUCTION / CONSERVATION AGRICULTURE

This refers to techniques which are not reliant on conventional agricultural practices and large external inputs, but which make use of low impact, non-mechanical cultivation and production methods. Such conservation farming methods have been used very successfully in many areas of the world.

Context and concept

Overall grain production in ANDM, especially in the Umzimvubu Local municipality area, has declined significantly due to unproductive agricultural land abandonment (findings from social survey). The land has lost its capacity to produce following years of exploitation without putting anything back to maintain productivity of the soil as a resource base. Access to cash grants has compounded the lack of incentive for involvement in agricultural activities.

Different methods of conservation through production have been tried and tested as an alternative and more sustainable production method in different parts of the world, including South Africa, mainly by NGOs and aid agencies. In Zimbabwe and Lesotho there have been very successful interventions based on the Foundations for Farming material, and Lesotho has almost three decades of experience with alternative appropriate production approaches which have had success with both erosion control and yield increases. Some of these approaches have potential to work in the ANDM if the land has to recover its productive potential and go some way towards meeting the food and fibre needs of the custodians of the land.

There is a fundamental difference between the traditional / communal rural areas in Alfred Nzo and the commercial farms. They are in the same biophysical area, they have the same rainfall, similar soils, and can support similar plant and animal species: the major difference is the management style and land tenure system. Breakdown of co-operative communal land management has led, as described in section 5, to extensive overgrazing by wandering livestock, which has bared much of the soil in the surrounding area. Biodiversity loss is severe, livestock are often starving during winter and early spring due to insufficient biomass and nutrition, and most wildlife has disappeared as a result of poaching.

Approach

The recent and highly commended buy-in by the national Department of Environment Affairs to the CBNRM concept (Community Based Natural Resource Management), as a viable alternative land use approach, has received interest and initial support from the District. This approach differs from the popular but unsustainable EPWP approach (Extended Public Works Based) in that it relies on non-wage incentives for involvement of people in land care and production activities. People receive real benefits – economic, social, cultural and spiritual – from managing the natural resources widely. The CBNRM approach has a far greater chance of realizing sustainable land use targets, long term livelihood benefits and resource care than a temporary labour intensive scheme. It requires a mind shift to a new paradigm.

Livestock in the degraded rangelands can be better managed to:

- Increase the land's ability to absorb and hold water
- Build new soil through organic input support
- Help pioneer plants emerge and establish to restore groundcover
- Increase forage production
- Increase biodiversity
- Build healthier and more resilient landscapes

Cultivation methods can be adapted, and sometimes adopted, as follows:

- reduce economic and chemical input demands,
- make use of locally available technology (animal draught instead of hired mechanized contractors)
- include low or zero tillage to reduce soil disturbance
- employ innovative water harvesting methods
- increase contribution of organic content to 'feed' the soil and improve structure and fertility
- integrate multiple activities and outputs to increase the range of yields, extend food security periods and improve household nutrition, e.g. bee keeping, use of fodder trees, intercropping, etc.

In designing a programme, the following factors need to be taken into consideration:

- Soil types, climate and rainfall (amount, nature and seasonality)
- Labour availability and gender issues (impacts of migration, child / female headed households, etc)
- Cultivation options, implements and draught types (tractors, oxen, donkeys, hand tools, plough types, etc)
- Availability of nutrient and organic inputs (manure, fertilizers, pesticides, etc)
- Crop demands and local food security needs
- Extension services and technical support availibility

The 'conservation through production' concept can make use of many approaches, with its central tenet being *increasing agricultural production while reducing the vulnerability of rural livelihoods to drought and soil erosion*. The use of a CBNRM approach to involve target communities in designing and driving their production greatly strengthens the chances of success, for both productivity increase as well as resource conservation and management. Better resources produce better yields for longer periods.

Strategies:

- Use of CBNRM guidelines (DEAT) and experienced facilitators.
- Possible consideration of EPWP based initial support for labour intensive erosion control requirements
- Improved communication between key departments providing support
- Awareness and education on legislative responsibilities for officials and developers and provision of easy access legislation on communal land rights to the general population
- Environmental management planning prior to carrying out development projects
- Land development strategy based on local needs and local biophysical status

- Erosion prevention and rehabilitation driven from a point of soil, soil nutrient and water management for improved production
- Indigenous and plantation forest development strategy that takes into account impacts of different species on the environmental resources.
- Proper demarcation of land uses based on land quality, potential and available resources

7.2.2 PROTECTED AREA DEVELOPMENT

The Priority Environmental Areas can be used as the basis for identifying new protected areas. Large portions of untransformed land within these areas have potential for protection, assuming there is a willing community or owner. Expert knowledge of the area and its environmental assets can be very important in this assessment, and already five potential areas have been identified for exploration and proclamation under the Protected Areas Act. All have high aesthetic appeal and considerable potential for tourism, and are located in the upper Umzimvubu catchment which is important for water security. Four are located on communal land, and one is on private land. These potential sites include:

AREA	ATTRIBUTES
1. Ntsizwa mountain and forests	Indigenous forest, old mines, resident rare bat species, recreation, heritage
2. Ongeluksnek valley wetlands	Wetland system, bird life, aesthetic appeal, recreation, adjacent to protected area and escarpment (Transfrontier)
3. Goxe / Gogela basalt cliffs	Umzimvubu river, basalt cliffs with resident Cape Vulture colony, aesthetic appeal, recreation, junction of high biodiversity (cycads, proteas and forest)
4. Cedarville farms conservancy	Private land along Umzimvubu river with good groundcover, some wildlife remnants, co-operative land owners, mixed use.
5. Tina River valley and Ncome wetlands	Extensive wetland systems, breeding cranes, juxtaposition of settlements and sensitive ecosystems,

The delineation and proposed protected status application will require the following for each of the sites:

- Conduct stakeholder research to confirm willingness of the community or owner to the general vision and process.
- Involvement of provincial conservation bodies and relevant NGOs to assist with the process.
- Delineating the boundaries with input from the relevant community or owner(s).
- Desktop assessment of the area to document known biodiversity, cultural and environmental features and to develop a zonation plan.
- Field assessment to verify key features and to confirm the zonation.
- Development of Integrated Management Plans (IMP) as the basis for the protected area signing.
- Community and stakeholder consultation and establishment of Tenure security, with proclamation of protected status and appointment of a responsible management custodian.

This work should be done in close collaboration with the DEAET and EC Parks and in partnership with conservation NGOs that focus on protected area development, such as Landmark Foundation and WWF-SA. There are a variety of tools that can be used to proclaim protected areas, including formal nature reserves, protected environments, and biodiversity agreements. It is important to ensure the correct legal tool is applied to the proposed protected area. There is a considerable amount of work needed to develop the proposal to be signed off by the MEC for a protected area and it must be carefully considered up front which route to follow. This is why partnership with the provincial conservation bodies and relevant NGOs will be so important.

7.2.3 WASTE MANAGEMENT

A separate Waste Management Plan was commissioned by the District and provides detail on the outline below, as well as detailing various required actions.

The complete lack of waste disposal facilities in the both urban centres and rurally located settlements results in the *ad hoc* disposal of waste into the surrounding environment, with the littering of settlements, road sides and drains and consequent collection of waste material in water resources such as streams, wetlands and rivers. Solid waste is also disposed of into pit latrines, hindering their efficiency and reducing their life span. Concentration of litter in rural settlements leads to risks for children and livestock (e.g. broken glass, bacterial development in accumulated piles of litter) as well as unsightly accumulations, which do not contribute towards the well-being of residents nor the tourism development efforts in the sub-region.

The current inability of the local municipalities to provide free basic refuse removal and waste management is not only a problem in terms of service provision obligations. It contributes to the growing problem of waste disposal and environmental degradation both in the country and globally. The obtaining and production of raw materials for the manufacture of basic steel, plastic, glass and other goods is enormously demanding on energy and finite landscape resources, while simultaneously we require more space in which to dispose of 'waste' in landfill sites. Environmentally, 'waste' can be viewed as a *resource out of place*, and the proper management and recycling of waste as an opportunity to turn a liability into an asset, simultaneously creating opportunities for income generation through value adding. South Africa has a growing awareness of, capacity and indeed a great need for improvement of waste management. This is happening through many well established initiatives country wide, mainly focused in urban areas. More than 113 000 officially recorded jobs have been created through recycling activities nationwide, with an estimated 20% more informal 'income generation' activities linked to these activities.

The Department of Social Development has indicated that 'Municipal planning needs to focus strongly on local economic development initiatives that will enable the community to generate an income.' A waste management and recycling project, base dona sound long term strategy with incentives for public involvement, can address three problems simultaneously and sustainably: solid waste removal as a free basic service, reducing environmental impact, and creating income generation opportunities, thereby satisfying the Department's motivation. The concept aligns extremely well with the Nation's principles of *Batho Pele* (People First), which include consultation, access to services and value for money.

7.3 SUGGESTED INTERVENTIONS AND 'PROJECTS':

The shortcomings of the Waste Plan with respect to environmental management, combined with needs identified during the status quo assessment, point towards the following interventions being urgently required:

- ***Appropriate sanitation programmes*** and basic latrine infrastructure being facilitated in all rural settlements, especially those within 1km proximity of river systems
- **Addressing the increasing overburden on urban sewerage** and storm water management systems, which are affecting water resources through both liquid and solid waste contamination. This is currently being addressed at Cedarville through renovation of the old sewage works, waste licensing and exploration of a wetland-type attenuation system.
- **Widespread public education** about the impacts of irresponsible waste disposal on the environment and health. This needs to be popularized, and involve commericla support to reduce packaging volumes, which are the main culprit in terms of composition of solid waste.
- **Development of improved waste recycling facilities** in all urban centres, as well as rural hubs, where waste can be collected through a '*weigh&pay*' buy-back system for recycling.

With respect to the last item above, this EMP / framework strongly suggests the inclusion of an IDP activity to research, design, test and refine a model for rural waste management, through sustainable means, involving existing ward structures, local entrepreneurs and a sample area, which will address the following key problems:

  - the current backlog in providing free basic services to rural areas for solid waste removal and free basic energy subsidies
  - the low employment and income rates resulting in a high percentage of indigent households living on less than R800 per month.
  - the litter problem in the landscape, which negatively affects land resource quality, human health and aesthetics

A well structured participatory waste management system, which simultaneously provides a mechanism for distribution of free basic services to scattered rural settlements, and which is based on entrepreneurial involvement of the poorest households, plus co-operation with and support from the local authority, is relevant to the objectives for both the country's development and the context of the requested support, through its potential to positively affect the following key areas:

- Improvement in service delivery and increased confidence in local municipalities, with potential to lead to increased investment in the area. This is key in the current volatile climate in the country regarding challenges to local authorities with respect to poor service delivery. The proposed mechanism will also assist to distribute free basic energy to indigent rural households, through the latter receiving energy tokens per measured unit of waste delivered to a collection point/node.
- establishment of sustainable, participatory programmes for target communities, allowing them to become involved in local economic and land care activities in an independent manner, through entrepreneurial opportunities such as transport provision, collection, sorting and processing, etc.
- deepening of democracy through intensification of support for local economic development interventions, by assisting affected communities to implement economically related development activities at village and regional level.

The action is based on the ***development of social and human capital***, to optimise on existing opportunities through value adding along the waste management stream (i.e. turning waste into a resource through recycling), and through provision of the necessary infrastructure and systems (transport, depots, personnel, management systems, etc) in order to facilitate participatory development and deliver on free basic service obligations for indigent rural households.

7.3 GUIDELINES FOR ALLOWABLE ACTIVITIES IN CERTAIN AREAS

In order to decelerate the degradation of resources, and mitigate the impacts described in section 5, areas which are relatively intact (less than 55% of the District's land surface) should be left as undisturbed as possible, as they are critical for performing the vital ecosystem functions of:

- water absorption, and release, including flood mitigation,
- surface and groundwater supply
- drought resilience,
- pollination support,
- provision of resources (thatch etc)
- Basis for livestock production
- landscape and aesthetic resources for the growing tourism industry

In order to achieve this, the ANDM needs to have a clear understanding of what activities are appropriate and permissible in the remaining potentially intact areas of the district. The correct mechanism for doing this is to update the existing development planning tools such as Integrated Development Plans and Spatial Development Frameworks for the two local municipalities in the district. If these were strengthened and made more accurate with detailed spatial information and clear guidelines for permissible activity, then the environment within the district would be secured.

During the development of this EMP, accurate spatial tools have been developed for such planning, and these should be integrated into the IDPs and SDFs. Already these tools are being used at a provincial scale by ASGISA-EC, DAFF and DEAET to assist their decision-making where it concerns the environment.

There are two ways to complementary ways to assist decision-making regarding permissible activities. Firstly are blanket restrictions for activities in land that is currently intact (i.e. virgin grasslands). No activities that turn the soil should be allowed, including ploughing or planting of trees. The little remaining grassland in the ADNM should be left to provide the ecosystem services that they do. Permissible activities in virgin grasslands should include sustainable activities such as tourism development, or grazing with a clear management objective and plan (fire and rotational grazing).
The second is to use the detailed spatial products provided in the EMP to overlay any development application plan. The Priority Environment Areas should be avoided for activities that transform the natural environment (ploughing, plantations, urban, etc).

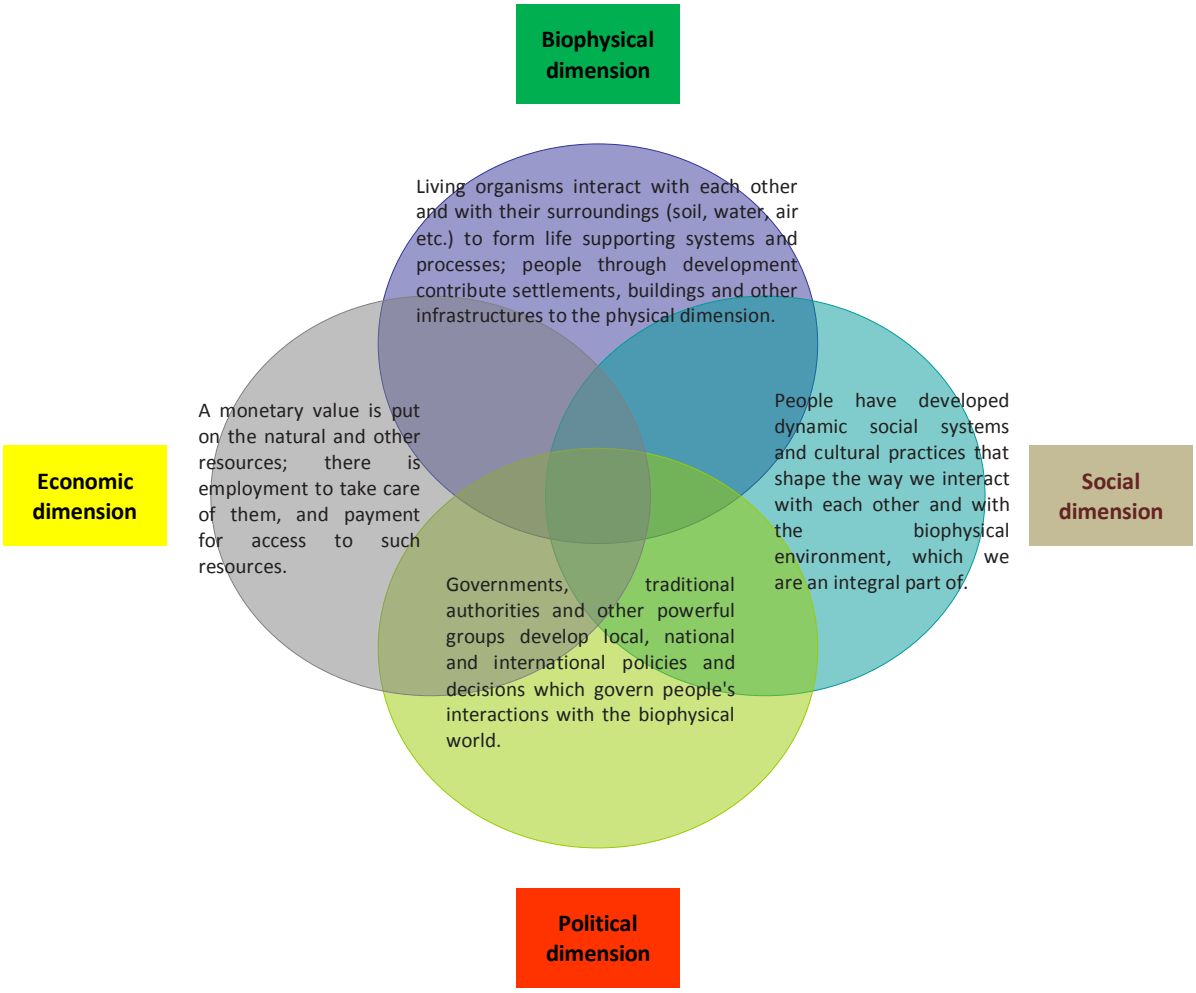
New arable developments, including plantations, should not be allowed into the virgin grasslands, and should be restricted to land that has already been transformed, such as old fields or jungle wattle patches. The technology exists to reclaim such areas for productive use and the ANDM cannot afford to lose any more of its virgin grasslands to inappropriate development.

8. RESOURCING, TRAINING & CAPACITY BUILDING

8.1 INTRODUCTION

In compiling the conceptual capacity building plan that will help Alfred Nzo District authorities implement the EMP with informed participation of their stakeholders, it will be important for the stakeholders to examine their perception of values and their actions, and to educate themselves as the beneficiaries and consumers on application of a sustainability mechanism with a full understanding that they are the also the losers if the environment continues to deteriorate.
It is very important to take cognizance of the following if long term success has to be achieved:

- The EMP will be implemented in a community that has extensive local knowledge that has to be integrated into the capacity building program. The capacity building plan should thus aim to develop skills, capitalize on the knowledge and values inherent within the community to develop skills, and promote behaviour that supports environmental sustainability.
- There are international, regional, national, provincial and local guiding principles and approaches, some of which are law that have to be adopted to formulate the program to ensure that it can hold its own.
- Environmental management capacity building regardless of the target audience should always take into consideration the interaction between the physical, social, economic and political dimensions of the environment (see figure below), as all have an impact on the outcomes of the sustainability and equitability of environmental management choices.
- The interaction between the four major dimensions of the environment should be addressed in an equitable manner to ensure that all stakeholders understand and carry out their responsibilities.



8.2 IMPORTANT COMPONENTS OF AN ENVIRONMENTAL MANAGEMENT CAPACITY BUILDING INTERVENTION

8.2.1 Determination of organizational structures

It is important to utilise existing community structures that enjoy community support and participation. Such structures would need to represent institutions such as traditional authority, NGOs and CBOs, local government, and any other members that the community would envisage as crucial in adding value to the development of the product and its long term sustainability.

8.2.2 Negotiation between authorities and local resident communities

Any decision on the utilization of environmental resources, whether for the exclusive benefit of the resident communities, or for the greater good of the society, should be preceded by consultation, negotiation and interaction with existing community forums to achieve consensus and remove suspicion on possible dispossession. Some of the important issues that need to be addressed and agreed on include

- User rights
- Compensation that may be indicated
- Issue of boundaries both physical and social
- Long term participation and responsibilities of the main parties
- Job and business opportunities
- Development of entrepreneurial skills

8.2.3 Women and the environment

The role of women in our traditional African cultures as child minders, food producers, fuel and water gatherers cannot be overlooked in the design of an environmental awareness and education program. Recognizing their influence in decision making on the use of environmental resources and development contribution to the quality of family and community life can lead to attainment of a high quality of life for all.

8.2.4 Use of indigenous knowledge

Members of the community, regardless of their level of education, put value on good family health, productive soil, nutritious food, clean air, proper sanitation and neighbourhood safety. These issues are inherent within any communities' value system including Alfred Nzo District residents. The doctrine of consumerism has somewhat diluted the values and a reintroduction in the least disruptive manner would enhance an appreciation and widespread adoption by the community.

The different cultural groups in Alfred Nzo by and large recognize the relationship between humans and the rest of nature. Visitors to the area will have many other views which look at the relationship between humans and natural and cultural resources differently; some more holistically while others will have a very limiting view. Respect for other cultural perspectives can be a good basis for overcoming environmental and development problems.

8.2.5 Community involvement in environmental management solutions

It is crucial to understand the role played by individuals in a community in order to develop a model that instills and promotes a culture of working together in addressing environmental problems and identifying opportunities. Stakeholders have to examine:

- the relationship between education, public involvement, activism and social change
- the role of the educator in initiating and promoting voluntary action and community involvement
- expressions of environmental values through actions .
  All the factors and issues listed in section 8.2 above point towards the need to draw on the guiding principles of the CBNRM approach as a useful strategy for implementing both the capacity building and practical intervention components of the EMP / Framework

8.3 AWARENESS RAISING AND CAPACITY BUILDING APPROACHES

There are several models already in existence for environmental capacity building, some specifically developed for South Africa by experienced NGOs such as WESSA (Wildlife & Environment Society of Southern Africa) and others developed under UNEP and UNESCO. A lot of them are targeted at schools, involving both learners and teachers, while others have been designed for authorities and resource users. The district has to develop an educational and awareness model best suited to their internal needs and goals. Attempts are made here to outline possible appropriate models for best application in the context of the District.
Alfred Nzo District has to make responsible decisions and take actions to achieve better environmental performance through maintaining compliance with environmental laws and moving beyond compliance. This requires a foundation of strong awareness for informed decision making.

At present Alfred Nzo District does not have an environmental management strategy which guides the way they do business in order to ensure that all developments commissioned comply with certain specific standards. Staff with project management responsibilities should have an *environmental code of ethics* that is well known and practiced. They should know the benefits of managing the environment both for themselves and the communities they serve, be able to measure key successes, identify hurdles, allocate resources and have contacts in place should they need additional backup.

Because of its relatively small size and a high degree of homogeneity in land use patterns, Alfred Nzo has an advantage as resource allocation may not be as complex as other larger and more complex areas.

If key personnel in the district have improved environmental management capacity, there will be improved communication with the stakeholder community, resulting in better planning, operational controls and improved potential for productivity on the ground.

There is a need for environmental raising awareness among a variety of stakeholders, including the public and private sectors, and civil society, in order to sensitize them on the issues affecting the environment in the ANDM district, and what responsibilities are as individuals and as a collective to ensure that the environment is productive. The EMP aims to address, in a systematic way, key environmental and social issues related to utilization of natural and cultural resources and to promote best practices to maximize positive impacts, as well as mitigate identified negative impacts.

Building environmental management capacity for the district will enable staff, authorities and residents of all age groups to achieve sustainable development. The training thus designed should be responsive, locally relevant, functional, as well as action driven.

In compiling the capacity building concept plan for Alfred Nzo, it is important to look at the context for WHY and HOW such an activity can benefit the local economy. There are several economic activities, such as industry and manufacturing, which could possibly benefit more people, and these have to be assessed against criteria such as

- Utilising and conserving the natural landscape and resources
- Promoting and possibly enhancing the traditional culture and heritage of the area
- Targeting, involving and benefiting local people in environmental management for sustainable development

The Capacity Building programme aims to support ANDM to develop and enhance institutional and individual capabilities to effectively address environmental challenges in the district. As the tier of government responsible for development planning, monitoring and evaluation, Alfred Nzo District's capacity building activities should develop and nurture the district's capacities so that local, regional and national specific environmental programmes can be successfully implemented and sustained. This is achieved by imparting sound environmental practices in every initiative such as institution building, providing technical and substantive support in the implementation of global, regional and national environmental policies.

8.4 TARGET GROUPS AND RELEVENT TRAINING CONTENT

The capacity building activities should aim *at improving environmental awareness to enhance public participation in environmental management, and mainstreaming environmental education and training to ensure positive environmentally sustainable lifestyles among current and future generations*.

The approaches and content used must be applicable to the target groups. Excessively complicated or irrelevant content will not have the desired impact. There is also the risk of officials moving on from their positions, and the training and related institutional memory being lost to the District's asset base, and as wide a spread of officials should thus be involved in the foundational training, as outlined in section 8.4 below. Workshop length and facilitation should be 'short and sweet' to get the message across without creating boredom – most people do not find environmental issues stimulating anyway! The content needs to be relevant for people's lives and functions if it is to be real for the target groups.

Possible target groups for involvement in the capacity building and training programme include, but are not limited to:

OFFICIALS:
Mentoring e.g. water licensing process, support for understating Water Act requirements.
Understanding EIA legislation and process

COMMUNITIES:
Targeting food security, energy, health, water, biomass and alien management, etc

CONTRACTORS:
Compliance with NEMA and regulatory framework

SCHOOLS:
DEAET outreach, links with communities, involvement in events, plus EcoSchools programme via WESSA

Based on the information collected and collated from the surveys undertaken during the status quo assessment, the following capacity building requirements were outlined:

Rural	Urban	Commercial farms	ANDM & STATE STRUCTURES
• Regulatory framework • Water quality and quantity • Waste management • Sanitation practices • Environmental health • Environmental public awareness and environmental conservation promotion in community			
	Regulatory framework	Regulatory framework	Municipal environmental management systems
Soil erosion and sedimentation	control of air pollutants (indoor air quality)	Soil erosion and sedimentation	Regulatory framework
	Water quality and quantity	Water quality and quantity	Environmental health
Waste management	Waste management	Waste management	Indoor air quality
Sanitation practices	Sanitation practices	Sanitation practices	
	Environmental health	Environmental health	
Alien vegetation management	Alien vegetation management	Alien vegetation management	Alien vegetation management
	Environmental public awareness and environmental conservation promotion in community	Environmental public awareness and environmental conservation promotion in community	Environmental public awareness and environmental conservation promotion in community
Communication plan	Communication plan	Communication plan	Communication plan
Energy conservation plan	Energy conservation plan	Energy conservation plan	Energy conservation plan
Rangeland management			Auditing and monitoring plan
Corrective actions and preventative programs executive plan	Corrective actions and preventative programs executive plan	Corrective actions and preventative programs executive plan	Corrective actions and preventative programs executive plan

An implementation framework is suggested to address these needs, to be implemented in two primary appropriate and practical phases:

Phase A: as a component to be delivered within the EMP contract

a) **General environmental awareness and legislation overview** for municipal officials and ward councillors (workshop type interactions with field exposure if feasible)
b) **Legislative requirements and practical process**, focusing on the EIA procedure and water use licensing support. This would involve a workshop for Infrastructure, PMU, Municipal Manager's office and Planning & Development staff, with mentoring for specific identified staff directly involved. Contractors and consulting engineers could be included in a sub-section of this training.
c) **Development of an outreach awareness module for rural communities** including basic land rights, water pollution and conservation issues, alien plant threats, environmental authorisation thresholds, waste management and responsibilities, routes of contamination, etc.
d) **GIS technical support for Municipality's GIS technician,** through hands-on practical database input and techniques for managing and producing information.
e) **Developing capacity of relevant environmental and LED staff to continue support for item c**

Phase B: on-going long term capacity building support beyond EMP contract deliverables

a) WESSA support for the EcoSchools programme
b) CBNRM based land care education through Departmental and local agency support (public and private sector involvement)
c) Participation in Provincial Water Affairs ECWaC task team
d) Ongoing conservation and pollution education with support for DEAET regional office.

The table below outlines a proposed capacity building and training structure taking the above issues into consideration:

CONTENT	TARGET GROUP	METHODS	OUTCOME
General environmental awareness and legislation overview: resource base, water, waste, EIAs, CBNRM and landcare basics	• Ward councilors • Municipal officials with no environmental background	- Presentations, with interactive sessions in workshop format - Provision of written references	Improved understanding of environment and links with planning and economy. Ability to plan in informed manner to avoid negative resource impacts or losses.
Legislative requirements and practical processes of the EIA and water licensing systems	• Municipal officials (PMU, P&D, MMs office, Infrastructure) • Engineers • Contractors	- Workshop presentation and practical interactive sessions - Mentoring for specific staff	Understanding of legislative requirements for water and EIAs Ability to acquire, process and submit necessary licensing requirements Checklist for procedure Basic code of conduct
Development of an outreach awareness module for rural communities: waste, water conservation, pollution routes, rights, general responsibility as a citizen	• Rural residents, • urban residents • select 10 starter areas	- Workshop presentation and practical interactive sessions on site / in villages and urban settlements -	Improved understanding of environment and links with local livelihoods and economy. Ability to take action locally and at household level to address environmental problems and avoid others.
GIS technical support for Municipality's GIS technician	• IT and GIS officers and managers	One-on-one training, general workshop session, and mentoring for specific staff	User friendly GIS database to assist all directorates with planning. Ability of GIS technician/s to extract and develop relevant planning data, and update database.
Outreach by municipal staff to communities	• LED and environmental officers • Departmental officers e.g. DEAET	- Workshop presentation and practical interactive sessions on site / in villages and urban settlements Mentoring for specific staff	Ability of officers to provide basic environmental education to residents and roleplayers. Improved understanding of environment and links with local livelihoods and economy. Ability to take action locally and at household level to address environmental problems and avoid others.

8.5 SUPPORT FOR ONGOING CAPACITY BUILDING

On-going training and technical assistance to all of the identified target groups is essential to maintain the momentum and ensure that environmental awareness spreads to the wider community, and those that are already aware continue to engage in best management practices for continued growth of the environmental awareness initiative. This stage is foundational for ongoing implementation of the Framework, and needs to involve Departments, NGOs and Parastatals in providing support. This can include:

- DEAET regional and provincial offices
- SANBI
- ASGISA
- ECDC
- EC Tourism Board
- WESSA

There are also informal (non-training intervention) activities which can maintain the stage A capacity building and awareness impetus, including:

8.5.1 Participation in national programs and events at the local level

Authorities and stakeholders should promoting a culture of conservation through dedicated programs utilizing existing nationally recognized events such as

- School programs
- Water Week
- Arbour Week
- International Wetlands Day
- World Environment Day
- 20/20 Vision

8.5.2 Environmental Education and Technical Training

Long and short term training introduced should be inclusive of the community and be designed to constitute a major component of community development. Such training should be practical, relevant and directly applicable to day to day living.

The training embarked on should be linked to traditional land use practices in the rural areas. To attain success, it is important to instill an understanding that beneficiaries together with authorities need to have a unified approach incorporating the following into one unified training model:

- Conservation/preservation
- development
- research
- training and
- local participation

It would be worthwhile to introduce the concept of Sustainable Schools in the district in order to integrate sustainability education into the schools. This way, a more holistic program with measurable environmental, economic, educational and social outcomes is likely to be realised.

Environmental education develops skills, knowledge and values that promote behaviour in support of a sustainable environment. It is not confined to formal schooling. It also occurs in a wide range of non-formal education settings at work and at home. Environmental education in this broader sense is, more and more, being referred to as education for sustainability.

Stakeholders have to have forums where participants can make an input culminating in the development and implementation of a development model that will result in biodiversity conservation while emphasising on the role of education, community involvement and international cooperation.

9. IMPLEMENTATION OF THE FRAMEWORK

The EMP / Framework has two key stages:

- **Acceptance**: endorsement from stakeholders and authorities of the overall strategy
- **Action:** facilitation by a responsible agency or driver to make the planned interventions and ongoing capacity building happen

It is suggested that an implementing agency be formed to guide the action stage, in order to drive and monitor the actions outlined in the framework (section 7). Effective implementation and management has serious governance requirements, some of which are outlined below.

9.1 GOVERNANCE ISSUES IN LAND AND RESOURCE MANAGEMENT AT LOCAL LEVELS

Land ownership and user rights in the traditional rural areas of Alfred Nzo, like the rest of South Africa, are intricately connected to the plethora of laws that govern the different resources and uses. There is a general perception, which reflects as the truth based on observable results, that land and associated resources traditionally under the local communities as common property resources are mismanaged because of the lack of clarity of custodianship. The state control of land, water resources, forestry and protected areas based on law is not proportionately matched with management resources on the ground to ensure that the resources are sustainably utilized by the communities resident in areas where the resources are found. Policy and legislation that does not recognize the local systems of resource management have a limited chance of success as it will be understood by only a few.
On the one hand the indigenous systems of resource management have broken down and there is general apathy in the way resources are utilized, on the other the higher echelons in the governance structures put a claim on the resources mainly when there is a spotlight on them either as a result of a major transgression or a major disaster that needs to be addressed. The national institutional arrangements that have to be implemented at local levels have a strong separation between the land, water and tree tenure arrangements, an issue which causes confusion at local levels and affects development planning.

Actions

- There is need to build the capacity of the local and traditional institutions in order to give them legitimacy and formal recognition in governance and management of the resources that are the basis for their livelihoods.
- A process to reconcile and bring together the important aspects of the different pieces of legislation to make them applicable for small areas such as the Alfred Nzo District is necessary. Simpler and clearer guidelines are more likely to attract the attention of the local people than the lengthy and complicated national laws.
- Formalization of local authority administration of natural resources to ensure informed participation at the local levels.
- Development of a mechanism of resource administration and enforcement that combines local monitoring, district control and national law implementation. These should have appeal processes built into them that will also utilize the agreed and recognized local structures. If final authority is vested in the local structures, decisions may be taken relatively easily.
- Wider application of laws to regulate the use of natural resources at local levels
- Monitoring and evaluation

The principles outlined in section 3 should provide the basis for guiding the establishment of driving agencies and institutions, incorporating local and existing structures as far as possible, and integrating CBNRM approaches wherever possible to encourage ownership and sustainability of long term resource management interventions.

9.2 RESOURCING

Once the project intervention framework (section 7) is endorsed as part of the IDP, it can be costed and budgeted in more detail, with proposed implementation strategies.

10. CONCLUSIONS

The main messages coming out of this framework include:

1) The economy of the ANDM is strongly linked to the state of the environment because of the high proportion of rural population. Tourism is an obvious focal point as an economic activity linked to the use of an attractive environment.
2) The current trend of state of environment is negative and the situation will only get worse if there is no concerted intervention by determined leadership.
3) The key to successful implementation is going to be identifying and developing strong local leaders.
4) In the 5-year time frame, it is unlikely that a lot of progress will be made regarding the bigger issues, but rather there may be opportunity to reduce the slide into despair. We must keep very realistic about raising expectations.
5) The issues of plant biomass, biodiversity, soil erosion, reduced livestock production and alien plant infestation are all much linked in terms of the underlying problems (too many animals and too little control on where and how they are grazed). Solutions to these cannot be tackled in isolation and there must be an integrated range management approach to the open grasslands.
6) The range problems are primarily manifesting on the communally grazed lands and not the private commercial lands. The implementation should thus focus on the former.
7) One of the broader recommendations is that of a 4-5 person extension service that focuses on all the land management issues (water, soil, plant), hence bringing together the efforts of several departments (agric, forestry, water affairs, etc). This approach may bypass the massive inertia of many governmental departments all trying to work in an area and all doing nothing.
8) There is a good chance that implementation fails because of the scale of the problem and the district. In the 5-year time frame the district should focus on key areas where there is a high chance of success. This will include areas:
    a. That are vulnerable (e.g. communities dependent on the natural water supply, which is threatened by alien plant infestations).
    b. Those are within one of the 24 priority biodiversity areas (as per map).
    c. Where is a willingness to cooperate within the community that is linked to strong leadership?

ANDM, through implementation of the integrated EMP / Framework, needs to promote sustainable environmental management that will contribute to the improvement of the livelihoods of people *without* compromising the functioning of the different environmental components. The EMP capacity building process should enhance the understanding of how the environment works and how its management, good or bad, relates directly to the productivity of the land and to addressing social and economic issues that affect the day to day life of the resident population of the district. There is a tendency to take for granted that resources such as water, soil, the different plants and animals will always be there, and not to examine the activities and programs including those legally sanctioned and how they affect the people's ability to make a living on the land now and into the future.

Environment and development are frequently in conflict as there are often no immediate tangible benefits that can be derived directly from conservation and contribute to the upliftment of residents at household level. Natural resources are a source of food and survival and there are contradictions encountered as communities express the desire to utilize the resources and conservation authorities express the need for conservation. A balance therefore has to be sought that seeks to carry out conservation with full participation of the surrounding communities.

Environmental management should be an integral consideration in Alfred Nzo development planning if long term solutions in the management of natural resources, human health, economic growth, energy, transportation, agriculture, industrial development and international trade are being sought. The current accelerated degradation HAS to be slowed, halted and reversed if meaningful and sustainable development are to become a reality in the District.

11. BUDGET FOR IMPLEMENTATION OF THE ENVIRONMENTAL MANAGEMENT PLAN

The EMP has identified five priority issues that need to be included in the budgets and future integrated planning for the Alfred Nzo District. These are

- Soil erosion - loss of topsoil & fertility, siltation of rivers,
- Uncontrolled alien plant infestation,
- Loss of grassland ground cover and biodiversity, and
- Addressing climate change induced extreme events.

Other issues that have been identified such as addressing water quality and waste management have not been included in this budget because separate processes are presently taking place in the district to cater for them.

Budgeting for environmental interventions and application of mitigation measures to enhance positive impacts for the district is an investment in the future as it will greatly reduce the environmental liability at local, regional, national and even international levels. The end result of this budget that is, clean air, clean water, productive soils, healthy livestock, knowledgeable communities and overall improvement in the quality of life of the residents should be seen as an investment in the future of the district, which if implemented properly, will be repaid may times over through reduced long-term operating costs of implementing community development.

Details on the issues, causes, and the necessary remedial measures have been covered in the main report. This section will highlight the necessary actions and associated costs for the next five years.

11.1 ISSUE 1: SOIL EROSION - LOSS OF TOPSOIL & FERTILITY, SILTATION OF RIVERS

Action	Budget	Implementing agency
Initiate and maintain a 5 yr extension programme within the ANDM to promote best-practice range management and catchment protection, including conservation farming, rangeland management and CBRNM extension to the various projects and communities. This is a cross-cutting action for all issues.	R5 M.	ANDM, Agriculture
Implement an educational programme addressing issues as identified in the Implementation Manual for the different target groups.	R2 M.	ANDM, DAEAT, Education
Where practical and important (e.g. near rivers that are used for potable water), implement reclamation projects to stabilise and reclaim erosion gullies.	R1.8 M	ANDM, Agriculture
Diligent monitoring of implementation of environmental assessment recommendations		DAEAT

11.2 ISSUE 2 :UNCONTROLLED ALIEN PLANT INFESTATION

Action	Budget	Implementing agency
Produce a detailed and spatially-explicit alien plant intervention plan for the district.	R800 K	ANDM,
Conduct feasibility and business plan studies on infestations that appear to be economic opportunities for charcoal, plantations, etc.	R520K	ANDM, DAFF, DWA
Reduce the area of alien tree infestation in the District by 20% focusing on priority areas identified in the intervention plan. Partner with WfW for budget.		ANDM, DAFF, DWA

11.3 ISSUE 3 :LOSS OF GRASSLAND GROUND COVER AND BIODIVERSITY

Action	Budget	Implementing agency
Identify areas where there is leadership control to implement good range management practices and where there is a reasonable chance of reversing the trend. Use extension staff and budget.	R600K	ANDM
Use extension officers to interact with those communities to develop sound range management practices that promote rotation, rest and good fire practice. Use extension staff and budget.		
Partnership with EC Parks and DEAET to formally protect key areas through stewardship or other mechanisms within the priority biodiversity areas.		

11.4 ISSUE 4 :CLIMATE CHANGE INDUCED EXTREME EVENTS

Action	Budget	Implementing agency
Establish a team to provide conservation farming, rangeland management and CBRNM extension to the various projects and communities. Use extension staff and budget.		ANDM
Conduct an assessment to identify which communities (people) and habitats and species are most vulnerable to climate change and how can their vulnerability be reduced.	R800K	ANDM
Monitor roads and bridges to ensure proper designs for minimum 1:50 year flood events, and construction according to specification.	R1M	ANDM
Manage burning and provide education improve range land management to increase ground cover, biodiversity and resilience to extreme weather events.	R800K	ANDM
More protection for existing water resources (wetlands, dams, springs and rivers) to support their natural function and resilience. Partner with Working for Wetlands.	R1.8M	ANDM, DEAET
Improve quality of sewage systems through appropriate design, location, monitoring, maintenance and upgrading to prevent floodwater infiltration and consequent damage and contamination		ANDM
Improved management of surface run-off through appropriate drainage design to reduce storm water damage and impacts on outfall areas e.g. rivers adjacent		ANDM

to towns becoming filled with solid waste after storms from run-off, and side drains becoming incised from storm run-off.		
Increase public awareness about the need for resilient landscapes and infrastructure design, and possible alternative agricultural production strategies.	R500K	ANDM