INTRODUCTION

The EMP implementation Manual has been produced to serve the purpose of informing communities and governance bodies especially on what the main environmental issues that need to be addressed in the Alfred NZO District are. This direction was chosen instead of traditional executive summary as the manual can also be used as a tool to educate the general public about the environment and its management. It is important that all users read the manual with the aim to implement the recommended steps as individuals and communities, and capture both the lessons learnt and the changes observed. The expectation is that the communities of Alfred Nzo District will take charge and be positive change they would like to see.

For those who have the interest in the EMP, the full report has been produced and it is available. This report has been widely consulted and the final is a culmination of several meetings with PSC constituted by representatives of key Department at the different tiers of government. Several communities representing rural, urban and commercial farm dwellers were also consulted so that as full a spectrum of issues as possible is included in the EMP

If the recommendations of the EMP are implemented, there is no reason why the degradation in Alfred Nzo cannot be defeated. The EMP should be treated as a living document which can hopefully be modified to accommodate the positive changes that will take places as the Alfred Nzo community proudly takes charge and manages the environment for better

Implementation of Environmental Management in Alfred Nzo

What is environment?

The surroundings of, and influences on our lives, our well being, our very existence and the resources for meeting our needs on the day to day basis. The rivers, animals, soil, plants and humans are all part of the environment.

What is environmental management?

Environmental management involves the management of all components of the bio-physical environment, both living and non-living. How human beings relate with, use and maintain the environment for social, cultural and economic purposes will determine the quality of the environment.

Take care of your environment, make it work for you.

Why is the environment important to you?

The environment is our life-support system. As human beings, the earth, our home, is our environment. It is where we live, breathe, eat, and raise our children.

The environment provides problem-solving raw materials for shelter, it creates our food and medicines.

What are the results of environmental mismanagement?

Not taking good care of our environment can have many devastating consequences to or lives and the future of our children and our planet earth. Some of the well known consequences include:

- loss of water resources,
- loss of productive potential of the land which will negatively affect our ability to produce food,
- the increase in incidences of incurable diseases,
- loss of job opportunities associated with natural resources
- loss of grazing and therefore ability to maintain livestock
- loss of our cultural identity

Always remember: Isizwe esingawagcini nesingawahloniphi amasiko aso siyatshabalala

Why do we need a good environment?

- It provides basic needs for the people and the animals such as food, water and clean air,
- It creates employment especially in rural areas such as Alfred Nzo District where people still rely heavily on goods and services that come from the land,
- Economic growth in a good healthy environment can be used to attract tourists and create jobs,

- Improved quality of life: a clean environment is a healthy environment. People who live in a healthy environment are also healthy
- It is pleasing to the eye so we can all be tourists at home!

What does the law say about the environment?

Know the law, make it work for you!

- Umgaqo siseko/Molao-Theo (Constitution): Everyone has the right to an environment that is not harmful to health or well-being. Government must act reasonably in order to protect the environment by preventing pollution, promoting conservation and sustainable development, while building the economy and society.

- National Environmental Management Act (Act No. 107 of 1998): provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

- Conservation of Agricultural Resources Act (Act No. 43 of 1983): Provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

- Mountain Catchment Areas Act (Act No. 63 of 1976): Recognizes mountain catchments as sensitive areas and makes provision for their conservation. This is especially important for Alfred Nzo as the District still possesses some of the most pristine mountain resources.

- National Water Act (Act No. 36 of 1998): Application of this legislation will ensure that Alfred Nzo optimizes utilization of the water resources in the District and fulfils its mandate as the Water Service Authority .

- National Forests Act (Act 84 of 1998): Sustainable management of the ANDM forest resource can be realized and equity achieved through application of this Act with the development of criteria, indicators and standards as per provisions of the Act.

- Minerals Act (Act No. 50 of 1991): Concerns that have been repeatedly raised of late will be addressed as application of this piece of legislation regulates prospecting and exploitation, and also regulates utilization and rehabilitation of land during and after prospecting and mining operations.

Desired state of the environment

- *Deep fertile soil that produce enough food for our families*
- *Enough good quality water to meet all our needs and the needs of our livestock and other creatures that live in our area,*
- *Managed "dywabasile" (wattle) so that it does not spread to other areas and destroy the remainder of our lands*
- *Stopping any further soil erosion and destruction of our lands*
- *Enough fuel for all and energy to meet our daily needs*
- *No more wildfires that cause destruction to trees, grazing and even our homes*
- *Safe well built houses*
- *Clean air*
- *Lots of grazing for livestock*
- *Proper sanitation facilities*
- *No garbage on our streets*
- *Healthy children*

Environmental issues that need to be addressed in Alfred Nzo

Water quality and quantity

Is our water clean enough and is it enough to meet all our needs?

Even though there are many rivers and streams, the water is not clean enough to drink except if it is purified and it comes from a tap.

Water is the basis and essential of all life and that includes your body. One can go quite a few days without food, but no one lasts longer than 3 to 5 days without water.

Where do we get water from?

We have many sources of water including springs, wetlands, rivers, dams and lakes. Even with all these sources, we still do not have enough water close to where we need it as it has to be collected, cleaned and piped before we can use it. It is becoming more and more expensive to provide clean and enough water for our people because the quality of our environment has deteriorated so much. Our streams and rivers are polluted, the wetlands are drying up and the dams are getting silted, all because we are not doing enough to maintain the source of this precious resource.

What do we need plenty of water, and good quality water for?

Water is life, we need enough of it everyday. We need water for drinking, cooking, cleaning our homes, washing our selves and clothes, watering our livestock and for building our homes.

What causes water shortages?

There are many reasons why we end up with water shortages even though our streams are still flowing. The main reasons for water shortages in Alfred Nzo District include:

- The abuse of our wetlands, the main water source through grazing, drainage and burning,
- Infestation of streams and grasslands by alien plant which take up a lot of water,
- Illegal practices such as mining sand in areas with no permits, a practice that causes a lot of pollution,
- Loss of groundcover and good grasslands because of lack of control of livestock

What can we do to save water?

- Protect our wetlands,
- We can recycle water for uses such as building and watering gardens because they do not need purified clean water,
- Educate our children and our communities on water conservation practices that they can implement in their homes,
- Informed participation by local communities in the control of infestation by alien vegetation which takes up too much water,
- Water management by the Water Service Authority,
- Protect groundcover and good grassland, and implement soil and water conservation measures,
- Stop illegal water use and have all water uses registered.

Water pollution

Water pollution is the contamination of water bodies (e.g. lakes, rivers, oceans, groundwater), the degradation of a body of water by a substance or condition to such a degree that the water fails to meet specified standards or cannot be used for a specific purpose. Poorer water quality means water pollution

What causes water pollution?

- Poor waste management practices resulting in waste matter getting into the streams and rivers
- Dip tanks located close to water sources
- Washing clothes in the streams and rivers. Soap and laundry detergents contain chemicals that are not for human consumption
- Agric chemicals such as fertilizers and pesticides either go into the ground water through the soil, or flow into the rivers due to soil erosion
- Poor sanitation practices especially where people use the veld for ablutions
- Unmanaged or poorly managed sewage systems that allow sewage to overflow onto the streets, into runoff water and go into the rivers
- Soil erosion resulting from poor land management practices
- Overgrazing by unmanaged and uncontrolled livestock which leaves the soil bare and easily eroded by wind and water
- Litter loads from poorly planned and unmanaged developments

Possible consequences of using polluted water for home consumption

- Diarrhoea diseases especially in children
- Cholera
- Skin diseases
- Dying of organisms living in water (fish, water plants, frogs), causing imbalances in our ecosystem functioning

How can we keep our water clean?

The population of Alfred Nzo is growing steadily therefore, water needs to be conserved and prevent from pollution in order to make it safe for drinking and other consumption process. Reducing the amount of water use can help conserve water as well as save money. Prevention of water pollution includes using eco-friendly household products such as non-phosphate or low-phosphate detergents and other toiletries, improving housekeeping, turning off the water tap when not needed, disposing the household wastes in proper sites far off from the water sources. Planting more trees can also prevent water pollution by reducing soil erosion and water runoff. Educating people about water pollution is an important way of preventing water pollution.

- Do not throw water back to the river after washing our clothes
- Have proper toilets so that we will not use veld and bushes
- Educate our children not to play with water
- Monitor our livestock not to drink same place were we collect our water
- Stop throwing waste close to the place were we collect water
- Fencing of grazing land to control movement of livestock
- Soil conservation programs
- Veld fire management
- Assessment of dipping facilities and moving those determined to be dangerously close o water

Soil erosion

At the present rate of soil erosion in Alfred Nzo, our ability to feed ourselves and our families will continue to deteriorate

Why do we have so much soil erosion in Alfred Nzo

Major causes of soil erosion

- Removal of vegetation because of poor range management practices.
- Poor farming methods including grazing of crop residues and tillage methods
- Veld fires
- Poor road construction and lack of maintenance

What are the consequences of soil erosion?

- Erosion causes economic loss and hardship because of crop destruction and reduced agricultural productivity
- Erosion also leads to shortened investment life of water-management infrastructures,
- Where there is uncontrolled erosion, there is greater flood frequency caused by sedimentation in rivers and streams, and reduced capability of soils to absorb water
- Sediments clog drainage ditches and stream channels,
- silt in reservoirs covers fish spawning grounds and reduce downstream water quality
- Pesticides and fertilizers, frequently transported along with the eroding soil can contaminate or pollute downstream water sources and recreational areas thus negatively affecting tourism as an economic strategy.
- Loss productive of agricultural land, hence loss of production
- destruction of public infrastructure

Why do we need to conserve soil and prevent erosion?

- Soil acts as a filter, cleaning air and water and we want clean air and clean water to stay healthy
- Much of the food we eat, directly, either grows in soil, or indirectly, comes from animals that eat plants, or from animals that eat other animals that eat plants. Plants that are used as herbs also grow in soil. They are used to make medicines, which help us cure sickness. Likewise, it is also the home to billions of organisms and microorganisms, which also help us make antibiotics.
- It exchanges gases with the atmosphere and thus influences the global climate
- Soil receives organic wastes and recycles their nutrients back to plants; it also holds and breaks down some toxic wastes

Soil is very important for our livelihoods, so we have to take action to conserve and manage it. There is a way if we chose to conserve this valuable resource

Methods of soil conservation

- **Development of a land use management strategy**

This should include the production of grazing plans, regressing of degraded areas, decisions on the structural measures required, livestock management, community awareness and education, involvement of youth in soil conservation projects, and decisions on alternative land use.

- **Plant trees and maintain grass cover**

Trees and grass hold the soil. Their roots hold on to the soil and help prevent erosion. The plants also help being a vegetative cover and are a wind barrier.

- **Terraces**

If cultivation takes place in hilly areas, terracing will prevent run-off and slow the washing down of soil.

- **No-till or minimum tillage farming:**

In this type of farming crops are grown with minimum disturbance through tillage. This way the land is rested and allowed to recover, with the soil maintaining high moisture and building up its organic matter which is good for crop production

- **Contour ploughing:**

This farming method of ploughing across the contour lines of a slope takes into account factors like slope gradient and soil elevation across the slope.

This method helps in slowing the water runoff and prevents the soil from being washed away, and helps in the percolation of water into the soil.

- **Crop rotation**

This method employs growing of dissimilar crops in rotation in a sequential manner. Some plant diseases tend to build up in soil if the same crops are cultivated on the same piece of land year after year. Lack of crop rotation also leads to an imbalance in the fertility demands of the soil. Crop rotation also helps in the improvement of soil structure and fertility.

- **Soil organisms**

One of the methods of soil conservation is with the help of soil organisms like earthworms. Earthworms, through aeration of soil, enhance the availability of nutrients in the soil. They also enhance the porosity of soil so that it can absorb more water. Good soil organisms such as earthworms should not be confused with crop pests, so it is important for us to learn the differences between the good and the bad organisms in our soil.

- **Planting indigenous crops**

Planting of native crops is known to be beneficial for soil conservation. Non-native plants are known to take up more water and nutrients, which dries up the soil and leaves it infertile.

Go indigenous, save water, conserve soil

Infestation by alien vegetation

Invasive alien plants are a big threat to water security, ecological functioning of natural systems, and are taking more and more land out of production every year. They are causing billions of Rand in damage to South Africa's economy every year.

Invasive alien plants are plants that have been brought to South Africa from other countries for their beauty, economic value or ecological purpose. Some are brought in unintentionally and here, without their natural enemies, are able to reproduce and spread prolifically. The invader plants and seeds spread rapidly and take up the growing space of our own indigenous plants. Invasive alien plants threaten the indigenous vegetation as they use up valuable and limited water resources. Most of them drink more water than indigenous plants and are depleting the valuable underground water resources. Many invasive plants are also responsible for causing exceptionally hot fires and affects the makeup of soil structure.

What causes Alien infestation?

- Alien plants are very aggressive in the way they grow and tend to overwhelm natural habitats of the indigenous vegetation.
- Alien vegetation does not necessarily have natural enemies in the new environment and will likely spread very fast if not controlled.
- They may find the growing conditions more favourable than where they originally came from, which makes them thrive and spread very rapidly.
- Overuse and lack of management of the indigenous vegetation such as overgrazing gives way for the alien vegetation to spread easily into new areas.

- Daily movement of animals between kraals and grazing areas which aids dispersal of seeds into different and sometimes already damaged areas.
- Poor weed control within existing plantations.
- Absence of alien plant control in most areas and even where it is taking place, poor or no follow up to monitor re-growth and address it on time.

Why is (black) wattle in particular a problem?

The black wattle is very common in the Alfred Nzo District and is found on all landscape types. The plant has ability to produce large numbers of long lived seeds which germinate in large numbers and shade other plants out of the landscapes. It also competes aggressively for water and therefore has ability to crowd out grass communities to the detriment of the grazing industry and wildlife. Wattle where it is found has replaced indigenous vegetation and caused loss of biological diversity through permanent changes to habitats.

Impacts of wattle where it has overrun landscapes include:

- Reduction in the amount of suitable habitat for rare species,
- Loss of indigenous vegetation,
- Loss of grazing land,
- Depletion of soil moisture thus reducing groundwater recharge and reduction in water flow in rivers and streams,
- Destruction of soil structure thus making it more vulnerable to erosion,
- Reduction of the productivity of rangelands
- Reduction of opportunity for fishing and hunting, hence reduction in recreation activities for the local people and potential visitors (tourists),
- Limit to land availability for production activities , and
- Reduction in animal and plant diversity

How can wattle be managed?

- Wattle can be a menace or a resource depending on how it is managed. Where it is considered likely to cause harm, or already causing ecological and possibly economic harm, the wattle should be removed completely to allow other more desirable vegetation types to re-grow. .
- Since wattle is also a wood source for the local communities and also has important other products used in industry, it can be turned into properly managed forest plantations provided there are resources and capacity to carry out the management.
- Integrated wattle management programmes such as the Working for Water Programme should be enhanced with capacity building of the local population to enable them understand full benefits for themselves as they participate.

- Value adding and turning the wattle into products such as charcoal has potential to contribute to economic growth locally and provide easy access to the charcoal as an alternative energy source.
- Follow up from any infestation clearing is a very important step in preventing any re-infestation. That is why it is important for the local people to educate themselves on the habits of the wattle tree and be always ahead in managing it.

Conservation of biodiversity in Alfred Nzo

We have to reverse the trend of biodiversity loss in our District for future generations to enjoy the benefits that come with rich biodiversity. So many plants and animals essential to quality living are disappearing and it is up to us to restore our environment and avoid the crises associated with extinctions.

What is biodiversity?

BIODIVERSITY is the sum total of all living things on earth, from genes to species to entire ecosystems. In order to conserve biodiversity we need to look after all its components. These include functioning natural habitats, the species that occur in these habitats, and the ecological interactions between species and their environments.

Why do we need biodiversity?

Humans live in the environment and in many instances rely heavily on the environment for their livelihoods. Clean air, fresh water for drinking and irrigation, healthy soil for farming, intact grasslands for grazing and many other natural services are very important to sustain people, both urban and rural. Without these functioning natural systems in place, the population of an area will either be forced to move, or will sink further into poverty as their livelihood shrinks. In such cases, governmental authorities will be required to support these communities, supplying them with the basics for life including water and food.

Why is biodiversity important to you?

OFFICIALS:

The district authorities have a legal mandate to make decisions that defend the environment and meet the constitutional right for all people to have a safe and clean environment. As governmental accountability increases, so district municipal authorities will increasingly be held accountable for the decisions and actions they have taken.

If there is a collapse of the natural ecosystem services provided by the environment (clean air, water, soil, flood attenuation, etc), then the dispossessed people within the community will look to the municipal officials to supply these services through expensive reticulation and other bulk supply projects. Furthermore, as people become more and more vulnerable to natural disasters (floods, droughts, heat and cold waves), they will look to the municipality for help. This will very difficult to provide and will led to general unhappiness and even unrest as communities become discontent with service delivery.

COMMUNITIES:

Rural and peri-urban communities rely heavily on biodiversity and natural ecosystem services provided by the environment (clean air, water, soil, flood attenuation, grazing, etc). In many instances the environment provides unseen services that are only recognised when they fail because of degradation. In times of financial difficulty, many people increasingly rely on the environment for their livelihood, which buffers them from abject poverty.

SCHOOLS:

Environmental management education should be in the mainstream of schools' programmes so that children understand the issues and are prepared to address them.

Let us use opportunities available to us such as the DEAET environmental outreach programme to benefit school children

Involve the young people in events such as Water Week, World Wetlands Day, Arbour Week and ensure that their participation bears fruit beyond the few days in a year.

What is causing destruction of our biodiversity?

There are many reasons for biodiversity loss and ecosystem failure. They are almost all linked to people using the land in ways that are unsustainable and that result in degradation. The root causes are generally related to social issues such as breakdown of local leadership, that result in people doing whatever they want to do, which is never a good thing.

How can we stop the destruction?

The ANDM has the responsibility of leading the way in terms of changing the way in which the environment is viewed. The degradation can only be halted by changing the way in which people are living their lives. This will require a multi-faceted approach to change the way in which decisions are taken about landuse (municipal IDPs and SDFs) and the way in which people use the land (land use management principles for arable and rangeland landuses).

What are your responsibilities as a responsible member of society?

We need to have a sustainable lifestyle that does not consume too many resources. Each of our actions needs to be assessed according to what impact it has on the environment.

What is the desired state?

In the context of ANDM, where there already has been considerable degradation of the environment, the desired state will be a halting of further degradation and then at least a restoration of ecosystem functioning for those areas that have been degraded. This will be done by re-vegetating the exposed areas.

Major actions required

Extension services

- Establishment of 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.
- Use extension officers to interact with those communities to develop sound range management practices that promote rotation, rest and good fire practice.
- Identify areas where there is leadership control to implement good range management practices and where there is a reasonable chance of reversing the trend.

Establishment of formally protected areas for biodiversity conservation

In partnership with EC Parks and DAEAET, Alfred Nzo should identify and formally protect key areas through stewardship or other mechanisms within the priority biodiversity areas.

CLIMATE CHANGE

Climate change is a global phenomenon that is affecting people and the environment. Alfred Nzo District is a small contributor but will be a major victim due to the vulnerability of the degraded landscapes.

What we should be concerned with are the human induced drivers of climate because they can be addressed to minimize their impacts on human communities and physical and biological systems.

How can we tell that climate change is happening?

- Air temperature especially night time minimum temperatures have increased and are continuing to do so.
- Weather patterns are becoming more and more unpredictable.
- Extreme heat events have become more frequent..
- There are more frequent wildfires whose source cannot be determined by conventional methods.

These changes are affecting our ability to produce food, manage disease and take care of the land.

What causes climate change?

- Human induced contributors to climate change such as removal of vegetation cover especially on a large scale such as clearing of a forests influence biological, physical, chemical and energy exchange processes that affect climate at local, regional and global scales.

- Addition of greenhouse gases into the atmosphere from industries, power generation and emissions from vehicles contribute to the basket of pollutants that are responsible for climate change.
- Physical modification of landscapes from rural to urban development replaces vegetation with hard surfaces such as roads and pavements, which affect the distribution and retention of heat and moisture.
- Waste treatment and disposal waste incineration, landfills and waste water treatment works.
- Agriculture including crop residue burning, fertiliser and pesticide application are also contributors.

Most often, mitigations involve reductions in the concentrations of greenhouse gases, either by reducing their sources or by increasing their sinks.

What are the impacts of climate change?

- Increased incidence of infectious diseases and respiratory diseases due to increased surface temperature.
- The likely occurrence of epidemics of infectious diseases are related to changes in the distribution of diseases carriers and to reduce cellular immunity in humans as the result of ultraviolet
- Increased incidence of skin cancer , eye diseases due to exposure to higher ultraviolet radiation levels
- Water quality deterioration may cause water related diseases like cholera
- Water scarcity the most significant impacts of climate change on water resources are the potential changes in the intensity and seasonality of rainfall. While some regions may receive more
- Extreme weather events
- A change in vegetation zone
- Poor crop yield

What can we do to mitigate climate change?

- Reducing emission of greenhouse gases
- Sustainable and proper management planning
- Identify areas prone to these natural disasters and limit further development
- Wetlands and grasslands must be protected
- Roads and bridges must be properly designed
- Manage burning and improve rangelands
- More protection on existing water resources
- Improve quality of sewage systems
- Proper disaster management
- Increase public awareness
- Waste management