Namibia: Environmental degradation and the future.

by Alan Marsh
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INTRODUCTION

Namibia has a variety of natural resources (see Box 1) that form the basis of her wealth. Some of our most important natural resources include large numbers of marine fishes, attractive scenery and wildlife, vast grasslands and woodlands and precious minerals such as diamonds and uranium. Our agricultural activities, the tourist, mining and fishing industries and our subsistence economy all depend on these natural resources and how we use and look after them. In the past, many of our natural resources were badly damaged and abused, which has made the reconstruction of independent Namibia more difficult. Nevertheless, with the resources that exist, there is no reason why our relatively small population should not enjoy a good standard of living that meets all our basic requirements. Many Namibians, however, live in situations that are unhygienic, with inadequate food, clean water and shelter and with poor educational and employment prospects. The need for good development programmes in Namibia is great.
NATURAL RESOURCES

A natural resource is any product of nature that people can use to support their way of life. Plants that provide us with food, grazing for our livestock, building materials, medicines and fuel are natural resources. The soil and water we use for growing our crops are natural resources. Wildlife and fish that we can hunt, catch and enjoy, and that tourists pay to see are natural resources. Scenery is a natural resource greatly valued by tourists.

NON-RENEWABLE NATURAL RESOURCES

Non-living resources cannot grow and reproduce and are called non-renewable natural resources. These resources cannot replace themselves, nor can they last forever if exploited. Examples of non-renewable resources are diamonds and uranium.

RENEWABLE NATURAL RESOURCES

Living natural resources can grow and reproduce. They can be exploited forever provided, that the numbers of individuals removed are replaced through growth and reproduction.
THE TURNING-POINT

Namibia has reached a turning-point in her history. For the first time in more than one hundred years, Namibians are in a position to decide how their country should be developed. The decisions that are made now will affect the well-being of Namibians forever. Good development programmes will make use of our natural resources in ways that ensure the sustainability (see Box 2) of our renewable resources and at the same time achieve the maximum long-term benefit from exploiting our non-renewable resources.

Such programmes will strike a balance between protecting the environment and meeting the needs of the people.

The Constituent Assembly paved the way for the wise use of our resources when it drafted Articles 91 and 95 of the Constitution (see Box 3). It remains for the government to draw up adequate legislation and for individuals to act responsibly to solve some of our urgent environmental problems, to ensure a bright future for all. Responsible action depends upon an understanding of our environment and its recent history.

SUSTAINABILITY

Sustainability refers to a process that can last forever. To harvest a resource in a sustainable way means that the resource will not be destroyed by the harvesting. Controlled harvesting is essential for sustainable development. The amount of a resource that can be harvested in a sustainable way depends upon how fast the resource is being replaced through growth and reproduction. The maximum sustainable yield of any plant or animal population is the maximum number that can be harvested regularly without destroying the population. The maximum sustainable yield can be regarded as "interest" that is obtained when we look after our "capital" carefully.

Two ways of harvesting a renewable natural resource. The one gives you a modest catch forever, the other very large catches for a short period and thereafter very small catches or none at all.
OUR ENVIRONMENTAL HERITAGE

The most urgent environmental problems in Namibia are deforestation, (the loss of valuable woody species) bush encroachment, (the increase of undesirable woody species) soil erosion, excessive use of ground water and the decline of fish stocks. These problems threaten to destroy our economy and prosperity. None of these problems was evident fifty years ago. The environment has deteriorated because of overstocking, ignorance, greed and rapid population growth. In many cases these factors are interrelated, and so cannot be addressed as separate issues.

Bush Encroachment

Bush encroachment is common in the woodland savannah ecosystems, which are important cattle-ranching areas. Under natural conditions these regions have a good grass cover with scattered trees and shrubs, and support a wide range of wild animals. Wildlife tends to feed intensively in localized sites before moving away to other sites. In this way the plants experience brief but intensive feeding pressure and long recovery periods. Browsing (leaf eating) and grazing (grass eating) wildlife and regular fires maintain a balance between the natural bush species and the grasses. Large animals, such as elephant and rhinoceros, also help by trampling and pushing over trees and shrubs. When people interfere by preventing fires and replacing the wildlife with large numbers of grazers such as cattle, the delicate balance between the grasses and the bushes is tilted in favour of the bush species.

Furthermore, when the livestock is restricted to a relatively small area, e.g. a fenced-off camp, that land experiences continuous grazing and trampling pressure, so there is little time when seeding and regrowth of grasses can take place without animal interference. Approximately ten million hectares of Namibia (12% of the land) has already been encroached upon by bush. In some places the bush is so dense that cattle and people can hardly penetrate it.

Natural Situation
(In Balance)

Gains:
New growth of bush
Losses:
Regular fires,
Many browsers of bush

Interfering with nature by preventing fires, killing wildlife and introducing grazing livestock to fenced off areas enables undesirable bush to increase at the expense of grass.

Poorly Managed
(Out of Balance)

Gains:
New growth of bush
Losses:
Occasional fires,
Fewer browsers of bush
Overstocking aggravates bush encroachment through overgrazing, which reduces grass cover. A decrease in grass cover exposes the soil to increased wind and water erosion. As topsoil is washed or blown away, it tends to collect at the base of bushes. These areas become more fertile than areas between bushes and this promotes expansion and reproduction of the bush. Increased runoff of water also results in less ground water near the surface. This benefits bushes, which have longer roots than grasses. Gradually the land becomes less fertile for agriculture. Usually, to stave off financial ruin, the farmers do not reduce their livestock, so the remaining grass is expected to support the same number of animals as before.

This speeds up the process of degradation.

**What can be done about bush encroachment?** It is difficult, if not impossible, to reverse bush encroachment. Good management practices can ensure that further valuable land is not lost to bushes. An important step is to make sure that overstocking does not take place and that by rotational grazing, the veld is rested adequately. Overstocking usually occurs when farmers fail to reduce stock numbers during the regular dry spells that occur in Namibia. Instead, they continue to carry stock numbers that are suited to the infrequent wet and unusually productive periods. Regular, managed burning of the veld would also retard bush encroachment and encourage the new growth of grasses. In the heavily-encroached areas, to suit the changes in the environment, we may have to change our way of making a livelihood to suit the changes in the environment. A shift from grazing livestock, such as cattle, to browsing livestock, such as goats, and browsing wildlife may be sensible. It may also be rational to harvest the wood for fuel. However, many of the bush encroached areas are situated where few people live. For the wood to help solve the domestic energy crisis in northern Namibia and in cities, it would have to be transported over long distances. A more cost-effective approach could involve converting the wood to charcoal, which has twice as much energy per kilogram as wood.

Common bush encroaching species in Namibia

**Acacia mellifera**  
(Black thorn)

**Dichrostachys cinerea**  
(Sickle bush)

*Illustrations by A. Marais*
Badly bush encroached area near Okahandja; no longer suitable for cattle farming.

Overstocking is common on smallholdings near Windhoek. Badly overgrazed land can be seen on right side of fence. No cattle were kept on left side.

Gilblaar in Bushmanland; cattle farming is not viable where gilblaar is common.

Attempts to control bush encroachment with herbicides have been very expensive and relatively unsuccessful.
EXCERPTS FROM NAMIBIA'S CONSTITUTION

ARTICLE 95

"The State shall actively promote and maintain the welfare of the people by adopting ... policies aimed at ..., the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future ..."

ARTICLE 91

"The functions of the Ombudsman ... shall include ..., the duty to investigate complaints concerning the overutilization of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia."

Although it is the Ombudsman's duty to investigate environmental complaints, it is up to the people to bring such complaints to his attention. This can be done in person, by letter or by telephone call. If you feel unsure about presenting your case, it may be sensible to form a committee of concerned people to do so, or to refer your case to the Ombudsman via a local authority.

Biological diversity means all the animal and plant species occurring in a particular area (e.g. Kavango, Etosha Pan, Namibia). It refers particularly to species that occur naturally in Namibia. Each species has unique properties and each plays a unique role in the environment.

For example, most of our land ecosystems have several species of browsers (leaf eaters). Although they all eat the leaves growing on bushes and trees, they do not all play the same role in the environment. Each species has its likes and dislikes, tending to favour certain tree or bush species and browsing at a particular level, depending on the size of the animal. If we remove the wild browsers from an area and replace them with one species of domesticated browser, e.g. the goat, it is unrealistic to expect the goats to browse in exactly the same way as all the wild species put together. A reduction in the biological diversity of browsers would probably change the composition of plant species. Allowing the same number of fewer kinds of browsers to use the plants in an area as food means that certain kinds of plants are over-exploited and may die out. In this way, the productivity of the area decreases.

Ecosystem refers to all the plants and animals in a given area and the non-living part of the environment with which they interact. For example, a crack in a rock face may support a small, simple ecosystem. The soil and water that collects in the crack supports a few plants which in turn support a few insects. The plants extract nutrients from the soil and the insects feed off the plants.

Our marine ecosystem is more complex. We owe our rich fisheries to the cold Benguela current that sweeps northwards up the coast before moving offshore in southern Angola. The water contains large amounts of nutrients. In the presence of abundant sunlight, algae (water plants) grow in these waters. Of special importance are the phytoplankton, small species that drift about with the currents and cause water to be a deep green. A variety of small invertebrate animals (zooplankton) feed upon the phytoplankton. These animals and the algae are food for a range of different fish, including the commercially important pilchard, anchovy and horse mackerel. These fish are food for predators such as snoek, sea birds and seals. Uneaten plankton ultimately sinks to the ocean floor and supports bottom-living fish, such as hake, kingklip, sole and lobsters.

Essential ecological processes are important interactions that occur within ecosystems among animals, plants and their non-living environment. These processes enable the environment to support the animals and plants living in it.

The nutrient cycle is an example of an essential ecological process. All plants and animals need certain chemicals to live. We call these chemicals "food" or "nutrients". The nutrient cycle starts with the soil, from which plants take up nutrients through their roots. Animals obtain their nutrients by eating the plants and/or by eating plant-eating animals. The nutrients return to the soil when various small animals and bacteria break down dead plants, animals and dung. In this way, nutrients are recycled within an ecosystem.

Numerous other cycles are essential for the maintenance of ecosystems (e.g. the water cycle and the oxygen cycle).

It is important that the activities of people should not disturb essential ecological processes to any great extent. For example, when people burn cow dung as fuel, they are interrupting the nutrient cycle and robbing the soil of the fertilizer so necessary to support grass and therefore cattle. When overgrazing leads to soil erosion, nutrients are washed or blown away with the topsoil. This reduces the nutrients cycling within the ecosystem and hence reduces the amount of plant and animal life the ecosystem can support.
Rock etchings testify to greater biological diversity in former times in the Twyelfontein area.

The Atlantic Ocean surrounding Pelican point; one of the most productive oceans in the world.

Two ecosystems in the Namib Desert: a small wetland surrounded by extensive desert scrubland.

Vast forests of algae called kelp that occur on our rocky shores are indicative of a highly productive marine ecosystem.

The nutrient cycle; vulture faeces will return some of the zebra-nutrients to the soil.
Rapid deforestation in northern Namibia is threatening the cultural traditions of the people. High population growth and to a lesser extent overstocking are leading to the rapid deforestation of northern Namibia and areas around major cities. Many people who have been in exile for twenty or more years have been shocked to see that during their absence there has been a dramatic reduction in the size and number of trees. Under normal circumstances, trees were felled to clear land for growing crops, for fuel and for materials for housing, fencing, furniture and household implements. During the war, large tracts of forest were cleared by the military occupation forces. Rapid population growth in the past fifty years has meant that larger numbers of trees are felled each year to maintain living standards. Trees have been unable to reproduce or regrow at the rate at which they have been used, so large areas have become quite barren.

Overstocking with livestock has made the situation worse, as it has caused excessive trampling and browsing on new growth. The coincidence of prolonged dry periods in this time has hastened the process of deforestation. So-called drought, however, cannot be blamed for deforestation, as the trees are adapted to survive such conditions. In parts of Owambo, deforestation has become so serious that villagers now use cattle dung as a cooking fuel. Burning dung is a very bad practice because it robs the soil of valuable fertiliser, leaving the soil less able to support life.
Deforestation is much more than the simple loss of trees. The process of deforestation is a vicious cycle. Deforestation results in increased runoff during rainstorms and in the soil, absorbing less water. It also causes increased water and wind erosion of topsoil. The loss of trees exposes the land to more sunlight. The soil becomes drier and less fertile, and the environment less able to provide Namibians with food, water, shelter and fuel (see Box 4).

Our forests can recover if firm action is taken. Our naturally-occurring trees are fortunately very resilient. We can help the forests of northern Namibia to recover, firstly by establishing timber plantations specifically for fuel, building material and handcrafts. Secondly, wood could be used more efficiently by using fuel-efficient, wood-burning stoves and ovens. Thirdly, wood could be saved by using alternative fuels such as biogas, electricity and solar energy, and by using alternative building materials, such as clay bricks. Finally, the recovery of degraded natural woodland will speed up if we protect this land from livestock.
Open fire cooking uses about five percent of the heat of the fire only.

Women spend long periods of time collecting fuel wood in rural areas giving them little time for other important activities.

This barren region in Owambo once supported a valuable Mopane forest.

Fuel wood will last four times longer if efficient but simple stoves are used.

The pallisades of homesteads in northern Namibia use vast quantities of hard wood.
Overstocking leads to overgrazing.

(Ministry of Agriculture)

Mopane forest in good condition in north western Namibia.

A charcoal producing factory near Okahandja; converting undesirable bush into a useful fuel.

Sunnbaked clay bricks; an affordable alternative to wood as a construction material.
Arid-adapted living hedge in northern Namibia: an alternative to wooden fences.

A bluegum plantation in northern Namibia; Namibia needs many more efforts like this.

Using solar energy to extract water; appropriate technology.

Springbok browsing on Acacia bushes.

Village in north west Namibia, poverty, littering and unsanitary water are often linked.
SOIL AND WATER

The productivity of the land and our prosperity depend on two key natural resources, soil and water. It is vital that we care for these resources wisely.

WATER

Namibia is a dry country. Our fresh water supplies are gradually decreasing. In particular, our ground water is being removed more rapidly than it is being replaced by rain-water penetrating the soil. For example, the water tables of the Kuiseb and Omururu rivers have dropped considerably in the past twenty years because of the ever increasing use of their water by west coast towns and related industries and mining activities. Farmers in the Karastfeld are experiencing dry boreholes for the first time in living memory now that ground water is being pumped into the Eastern National Water Carrier canal to supply growth points, such as Windhoek, with water.

We could obtain much of our water from the permanently flowing rivers of the north, but this will be very expensive. Water will always be a major factor that limits Namibia’s farming potential, industry and employment prospects. Learning to live within the limits posed by this scarce but precious resource is one of our greatest challenges.

SOIL

Namibia is losing topsoil more rapidly than it forms. As we lose topsoil, our potential to produce food is reduced because it is the soil near the surface that contains most of the nutrients so important for plant growth. It is also the topsoil that contains all the seed stores that will germinate to produce the next generation of plants such as grass for our cattle, when conditions are right. Topsoil has a high organic content because of all the living and dead plant and animal matter that it contains. The roots and leaf litter of plants, the small burrowing animals such as ants, termites and earthworms, and the dung of large animals all help prevent erosion and encourage water to penetrate the soil and enter the underground water table. In particular, it is the roots, litter and dung that bind together the soil particles which slow down water erosion. The roots and burrowing activity of small animals help the ground to draw in water. The organic matter also acts as a mulch, retaining moisture and releasing nutrients into the soil.

Excessive trampling, reduction of plant cover through overgrazing and deforestation, and poor farming practices expose the soil to excessive runoff during thunderstorms, and excessive drying and heating from the sun. These factors encourage soil erosion by water and wind, and reduce seedling survival.
THE RISE AND FALL OF THE FISHERIES EMPIRE A SHORT LIVED AFFAIR

The ocean has been shamelessly raped of its products. Namibia has one of the richest marine fisheries in the world, but it has been over-exploited to such an extent that populations of several valuable fish species and lobsters have become dangerously small. The collapse of our fisheries is a calamity, because wise exploitation of this renewable resource should earn more foreign exchange for Namibia in the long term than the non-renewable diamond and uranium mining industry.

seine nets. It is not possible to protect one species while continuing to harvest others from the same habitat. This is particularly true for species that are larger than the one being harvested. For example, much of the current pilchard catch is a result of anchovy fishing. The collapse of the fishing industry took place despite repeated warnings to the industry and authorities. Unfortunately, a lack of scientific data on our fisheries has always been a convenient loophole for unscrupulous exploiters.

Greed is the major reason for our current predicament. Fish populations have been over-exploited because quotas have sometimes been set too high and/or fishing companies have exceeded their quotas. In addition, illegal fishing by foreign trawlers has occurred. Overfishing also results from the non-selective nature of fishing with trawl nets or purse-

The collapse of the pilchard fishery serves as a dire warning. When commercial fishing started in Namibian waters forty years ago, the most important fish was the pilchard. In the first decade of the industry, the catches were carefully regulated and pilchard stocks remained intact. In the early sixties, however, complaints from the industry led to dramatic

Lobsters caught near Luderitz.

Bottom trawl catch off Walvis Bay

Tonnes of pilchards on their way to factories at Walvis Bay.

Pilchard catch size since the start of commercial fishing in Namibia.
increases in pilchard quotas. In 1968 there was a record catch of just under 1.4 million tonnes. This very high level of exploitation was far greater than the rate at which pilchard populations could renew themselves. The pilchard industry collapsed soon after, and has not recovered since. The current annual average pilchard harvest is less than 50,000 tonnes, thirty times smaller than the catch of 1968.

Initially, overfishing results in a steady decrease in the size of fish populations, but at some point the populations suddenly crash. Although profits may be high initially, a point is inevitably reached when catch size and profits start to drop. Even under good conditions, it may take a very long time for fish populations to recover. The reduction of one species sometimes makes way for other, less desirable species to increase. The increase in horse mackerel numbers is thought to have occurred because of the decrease in pilchards. Whether the pilchard can once again gain the competitive edge over horse mackerel remains to be seen. If the pilchard populations are to be given a chance to recover, they should not be harvested at all for about ten to fifteen years.

Because of our non-selective fishing methods, this would mean a substantial cut-back in anchovy fishing. Although the future benefits from healthy, well-managed pilchard populations are very high, the immediate loss of revenue from pilchards and anchovies may seem too high a price to pay.
Ultimately a price has to be paid for past mismanagement, however from an ecological perspective, the longer one delays positive action, the higher the economic, environmental and social cost. Historically, most of the profits from fishing in Namibia's waters have gone to foreign countries. If foreign exploitation can be reduced and illegal fishing halted, Namibia may earn more than usual from fishing while simultaneously practising the restraint necessary to allow her fish stocks to recover fully.

Putting an end to illegal foreign exploitation will require sophisticated monitoring, the ability to act swiftly and decisively in the events of infringements, and genuine co-operation from legal fishing fleets.

**TAKING ACTION.**

Protection of the environment and sustainable development are two sides of the same coin. We cannot have one without the other. It is in the interest of all Namibians to protect the environment if it is to realize its potential to support a population that is growing rapidly in numbers and needs. Articles 91 and 95 of Namibia's Constitution reveal the serious intent of the government concerning the environment. Even when the government has drawn up the legislation that should stem from these articles, the health of the environment will not be guaranteed. Ultimately the responsibility for protecting our environment rests upon each one of us.

*M. Seely*
What can I do to protect the environment? Knowledge of the environment is the foundation for action. All parts of an ecosystem, including people, are interconnected, so our every act affects the environment in some way.

All of our environmental problems are accumulations of many small and simple individual acts. We may often act without realising the impact we could have. Overstocking communal rangeland is an example of this. If an individual can afford to buy an extra cow or two, he/she does so without realising that if several other individuals also add extra animals to the grazing area, they may destroy the land. Other acts occur because of short-term viewpoint that many people have. For example, overstocking on commercial farms may occur because people are primarily concerned with the profits they can make during their lifespan rather than with the productivity of those farms for future generations of Namibians.

The Ombudsman has the duty to investigate complaints about the environment (see Box 3) but it is up to us to bring such complaints to his attention. Rapid population growth is at the root of most of our environmental problems. Unless we tackle this problem, no amount of ecological wisdom and goodwill will prevent the ultimate ruin of our land (see Box 3). Our population is destined to grow as approximately half of our people are fifteen years old or less. Even if each couple has only two children, the population will increase in size. As the population grows, so the need for land and resources grows. The land can accommodate this up to a point. At some stage, however, there will be too many people for the land to support. Perhaps the most important contribution that individuals can make towards securing the future health and prosperity of Namibia is to limit their family size. In this way people can more effectively spend their resources by making sure that their children are well-fed, healthy and well-educated. A well-educated and healthy society is a rich society that can reap the benefits of a healthy, productive environment. Throughout the world, poverty remains a major contributor to environmental destruction.

Estimated changes in the size of Namibia's population.

Age structure of Namibia's population in 1990.
THE POPULATION CRISIS

The number of people living in Namibia is increasing rapidly each year. Since 1920, when the population size was first estimated, our population has increased considerably. Our population doubles in size every twenty-three years. That means that there are twice as many people in 1990 as there were in 1967. That means that we now need twice as much food, clothing, houses, jobs and other essentials as we needed in 1967.

Our population will definitely grow in the future because a large number of Namibians are children who will soon become childbearing adults. Thus, just to maintain our current, inadequate standard of living requires a consistent increase in national productivity each year. Ensuring that the standard of living is improved requires even greater increases in productivity. To raise our levels of productivity we will need to exploit our natural resources more and more.

Unless we are very careful, the environment will become more degraded than it is at present and therefore less able to support our growing population. The net result will be a vicious cycle of poverty leading to greater over-exploitation of resources, leading to greater poverty.