

Chapter 3: Environmental issues

Introduction

Environment refers to the totality of the surroundings within which humans live and exploit resources for their welfare and development. Poverty is a state of deprivation of basic human needs and has been elaborated in Chapter 2. Poverty can contribute to environmental degradation while the latter can perpetuate poverty. Poverty reduction can, therefore, be viewed as a strategy for sustainable environmental management.

The Zambian Government adopted a national conservation strategy in 1985 and the National Environmental Action Plan (NEAP) in 1994, in an attempt to redress the imbalance between development and environment. The Environmental and Pollution Control law was enacted in 1990 and the Environmental Protection Council was established two years later. New wildlife and forestry laws were enacted in 1998 and 1999, respectively, which are intended to strengthen the management of natural resources and the environment. However, in spite of these policy and legal initiatives, little has been achieved on the ground to reduce the impoverishment of the people and the environment.

The government recognises five priority environmental problems (MENR, 1994) which are:

- i) water pollution and inadequate sanitation;
- ii) soil degradation;
- iii) air pollution in the Copperbelt towns;
- iv) wildlife depletion (fish and game);
- v) deforestation.

To deal with these environmental problems, the government through the Ministry of Environment and Natural Resources (MENR) is implementing the Environmental Support Programme (ESP) with assistance from the World Bank, UNDP and the Nordic Development Fund. The main components of the ESP are institutional capacity building, community environmental management, legal framework and enforcement, environmental education and public awareness, Pilot Environmental Fund (PEF), and Environmental Information Network and Monitoring (EINM).

Sustainable development

The mission statement of MENR emphasises sustainable development as one of the objectives of the environmental policy. Sustainable development is also a key policy objective in the forest and wildlife policies (MENR, 1998a; NPWS, 1998). Carew-Reid *et al.* (1994) stated that a society is sustainable only if both the human condition and the condition of the environment are satisfactory or improving. Sustainable development, therefore, is founded on respect and concern for people and the environment. The primary objectives of sustainable development are to improve the

quality of human life and conserve or improve the capacity of the environment to meet present and future human needs.

Human wellbeing can only exist when all members of society are able to meet their needs and have the freedom to fulfil their potential. In Zambia these conditions for sustainable development are to a large extent lacking. Indeed recent macroeconomic policies and institutional reforms, although well intended, have created huge demands on natural resources and the environment amidst extreme poverty and social maladjustment. The clear signs of unsustainable development that include population pressure, poverty, resource depletion and debt prevail in Zambia today. Poverty reduction is, therefore, one of the key pre-conditions for achieving sustainable development in Zambia. CSO (1993) defined poverty as a level of living when individuals or households are not able to meet their food and other basic needs, such as shelter, energy, sanitation and water supply. However, poverty has been calculated as the cost of acquiring basic food items that provide basic minimum calorie requirements for the individual or household. This actually underestimates the level of poverty because it excludes other basic needs. Based on this narrow view, the prevalence of poverty is higher in rural areas, where 78% of the population is extremely poor, than in urban areas where 44% are extremely poor, although in both areas levels of poverty vary among socio-economic groups.

Environment and peoples' livelihoods in Zambia

In Zambia, agricultural production is the main source of livelihood in rural areas, where 96% of households are involved in crop production (CSO, 1994). The majority of these are subsistence small-scale farmers, which are dominated by women. In the national accounts, forestry is grouped as part of agriculture, which emphasises the complementarities of forest resources and agricultural production. This grouping also underlines the point that agriculture in Zambia does not generate enough capital to meet other necessities of life. During the 1990s, agricultural production declined as a result of economic liberalisation and removal of subsidies. For example, cropland and tonnage of marketed crops declined by nearly 20% and 60%, respectively, from the 1991/92 season to the 1996/97 season. This decline has impacted negatively on the livelihoods of the rural population, especially that of women-headed households and worsened the rural poverty situation.

It is not surprising, therefore, that many rural communities are still engaged in hunting and gathering food from the forest to achieve a minimum level of food security, based on the availability of wild sources of meat from a diversity of animals (insects, reptiles, fish, birds and mammals), and wild food plants (fruits, nuts, seeds, roots/tubers, mushrooms and vegetables) that the forest provides. The loss of forest and replacement of indigenous woodlands with exotic species, therefore, often undermine rural life and food security. Similarly, land uses that exclude forest or people's right to hunt and gather wild animals and plants threaten food security and the survival of rural people, especially that of the poor, women and children.

Food security cannot be separated from fuel energy security and health. In urban Zambia, the majority of households cook with charcoal produced from indigenous

woodlands in rural areas. Traditional medicine in Zambia is based on minor wild medicinal plants and animals to provide basic health care in rural areas where modern medical facilities are either absent or inadequate. Not only do the rural populations use forest resources themselves but also trade in them with urban communities to generate incomes. Thus the importance of forest resources to human welfare extends to urban areas and sometimes to international communities. Most rural industries are based on resources from the forest, either as a source of raw material or energy. Among such industries are carving and carpentry, basketry, weaving and other craftworks that generate incomes for rural households. The importance of forest resources to both rural and urban livelihoods and health care in Zambia is, therefore, paramount and can play a crucial role in poverty reduction.

The principal laws that regulate the use of renewable natural resources in Zambia are the Forest Act of 1999 and the Wildlife Act of 1998. The provisions of these laws need to take into account strategies for poverty reduction, while safeguarding the wellbeing of the environment.

Deforestation

Deforestation is one of the priority environmental problems in Zambia (MENR, 1994). But what is often not appreciated is that there are two types of deforestation. Temporary deforestation, in which the natural forest regenerates, once land is abandoned, and this is associated with various forms of traditional shifting cultivation systems and charcoal production where stumps, roots, seedlings and seeds are not completely destroyed during forest clearing and subsequent cultivation. This type of deforestation does not necessarily lead to land degradation. Permanent deforestation in Zambia is associated with commercial and semi-commercial farming, in which land clearing involves the uprooting of trees and deep ploughing with machinery or ox-driven implements that eliminate natural sources of forest regeneration. With good soil conservation measures, even this type of deforestation need not result in land degradation, although forest recovery occurs over a longer period than is the case with temporary deforestation.

Studies have shown that temporary deforestation may actually increase the production and availability of useful wild food resources, such as insects, small mammals and vegetables. For example, edible caterpillars (*vinkubala*) which are harvested by bending, cutting and occasionally climbing trees are more abundant in regenerating woodlands on *chitemene* fallows than in mature woodland (Mbata and Chidumayo, 2001). Women and children are disadvantaged when harvesting caterpillars in mature woodland because trees are too big to bend, cut or climb. This is not the case in regenerating woodland where trees are small and can easily be bent and cut by all groups of harvesters, and this allows children and women to effectively participate in the harvesting of caterpillars, which are used for home consumption and sale. Woodland clearing, followed by regeneration is, therefore, essential for not only increasing caterpillar abundance but also ensuring equitable access by women and children to the caterpillar resource, which would otherwise be dominated by men.

Other wild food resources, such as small mammals (mole rats and mice), food insects (termites and grasshoppers), and “weed” vegetables also tend to be more abundant in fallow land and cultivated fields. There is also no evidence in Zambia of significant effects of deforestation on edible insects, mushrooms, small mammals, wild food roots (*munkoyo* and *chikanda*), vegetables, medicinal plants, bamboos and reeds. Often, depletion of these useful forest resources is largely caused by unsustainable harvesting levels and not deforestation per se.

However, deforestation does reduce the abundance of larger mammals, honey production and wild tree fruits. Hunting of large mammals and gathering of wild honey are dominated by men and the former is further restricted by government legislation. In most traditional farming systems, fruit and other useful trees are conserved during land clearing. The only problem is that whereas the men decide what trees to leave when clearing land for agriculture, it is the women and children that collect useful products, such as fruits, from the conserved trees. Consultations with women and children by men on what trees should be conserved during clearing would ensure that the needs of these users are taken into account.

Although deforestation is perceived as an environmental problem, the real issue is about the nation deciding on how much of the country should be under forest and how much deforestation should be allowed to sustain human wellbeing. The gross cropland, including fallow, has increased slowly from about 21% in the 1970s (Schultz, 1974) to 22% in the 1980s, and is probably still under 25% at present. Annual rates of deforestation, including re-clearing of forest re-growth, is estimated at <1% in rural provinces and just under 2% in urban provinces. Thus deforestation rates are well below population growth rates and could, if properly managed, be sustained in the medium-term (10-20 years). Indeed some deforestation is inevitable given the low level of input use in agricultural production due to economic policies and subsidy removal. Furthermore, the large dependence on charcoal for cooking in the urban households implies that until charcoal is replaced as an urban cooking energy source, forests will continue to be cleared to meet urban household energy needs. Currently, the major hindrance to cooking with electricity among electrified households is the unaffordable prices of stoves/hot plates and the unreliability of supply (World Bank/UNDP, 1990). For households that are not electrified, the high cost of connection is a serious obstacle to accessing electricity.

Forestland covers about 60% of the country, and about 17% has already been set aside for forest reserves and national parks in which settlements and agriculture are prohibited by law. But encroachment into these areas has occurred due to inadequate capacity to protect these areas. This capacity has further been crippled by the reduction in law enforcement staff in the Forest Department and the Zambia Wildlife Authority (ZAWA), as a result of the public service reform programme. Currently, about 16% and 5% of forest reserves and national parks, respectively, have been encroached and their sustainability as conservation areas is not guaranteed. Nevertheless, the country still has about 75% of forestland outside the existing conservation areas. With such a high ratio of forest land to total land, opportunities exist for increasing the land under forest protection, improving forest management outside protected areas and allowing sustainable levels of deforestation that take into account basic human needs and rural development. An improved and appropriate

forest management can be implemented by investing a significant proportion of the revenue collected from the trade in high value forest products, such as honey and bees wax, edible caterpillars, tubers (*chikanda*) handicrafts, charcoal and timber. These products can also generate incomes for rural communities and contribute to poverty reduction. Currently, revenue collection from forest products is negligible, perhaps due to the cumbersome system of revenue collection, incapacity and corruption. For example, annual revenue collection from the multi-billion Kwacha charcoal industry is less than 10% of the potential collectable revenue. If this revenue collection was raised to 60-70% and a significant proportion of this invested in improved and appropriate forest management, the government would have no need to borrow money from international sources to deal with the problem of deforestation. In any case, debt repayment has contributed to the increase in poverty and overexploitation of forest resources.

A large proportion of forest resources is under the common property regime. Although there are good arguments against common property management regimes, often in rural Zambia, common property resources are also an important source of useful forest resources, particularly for the poor, young and women. It is these groups who have least access to privatised resources. What is required for the sustainable management of common property resources are incentives, such as enabling legislation that guarantees rights for local people over the use and benefits of wild products, institutional reform that vests control and planning with local user groups, such as the poor, young and women, and that ensures that a significant proportion of economic benefits go to local communities. One way of doing this is the promotion of markets in wildlife products that would generate incomes for rural communities.

Wildlife and fish depletion

Wildlife, including fish, has played a significant role in meeting human basic needs, such as animal protein and income from trade in fish and wildlife products, such as ivory and other trophies. But this role varies according to ecological region and dietary customs. Fish is a major source of animal protein in the diet of rural and urban households and the annual production is estimated at 70,000 tonnes. The hunting of large mammals for meat and other products is part of local livelihoods in many parts of Zambia (Marks, 1973, 1977). The creation of game reserves in the colonial period and national parks by the independent government was done with minimum consultation with traditional authorities and local communities, and this has been a source of conflict over land use for wildlife management. Modern laws were imposed that restricted access to wildlife as a traditional source of livelihood. Further, the economic benefits of wildlife although evident at central government level, were not made available to local communities. It is no surprise, therefore, that wildlife is commonly regarded as agricultural pests and danger to human life and, therefore, should be eliminated when in conflict with human basic needs.

The 1980s witnessed a very rapid decline in major wildlife species. For example, of the 92% decline in elephant population from 1960 to 1995, 87% occurred between 1975 and 1990. The black rhino became virtually extinct in Zambia at the end of the

1980s. A number of factors contributed to this situation, including excess hunting licenses, inadequate law enforcement, corruption, high trophy prices, poaching and lack of involvement of local communities in wildlife management and benefits sharing (Mupimpila *et al.*, 1995). Of the three types of wildlife management areas (national parks, GMAs and private game ranches), GMAs have the greatest potential to contribute to poverty reduction in Zambia. The GMAs that have good and diverse game populations can generate a lot of revenue from safari hunting, and a significant proportion of such revenue can be invested in wildlife management, local community development activities and provide cash incomes.

Such a programme is being implemented through the Administrative Management Design for Game Management Areas (ADMAGE), which was adopted by government in the late 1980s (see also Chapter 2). This programme contributed greatly to the reduction in the decline of game populations, especially during the 1990s. However, the long-term threat to wildlife in GMAs is the competition for land between agriculture and wildlife. In GMAs, all types of land use are allowed, while game hunting is regulated by the wildlife law. Currently, game has been depleted in half of the 36 or so GMAs due to the combined effects of habitat encroachment and over-hunting. Thus unless economic benefits of wildlife are made available in a speedy and transparent manner, commitment by local communities to manage wildlife resources will remain limited. Ensuring that local people have a stake in the future survival of wildlife is a necessary pre-condition for ensuring long-term sustainable wildlife management. A very recent threat to wildlife has been created by the dissolution of the National Parks and Wildlife Service (NPWS), and the delay in establishing a functional Zambia Wildlife Authority. This has resulted in a high, but as yet unquantified, degree of uncontrolled and often unsustainable hunting of game throughout the country. The drastic reduction in the number of wildlife police officers, as a result of the restructuring of the wildlife sector, has increased the incentive to poach because of the reduction in the risk of being caught by ZAWA. The full impact of these recent developments in the wildlife sector will be felt for many years to come. From a poverty reduction perspective, this may have already undermined the capacity of ADMAGE to raise revenue and sustain community commitment to wildlife management and its contribution to poverty reduction in rural communities living in GMAs.

Soil degradation

Soil degradation is the loss of soil through physical movement and/or *in situ* loss of fertility and structure. Soil erosion is a localised problem in Zambia, and although it is generally acknowledged that it reduces land productivity, especially crop and range production, this impact has not been adequately quantified. In acid soils of agro-ecological zone III, with over 1,000 mm average annual rainfall, continuous use of nitrogenous fertiliser, especially for hybrid maize mono-cropping, reduces maize yields to below economic levels within four years, thereby necessitating land abandonment. Liming can counteract the effects of acid fertiliser, but lime is rarely applied, especially by small-scale farmers, partly because of the expense involved and partly because lime is not regarded as a fertiliser. Shifting cultivation, such as *chitemene*, is ecologically

suitable for such soils, but high population pressure (> 4 persons per square kilometre) can reduce fallow periods and ultimately impair woodland regeneration.

Water pollution and inadequate sanitation

Water pollution in Zambia is caused mainly by waste waters from industrial activities, sewage treatment plants that discharge effluents that do not meet environmental standards, and nutrient-rich runoff from agricultural lands, such as in the Kafue and Mazabuka areas (Environmental Council of Zambia, 2000). Often, municipal sewage treatment plants, which were originally designed for smaller populations than they are now serving, are unable to adequately treat the larger quantities of sewage influent.

On the Copperbelt, water pollution arises from runoff from mining dumps, seepage from tailings dams and accidental discharges of untreated wastewater. The valley tailings dams have created large ponds in which the urban poor and peri-urban populations, especially of women and children, fish, bathe and wash clothes. Because of the large abundance of bilharzia snails in such ponds, people are vulnerable to bilharzia. For example, the prevalence of bilharzia among Kawama Primary School pupils near Lubengele Tailings Dam in Chililabombwe was 65% in June/July 1996, and the performance at school of affected pupils was said to be poor. The fish in the dam had concentrations of cadmium, lead, zinc and copper that were far in excess of the FAO/WHO recommended maximum concentration (Chidumayo *et al.*, 1997). Yet poor urban households around the dam fish and consume the contaminated fish from Lubengele dam, which may have long-term debilitating effects on the health of consumers.

The pollution of natural waterways results in eutrophication, which promotes excessive growth of water plants, especially weeds. The Kafue weed, that has been declared a national disaster, threatens infrastructure and the livelihoods of the several hundred fisher people in the lower Kafue river. The high prevalence of environmental diseases, such as dysentery, cholera, malaria and bilharzia in the country, can also be correlated to water pollution and discharge of inadequately treated sewage waste, which invariably contribute to poor human health and environmental deterioration, a situation that undermines sustainable development.

Strategies for poverty reduction and environmental improvement

Table 3.1 gives the strategies that will promote sustainable utilisation of renewable natural resources, while contributing to poverty reduction and the wellbeing of the environment.

Table 3.1: Proposed strategies for environment issues. \$? in the cost column indicates that it was not possible to estimate the cost of the activities to achieve the objective

Objective	Output	Target beneficiaries	Implementation period and cost (US\$)
1. Review the protected conservation area system and propose a new system that accounts for environmental and basic human needs	New system of protected area proposed and adopted by government	Whole Zambian population	2-3 years (\$200,000)
2. Assess the rate of deforestation and propose sustainable rates of deforestation and ceiling, and identify, designate and monitor areas for charcoal production to meet needs for urban markets in the next 10-20 years	2.1 Sustainable levels of deforestation proposed and adopted by government 2.2 Suitable charcoal production areas identified, designated and regulated	2.1 Rural communities 2.2 The urban poor	2-3 years (\$200,000)
3. Improve revenue collection from commercial forest and wildlife products, and ensure that a significant proportion is invested in rural communities where these products are produced	3.1 70-80% of revenue collected annually 3.2 Natural resources management improved 3.2 Poverty reduced	3.1 Rural communities 3.2 Government	2-3 years (\$250,000)
4. Reduce charcoal dependence by urban households through low-cost electrification and subsidy on stoves/hot plates	4.1 Use of charcoal in urban areas reduced 4.2 Urban household welfare improved	4.1 Rural communities through reduced deforestation 4.2 The urban poor	10-20 years (\$?)
5. Promote the use of solar energy, especially in rural areas.	Use of solar energy increased	Rural households and communities	10-20 years (\$?)

6. Promote intensive crop production through the provision of assistance and affordable inputs	6.1 Deforestation reduced 6.2 Rural poverty reduced	Rural communities	10-20 years (\$?)
7. Promote conservation and use of local crop genetic resources	7.1 Local crop genetic resources conserved 7.2 Production of local crops increased	Rural communities	5-10 years (\$150,000)
8. Strengthen institutional capacity at local government and local community levels to improve natural resources management	8.1 Sustainable natural resources management 8.2 Strong local institutions for natural resources management created	Rural communities	5-10 years (\$200,000)
9. Zambia Wildlife Authority should immediately establish a strong law enforcement staff to curb uncontrolled game hunting	Poaching significantly reduced	9.1 Rural communities 9.2 Government	1-2 years (\$250,000)
10. Improve transparency and accountability in revenue collection and sharing with local communities	10.1 Local community commitment to natural resources management improved 10.2 Poverty reduced	10.1 Rural communities	2-5 years (\$50,000)
11. Continue the process of empowering local communities in natural resources governance and management	Governance over natural resources devolved to local communities	Rural communities	2-5 years (\$200,000)
12. Promote sustainable use of forest resources for the production of wild foods, medicines and tradable non-wood products, including beekeeping, especially among women, for income generation	12.1 More non-wood forest products produced 12.2 Trade in non-wood forest products increased	Rural women and communities	2-5 years (\$150,000)

13. Promote good land husbandry through sustainable conservation farming	Sustainable conservation farming adopted and increased	Farming households	5-10 years (\$?)
14. Improve water supply and sanitation in both rural and urban areas	Access to clean and safe water and sanitation increased	14.1 Rural communities 14.2 Poor urban communities	5-10 years (\$?)
15.Reduce water pollution and control water weeds	15.1 Water quality in natural waterways receiving wastewater from urban areas improved 15.2 Aquatic weeds controlled	15.1 Rural communities 15.2 Whole population	5-10 years (\$?)
16. Prohibit access to mining tailings dams and enforce prohibition measures and carry out environmental awareness	16.1 Access to mining dams eliminated 16.2 Greater awareness about mining pollution	Urban population on the Copperbelt	1-2 years (\$100,000)

