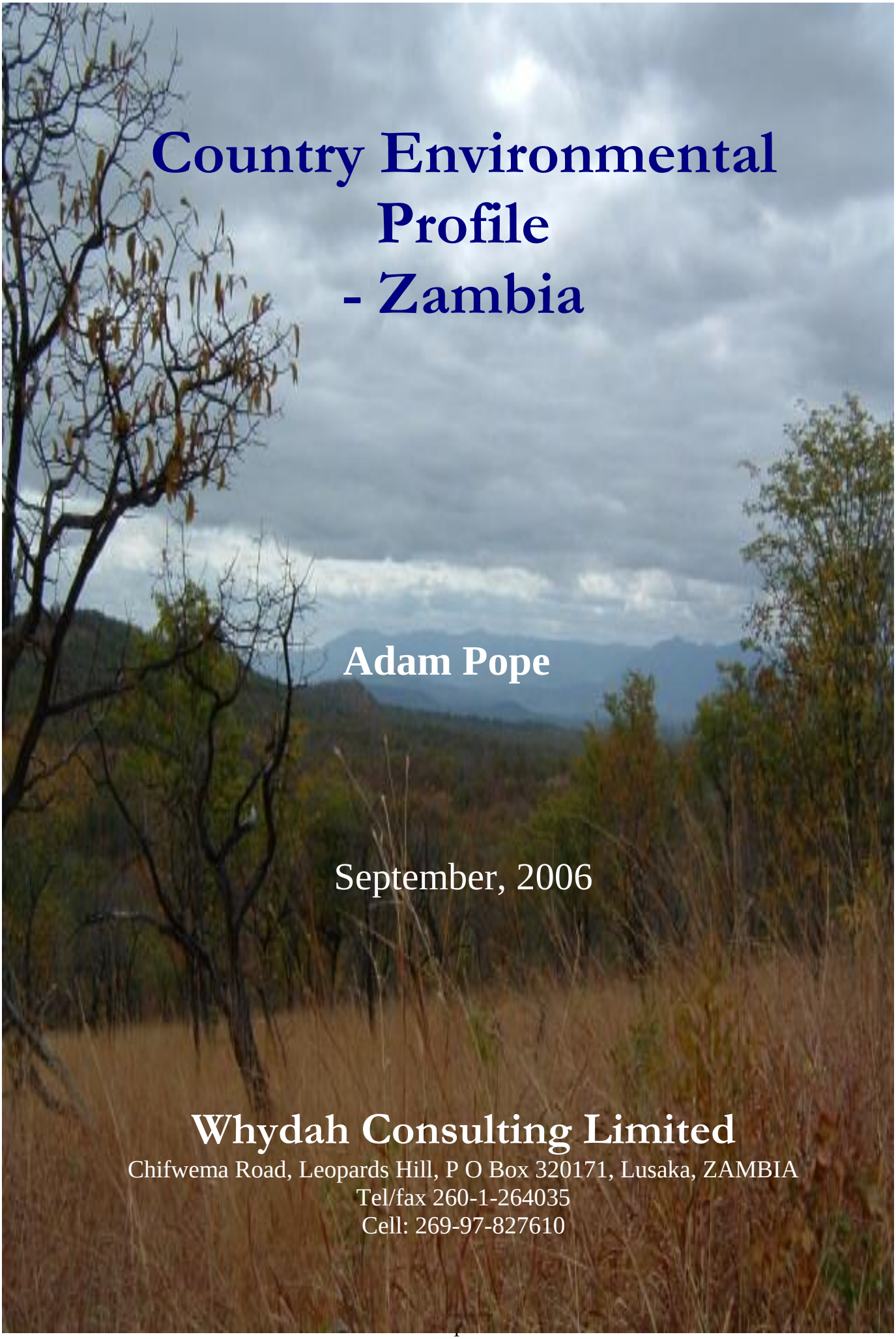

Country Environmental Profile - Zambia

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List of Acronyms

AFLEG	African Forest Law Enforcement and Governance Agreement
ASIP	Agriculture Sector Investment Programme
CBD	Convention on Biodiversity
CDM	Clean Development Mechanism (of the Kyoto Protocol)
CEP	Copperbelt Environmental Project
CFC	Chlorofluorocarbons
CITES	Convention on International Trade in Endangered Species of Flora and Fauna
COMESA	Common Market for Eastern and Southern Africa
CRB	Community Resource Board
CSP	Country Support Programme
DDCC	District Development Coordination Committee
DDE	Dichloro-diphenyl-trichloroethylene
DDT	Dichloro-diphenyl-trichloroethane
DRC	Democratic Republic of the Congo
EAC	East African Development Community
EC	European Commission
ECZ	Environmental Council of Zambia
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ERB	Energy Regulation Board
EU	European Union
FAO	Food and Agriculture Origanisation of the United Nations
FCCC	Framework Convention on Climate Change
FCCD	Framework Convention to Combat Land Degradation
FNDP	Fifth national Development Plan
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GMA	Game Management Area
HIP	Harmonisation in Practice
HIPC	Heavily Indebted Poor Country Initiative
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IBA	Important Bird Area
ICT	Information Communication Technologies
IOC	Indian Ocean Commission
JASZ	Joint Assistance Strategy for Zambia
MDG	Millennium Development Goals
MDRI	Multilateral Debt Relief Initiative
MEA	Multilateral Environmental Agreement
MEWD	Ministry of Energy and Water Development
MTENR	Ministry of Tourism, Environment and Natural Resources
NAWASCO	National Water Supply and Sanitation Council
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organisation
NHCC	National Heritage Conservation Commission
NIP	National Indicative Programme
NRCF	Natural Resources Consultative Forum

List of Acronyms (Cont'd.)

ODS	Ozone Depleting Substances
RDA	Roads Development Agency
ROADSIP	Road Sector Investment Programme
RTSC	Road Transport and Safety Council);
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SEA	Strategic Environmental Assessment
SPSP	Sector Policy Support Programmes
UNDP	United National Development Programme
UNESCO	United National Educational, Scientific and Cultural Organisation
WDB	Water Development Board)
ZAWA	Zambia Wildlife Authority
ZESCO	Zambia Electricity Supply Corporation

1. Summary

Zambia is a large country (752,612 km^2) with a wide range of spectacular landscapes. These range from the basalt gorges on the Zambezi River (including the Victoria Falls); to the Muchinga and Zambezi rift valley escarpments in the east of the country; the extensive wetlands of the Chambeshi, Kafue and Zambezi floodplains, to its large natural and man-made lakes (Tanganyika, Bangweulu and Kariba). The country also still retains a high level of natural forest cover, feeds significant unpolluted river systems that contribute to major international river basins (the Congo and Zambezi systems), and has abundant arable soils.

Historically these natural resources have been under little exploitive pressure. Even the extraction of copper/cobalt mineralization on the Zambian Copperbelt, leading to the country's urbanisation and industrialisation, are relatively recent phenomena (mostly in the last sixty years). Consequently, at a national scale, the country has few cases of extensive, chronic pollution or environmental degradation. Where these occur, they are related generally more to poverty than to the pressures of commercial exploitation.

The country now has a highly urbanised population by African standards, concentrated in two principal conurbations: Lusaka/Kafue in the centre, and the Copperbelt some 400km further north. These two centres hold 69% of the urban population.[1] Away from the main centres, the population is distributed mostly in clusters around regional centres and in linear settlements along trunk roads. Consequently, the average rural population density is low (approximately 9/km^2).

As one might expect, human impacts on the environment largely match the population footprint, with specific negative influences associated with localised, but intensive mining, industrial, agricultural and urban activities. On the other hand the deforestation rate is high by world standards and its effects are widespread, although there are significant foci around major conurbations and in areas of expanding small-scale agriculture. Unsustainable wildlife and fisheries practices are common, also contributing to the loss of biodiversity.

Policies, legislative structures, and development strategies exist that can facilitate the mitigation of existing negative environmental effects and constrain new ones. But institutional capacities at all levels: government, private sector, civil society and the rural communities, are weak. And although the economy is growing, the budgeting and allocation of financial resources for environmental management and controls still has a relatively low priority.

Recommended priority actions to reverse accumulating negative environmental impacts include:

- the expanded dissemination of environmental information;
- increased contributions to natural resources and protected area management; capacity building in the public service - to improve the consistent and effective delivery of environmental policies and regulations;
- an increase in public finance contributions to natural resources management; and

[1] The 2000 Migration and Urbanisation Report recorded 34.7% urbanisation in Zambia, declining from 39.9% in 1980.

- increased support for environmental research and monitoring by non-state actors – who often can support independent monitoring activities that government institutions sometimes have difficulty supporting.

At a more detailed level the Copperbelt mining complex, Kabwe, and the Lusaka-Kafue conurbation are areas of principal, localised negative environmental impacts. At the extensive scale, negative impacts are principally the outcomes of rural poverty – particularly deforestation, land degradation and reduction in wild animal populations. Deforestation rates represent a significant diminution of future forest resource and catchment management opportunities. Eutrophic and toxic impacts on water bodies are also areas of concern, principally in the Kafue River catchment where most economic activity is concentrated. Little information exists on dry season bush fires and subsequent surface cover removal, but these are believed to represent significant causes of nutrient loss and atmospheric pollution. They may also influence meteorological dynamics and climate change through albedo effects.

There are few, and very localised, incidents of extreme land degradation and desertification - usually related to mining impacts, or to poverty-induced, inappropriate and uncontrolled land uses. Heavy metal contamination on the Copperbelt, lead pollution in parts of Kabwe and a combination of aerosol and leachate pollution on the Copperbelt and in the Kafue industrial estate are examples.

Contributions to greenhouse gas (GHG) and ozone depleting substance (ODS) emissions are still relatively low, but monitoring of emission levels is still at a research level and adherence to chlorofluorocarbon (CFCs) and other protocols is problematic with insufficient resources.

Policy, legislative, and regulatory instruments exist for most sectors to support sustainable environmental management, and to control inappropriate developments. In many cases, these frameworks are in the process of modernisation and all generally incorporate coverage and domestication of international environmental and biological conventions. But many of these Acts are not seamless with each other, and this is compounded by an overarching absence of real inter-sectoral coordination and dialogue[2].

Weaknesses exist also in the institutional capacity to disseminate, regulate, and enforce policies and legislation. These derive mainly from inadequate financial, human and systems resources. These circumstances are exacerbated by the declining availability of basic mapping. In addition, while numerous thematic studies exist there is little environmental status reporting at the national level.[3]

Another shortcoming has been the transfer of many regulatory functions from thematic legislations to the more generic Environmental Protection and Pollution Control Act. While this focuses legislation, it weakens the field controls of line departments, and particularly agriculture - on land use planning and management controls such as cultivation near water courses, shifting cultivation, and other catalysts of deforestation, damage to headwater catchments, river sedimentation and soil degradation.

[2] Ministry of Tourism, Environment and Natural Resources, 2005: Draft National Policy on Environment, Lusaka

[3] The Environmental Council of Zambia, 2001: State of Environment in Zambia 2000, ECZ, Lusaka

There is also a range of indirect environmental impacts. These include reduced productivity in the natural resources sectors (for example, in agricultural land from nutrient-depleted, or acidity-affected soils; and forestry from illegal, selective timber extraction that creates low return/high cost forest management situations); and increasing pressure on the status of protected areas and the sustainability of their resources (in the timber, hunting and non-consumptive tourism sectors). Other effects exist in human health (especially in high-density urban settlements); increasing risks of extreme events; and dysfunction of social systems (through corruption, marginalizing the poor and vulnerable, disruption of customary systems and reduced personal safety).

National policy and planning structures that influence the utilisation of the environment include the National Conservation Strategy, the National Environmental Action Plan, the Environmental Protection and Pollution Control Act, and more recently, the Vision 2030 document and the environment and natural resources chapters of the subsequent Fifth National Development Plan (FNDP). The National Policy on Environment will be a key guiding document in the environment sector once it receives approval from the new Cabinet.

The Harmonisation in Practice (HIP) and the Joint Assistance Strategy for Zambia (JASZ), together now have generated a new and more coordinated and focussed approach to development support. Thematic strengths of individual cooperating partners are recognised and applied through sector leadership roles. Ironically, this also may have negative implications for the environment sector because donors with marginal involvement in the sector have now withdrawn from direct support. While the intention is for them instead, to mainstream environmental issues into all their programmes, there is a significant risk of marginalisation of important environmental issues until environmental mainstreaming is better defined and articulated as a sector-wide, cross-cutting issue.

European Commission's support to Zambia under the last three National Indicative Programmes (NIPs) has focussed on engineering infrastructure; capacity building in financial management and private sector development; and the social sectors (particularly health, education, and more recently social welfare). This targeting is likely to continue (which will build strengths from continuity and institutional memory). So the application of environmental support needs to be evaluated in this context. Recommended areas of future support include:

- the construction of capacity in state and non-state actors to collect, analyse, project, plan and monitor environmental and natural resource management interventions;

- building out consensus on, developing materials, disseminating them widely, and then applying mainstreaming environmental issues into all programmes;

- building enhanced environmental issues and capacity into programme design and the procurement of technical assistance that implement programmes;

- providing support, where possible, to special environmental concern areas in the agriculture, forestry, fisheries and wildlife sectors – and to simplified support to non-state actor interventions;

- providing mechanisms for local support to meeting the requirements of international environmental conventions;

- applying particular environmental intervention support through the private sector, state and non-state actors to specific areas of EC cooperation, for example, trade related areas (sugar) and special budget line support.

2 Zambia's Country Profile

2.1 The Natural Resource Base

Zambia is a large country (752,614 km^2) located in a mid-continental situation in south-central Africa. Its eight neighbouring countries include the Democratic Republic of the Congo (DRC) and Tanzania in the north, Malawi and Mozambique in the east, Zimbabwe, Botswana and Namibia in the south, and Angola in the west. Political and economic linkages with these neighbours were established during the colonial period. But those links now have been greatly strengthened by the development of regional political and trade coordination organisations (the Common Market for Eastern and Southern Africa [COMESA], the Indian Ocean Commission (IOC), and the Southern African Development Community [SADC]) in particular during the late 20^{th} century. More recently the African Union (AU) and New Partnership for Africa's Development (NEPAD) initiatives have expanded pan-African integration. Tangible physical consolidation has followed with, *inter alia*, the rehabilitation and further development of major inter-territorial road, rail, water and air routes.

Nevertheless, because of its political history, Zambia is still more closely aligned with its southern neighbours than with west, or east Africa. Although South Africa has a growing, principal trading partner status, the incremental development of convergent, multi-modal, transport routes on Zambia provides a sound foundation on which it can expand its economic base and trading capacity with all its neighbours, and with global markets. Recent national strategic interest in development corridors linking the southern and eastern African hinterland with coastal ports (Nacala, Mtwara, Walvis Bay), has emphasised these opportunities.

For all of these reasons Zambia's natural resource profile is gaining increasing interest in the context of economic development in southern Africa, water being one. Rainfall in northern Zambia is in excess of 1,200 mm per year. The run-off component of this precipitation feeds four major river systems, two of them inter-territorial. In the centre and west the Zambezi and its principal tributary the Kafue; in the north the Luapula that is a major contributor to the Congo River system; and in the east the Luangwa, that is Zambia's other major tributary feeder into the Zambezi.

Trans-boundary water resources are already an economic and political focal area in the Zambezi River basin that covers six of Zambia's riparian state neighbours. Interest is already emerging in the Luapula/Congo system as well. Apart from direct abstraction benefits from water resources, the flows in the major river systems also offer indirect benefits for hydropower generation, and for irrigated agriculture, fisheries and tourism development. The utilisation of Zambia's water resources has been limited in recent years, although the Kafue basin supports water and energy supplies to most of the country's economic core, and there has been interest in water transport in some river systems. As far back as the 1960's, the issue of trans-basin water transfer (particularly the Luapula-Kafue systems), was under discussion.

The high rainfall and crystalline geologies in northern Zambia tend to develop acidic soils that are not immediately suited to cultivation. But these conditions also support extensive, high canopy woodland and associated rapid forest growth that can both sustain headwater catchments and offer considerable, although largely undeveloped, comparative advantages for forest industries. Awareness of the significant and indiscriminate loss of this forest cover

due to shifting agriculture and charcoal production over the last 15 years is now growing and sustainability of forest resources is now a concern.

Zambia also has extensive areas of soils and grassland suited to livestock production. With a comparatively low average population density (approximately 13 per km^2, with average rural population densities of 9 per km^2), high level of urbanisation (36%), and relatively high rainfall (700mm in the south to 1,600 mm in the north), Zambia also has a comparative advantage in the agriculture sector over many of its southern neighbours. But sustained productivity of these resources will require improved land use practices as well as much needed improvements in the agricultural marketing arena.

Base and precious metal mining resources have been exploited commercially on a large scale since the early years of the 20th century and gemstones have received much increased interest over the last ten years. Metals mining outputs fell dramatically from the early 1980's in response to declining metal prices and the accumulation of unsustainable mining strategies. This position has changed dramatically since 2005 with rapidly rising metal prices fuelling additional geological and in-mine exploration. Associated mines investment that had already been facilitated by economic policy shifts and the associated privatisation of the state-owned mining house in the late 1990's. The geological resource base and the traditional and non-traditional minerals sector (gemstones, dimension stone and industrial minerals), still has considerable unexploited growth potential. On the other hand, the accumulation of negative environmental impacts from previous mining efforts has left an expensive legacy of restoration. These accumulating impacts must be avoided in the future.

Zambia's landscape and wildlife resources offer a further area of opportunity for direct production and tourism. The latter has slowly evolved from small beginnings and equally small capital bases in the 1960's to a launch position now where infrastructure and tourist critical mass have started to attract international business interest, particularly from South Africa. Care will be needed in the treatment of demands from large tourism corporations if prime, but sensitive, tourist sites are to be protected for posterity; monopoly situations are to be avoided; and Zambian investors are to be given sufficient opportunities for investment.

Zambia's environmental regulatory framework has previously been under little real pressure from developers. But the new climate of investment and relatively rapid economic growth is likely to present a significant challenge to institutions that are still developing a core of skills and working experience and still suffer from financial constraints. In these circumstances establishing clear regulatory frameworks, widening the skills base by incorporating appropriate non-state actors, and increasing financial support to environmental institutions may become critical requirements.

2.2 Political Structure

Zambia has followed a republican form of multi-party, participatory democracy since reforms that ended the single party, Second Republic in 1991. The President and Vice-President are supported by a Cabinet of 28 Ministers. There are 150 seats in Parliament, currently dominated by one party. Currently five parties, or party consortia, are contesting the tripartite elections scheduled for 28th September, 2006. There has been little or no debate on environmental issues during the election process.

A customary system of rule also still functions in Zambia, with chiefs having traditional authority over some 80% of the country's land area. The 286 Chiefs elect 27 representatives to a House of Chiefs. Chiefs used to administer a system of customary control on resource use, but in a practical sense this role has become increasingly symbolic - although this function and that of community entities in natural resources management is still hotly debated. Alleged cases of customary and district authorities ignoring protected area management objectives in protected forest and wildlife areas and providing land to developers without adequate consultation with communities, or with district and national planning authorities continue to undermine the original objectives of customary rule in natural resources management.

The seats of political and administrative management are in the capital city, Lusaka, located in the centre of the country. The line ministries are also represented in the 9 provincial centres, each of which is supporting a Provincial Minister; and in 72 districts, each headed by a political District Commissioner and an administrative District Secretary. Functional integration of district affairs is theoretically through the District Development Coordinating Committees (DDCCs), but in most cases capacity shortcomings, or central control undermines the opportunities for decentralised natural resources management that these structures offer.

Nevertheless, Zambia aims to decentralise its administrative management to the district level, with support from the provincial seats and from Lusaka. Although a policy exists for this objective, there is no established strategy for achieving this aim and control is still firmly retained by central government. Among other issues, this constrains many new initiatives in environmental management.

2.3 Principal Economic Sectors

The principal driver for the economy has traditionally been the mining sector. Copper and cobalt production, with by-products of gold, silver and other heavy metals historically generated over 90% of all foreign exchange earnings; contributed 22% of gross domestic product (GDP) until 1992, and generating formal employment for over 50,000.

Mining contributions have declined significantly over the last 15 years and the country's economic strategy is now oriented to diversification from mining to establish three additional core sectors: agriculture, tourism and manufacturing.[4] Recent metal price increases and new mining investments may undermine this objective.

2.4 Economic and Social Indicators

Zambia's economy has demonstrated growth in the last few years (averaged at 4.6% per annum)[5], after a long period of stagnation. Causative factors in this growth phenomenon have been poorly researched, but the introduction of more democratic government, the privatisation process, growth in global and southern African economies, and the associated growth in commodity prices (in particular metal prices) have all been significant.

[4] Ministry of Finance and National Planning, 2006: Draft Fifth National Development Plan, Lusaka
[5] Delegation of the European Commission, 2006: Draft Zambia-European Community 10th European Development Fund Issues Paper (Provisional)

The country's Gross Domestic Product (GDP) was estimated by the Central Statistical Office to be US$5.4 billion (at current prices) in 2004, with the following contributions to GDP:

Sector	**%age**	**Financial**
Contributor		***Contributions (ZMK billions)***
Mining and quarrying	8.1	257.8
Agriculture, forestry, fisheries	14.7	463.6
Manufacturing	10.7	338.0

The economy is estimated to have grown by 5.1% in 2005, with a strong domination by non-traditional sectors, particularly construction, services (including tourism) and non-traditional exports. The growth in the construction sector would appear to reflect significant growth in both the formal and informal economy.

Formal employment is in the region of 400,000 to 600,000, excluding the agricultural sector - where over 70% of the working population is located. This is still small in the context of a population of 9.89 million.[6]

National poverty levels remain high in Zambia. Sixty- eight percent (68%) of the population are considered to fall below a poverty datum line, and rural poverty is highest at 78%, in spite of some net urban-rural migration in the late 1990's. Zambia also has one of the highest levels of income disparity in Africa.

Total net enrolment in primary education is 81.3%, but secondary education is only 10.6 % and only some 24,000 students are in tertiary education. The overall adult literacy rate is 67%. Educational resources are heavily biased to major urban (and population) centres.

Medical resources are also limiting economic growth, with high levels of morbidity and mortality from parasitic and infectious diseases (malaria, tuberculosis, dysentery, HIV/AIDS). Life expectancy at birth has declined to less than 40 years.

These socio-economic factors complicate and militate against sound environmental management and sustained development and, therefore, warrant close attention to the identification and monitoring of appropriate environmental indicators.

2.5 Indicators of Threats to the Natural Environment

A major constraint to sustainable natural resource and environmental management is the paucity of established and regularly monitored environmental indicators. Furthermore, outside the agricultural sector[7], there is no integrated warning system capable of raising awareness of significant impacts on the natural environment. Only three recent documents have researched the state of environment in depth: the National Conservation Strategy of 1985[8], the National Environmental Action Plan (NEAP) of 1994[9] and the State of Environment in Zambia of 2001[10]. Neither document established usable environmental

[6] Central Statistical Organisation, 2003: 2000 Census, Ministry of Finance and National Planning, Lusaka
[7] Crop Early Warning System, Meteorology Department
[8] IUCN, 1985: The National Conservation Strategy for Zambia, Gland
[9] Ministry of Environment and Natural Resources, 1994: National Environmental Action Plan, Lusaka
[10] The Environmental Council of Zambia, 2001: State of Environment in Zambia 2000, ECZ, Lusaka

indicators, and as noted, this remains an area of concern as economic growth accelerates. The NEAP did recognise the need for a ranking system for environmental issues and established that a social cost assessment was the best mechanism for achieving this.[11]

Before and after the NEAP, baseline positions were achieved to various levels of detail, on some environmental parameters: the extent and rate of deforestation; wildlife population trends (locally); threatened and endangered species; the extent of land under agriculture; the availability of safe drinking water and appropriate sanitation; and air quality; among others. Most of these databases, however, were developed before the late 1990's and are now becoming increasingly interrupted and outdated.

The Fifth National Development Plan (FNDP) includes a number of objectives and indicators that will be monitoring. Regrettably, environmental indicators are not well represented in the final draft FNDP monitoring and evaluation system – which understandably is strongly oriented to measuring economic growth trends and social service delivery.

[11] Ministry of Environment and Natural Resources, 1994: National Environmental Action Plan, Lusaka

3 The Status of Zambia's Natural Environment

The next sections discuss the status of Zambia's natural environment. While a general thematic description is provided, it is considered important that the environment be considered in the context of possible demands and impacts on it, not least from the substantial economic growth objectives incorporated into the FNDP.

3.1 Biomes

Much of Zambia lies on the ancient, eroded central African plateau, in an altitude range of 1,000m and 1,500m and with a rainfall range of 700mm to 1,600mm per annum. Temperatures are moderate and fluctuate around 25^{o}C, with an average seasonal range from approximately 28^{o}C in the summer months, to 15^{o}C in winter. Frosts occur locally in low-lying areas, but the influence of cold, dry, Kalahari air masses creates significantly lower extreme temperatures in the south-west, in the winter months.

Nevertheless, although moderate environmental conditions prevail over much of the country, geological and geomorphic influences have interacted with biological processes to evolve considerable levels of biodiversity. Thus Zambia occupies a core position in the Zambezian Regional Centre of Endemism[12].

Biome definition varies, but one classification identifies seven, altitude-linked, biotic groups[13]:

- the Montane Zone (small areas in the north-east, of high biodiversity montane grassland and relict evergreen forest on up-thrust igneous and metamorphic geology);
- the Sub-Montane Woodland Zone (a northern arc of dissected escarpment terrain above 1,500m characterised mainly by Miombo woodland and forest with high vegetative biodiversity, on metamorphic geologies);
- Plateau Woodland Zone (with Miomo - high canopy, deciduous, three-genera-dominated woodland - being the most extensive component, interspersed with more restricted woodland types and drainage-line grasslands [dambos] and swamps on strongly-leached acidic soils);
- Upper Valley Zone (extensive, flattish terrains with mixed woodland, periodically flooded grasslands and swamps on alluvial soils. Biodiversity-rich in the Mweru-Tanganyika area);
- the Escarpment Zone (located along the Tanganyika- Luapula, Luangwa-Luano and Zambezi rift valley systems - characterised by variable, mixed forests, with moderate levels of biodiversity within dissected valleys;

[12] White, 1983: Vegetation Map of Africa, 1,5,000,000, UNESCO/AETFAT/UNSO
[13] Bingham, M.G., 1998: Protected Area Master Plan for the Zambian National Park System – A Biodiversity Map of Zambia, EDF/NPWS Project, Department of National Parks and Wildlife Service, Chilanga

- the Kalahari Basin Biome (high canopy, largely deciduous woodland, grassland and floodplain on ancient, wind-transported sands in the western part of the country);

- the Rift Valley Savannah (mixed deciduous, savannah woodland, riparian woodland and grassland, on alluvium in low-lying, down-faulted, Karroo-age geologies, generally 500m lower than the plateau);

- Lake Systems (often deep, faulting, or rift valley-derived, extensive open water areas and associated shorelines and escarpments.

The dominant biome – the Plateau (Miombo) Woodlands – has an extensive occurrence in central Africa, from Tanzania and the DRC in the north, to northern South Africa. Because of this geographic range its characteristics vary considerably, and so too the floral and faunal assemblages it supports.

3.2 Endemics

Because of its geomorphic history and the continuity of many of its landscapes and river systems, Zambia hosts few truly endemic species. Nevertheless, the Luangwa valley is home to two endemic sub-species or races[14] of large mammal; the Thornicroft's Giraffe (*Giraffa camelopardalis thornicrofti)* and Cookson's Wildebeest [*Connochaetes taurinus cooksoni*), and the Bangweulu Floodplain and Kafue Flats two endemic Lechwe sub-species; the Black (*Kobus leche smithemani)* and Kafue (*K. l. kafuensis)*, respectively. Over 750 species of bird have been identified, of which 76 are considered threatened or endangered. Although several have limited ranges, only the Chaplin's Barbet (*Lybius chaplini*) is truly endemic. Recent research has identified forty-two Important Bird Areas (IBAs), each with particularly important bird populations. Together these IBAs cover 14% of Zambia.[15]

The existing knowledge of most other faunal assemblages and the flora is insufficient to make definitive current statements about other endemics, but 25 mammal, 36 bird and 4 reptile species are generally considered so scarce, or restricted in range, that they are protected under national and international agreements.

3.3 The Status of Natural Resource Utilisation in Zambia

3.3.1 Mineral Resources

Zambia's mineral resources have been exploited commercially on a large scale since the early 20th century. Gold and other high value minerals have been mined widely in Zambia, but mostly on a small scale. Copper and cobalt ore bodies occur extensively in the mineralised Copperbelt arc area (bordering and continuous with the DRC) and have been mined intensively since the 1940's. Both underground and opencast mining techniques have been used and integrated with on-site metallurgical processing and refining. Some 60 years of accumulated mining and process residues, effluent disposal, derelict plant and equipment, and associated human settlement have left a legacy of negative environmental impacts.

[14] The exact taxanomic status of these species is under debate.
[15] Leonard, Peter, 2005: Important Bird Areas in Zambia, Zambian Ornithological Society.

These impacts are now being addressed by the Copperbelt Environmental Project (CEP), but many remedial actions will require long-term inputs. The residues of the closed lead and zinc mine at Kabwe are an example (they are included in the CEP mandate), where lead contamination in the soil continues at high levels and the population, and particularly children, still exhibit very high levels of lead pollution more than ten years after the mine closed.

High international base and precious metal prices have recently generated a fresh cycle of mining exploration and investment throughout the country (particularly within and to the east and west of the traditional Copperbelt mining areas, but countrywide). These initiatives are already affecting forest reserves and headwater areas. While the Environmental Council of Zambia have insisted that environmental management plans be developed from EIA processes on new developments, these will require high and sustained levels of independent monitoring to ensure that biodiversity impacts and polluting cycles are not repeated.

Coal mining in southern Zambia also has significant localised environmental impacts that have accumulated in the 40 years of operations. New investment structures offer opportunities to ameliorate some of these impacts and to avoid unnecessary landscape disturbance in the future.

Small-scale mining; mainly related to tin deposits, semi-precious and precious gemstones and dimension stone; has also expanded significantly and poses a localised environmental effect through haphazard pitting. Uranium prospecting has received renewed interest in North-Western Province and southern Zambia - along the Kariba shoreline - but mining awaits a policy decision on the exploitation of radioactive minerals.

Large-scale quarrying and dimension stone mining is increasing, but still at low levels of development. Except for cement and lime production, where localised quarrying, dust and smoke pollution occur, this mining sector so far has had relatively minor impacts. Continuation of growth in the construction sector is likely to encourage further investment in cement production and aggregate quarrying.

3.3.2 Land, Soils and Agricultural Resources

Commercial agriculture is concentrated in less than 20% of the land area designated as titled State Land - historically concentrated in the southern, central and eastern parts of the country. Arable farming is mainly located in five areas: around the Copperbelt (including the Mpongwe block); in the Choma, Mazabuka and Mkushi farming blocks; and around Lusaka. Localised plantation agriculture is located in the north near Kasama (coffee and sugar), in the Luapula Province - Kawambwa (tea), in the east - Chipata and Lundazi (tobacco and cotton) and Mazabuka-Kafue (coffee and sugar).

Principal environmental concerns with large-scale agriculture are pollution and biodiversity effects from agrochemicals and land clearing. Where farming adjoins river systems or overlies dolomite aquifers the water pollution threat is highest. Examples of agricultural chemical impacts exist around sugar estates on the Kafue Flats, but long-term residual effects from DDT/DDE usage prior to 1980 have also been identified in Lake Kariba – providing a reminder of the compounding and long-term effects of chemicals in food chains. As DDT is

once more approved as a mosquito/malaria control substance in Zambia, there will be need for more careful application practices if repetition of accumulating impacts is to be avoided[16].

Elsewhere on customary land, cultivation and livestock development follows a variety of traditional land use systems. Southern, central and parts of eastern Zambia are the most intensively cultivated areas that traditionally used ox-plough and hoe cultivation systems. Cash cropping and outgrower schemes have now extended the cultivation of cotton, tobacco, soya bean, sunflower and paprika throughout the country, but particularly in the Central and Eastern Provinces, and export vegetables in the central farming areas,. While these initiatives have helped to reduce rural poverty and its density impacts on natural resources, the absence of sound land use planning, rotation and grazing practices have placed negative pressures on vegetation cover and has accelerated soil degradation in many areas.

In some districts the absence of economies of scale, and of road access for crop input purposes, has precluded the application of necessary agricultural lime and fertilizers. This has encouraged a steady drift to new cultivation areas, especially in the leached soils in northern Zambia, and particularly since population densities have undermined the traditional chitemene technique for restoring nutrient and lime levels through the burning of scrub and tree branches. Often shifting agriculture practices lead to cultivation on saline soils, steep slopes and beside watercourses, contributing to soil loss through wind and runoff erosion, and acidification of soils and associated yield reduction - but increasingly also deforestation and fragmentation of protected areas[17].

Zambia has three recognised agro-ecological zones. Environmental impact risk is highest in Agro-Ecological Zone 1, which is mostly in low-lying valleys with annual rainfall in the 600 – 800 mm range and an above average frequency of drought. These riverine areas are also prone to flooding. Together these effects suggest that climate change impacts should be most intensively planned for in this zone.

Zambia's extensive areas of potentially rich rangeland are most seriously affected in the west and south-west of the Zone 1, where pastoral traditions exacerbate over-grazing, and density-linked livestock diseases.

With increasing development of the economy and demand for agricultural products, pressures on arable and rangelands are expected to increase rapidly. Areas where environmental monitoring may be important include the new provincial farming blocks; areas of increased sugar planting; and areas of high rural population density.

3.3.3 Forests and Woodland

Forest and woodland covers about 30 million hectares, or 40% of Zambia's land area, with a bias in the northern half of the country. Scattered woodland associated with farming areas covers another 3.4 million hectares – giving an overall land coverage of 45%. About 60,000 ha are covered by exotic pine and eucalyptus plantations, mainly (50,000 ha) on the Copperbelt, with the balance in small, mostly degraded stands scattered through most districts. The occurrence of commercially important hardwoods of extractable size is low (on

[16] As it is more than twenty years since the last DDT/DDE impacts were identified there is little evidence that there is still sufficient understanding of the need for careful practices, or of the impacts of poor practices.
[17] Ministry of Environment and Natural Resources, 1994: National Environmental Action Plan, Lusaka.

average 1 to 2 trees per hectare). Nevertheless, the overall volume of potentially extractable hardwood is substantial (about 300 million m^3)[18]. Global demand for hardwood timbers, particularly from China, has fuelled recent demands on Zambian timber sources, which the Forestry Department is poorly resourced to deal with, and illegal logging is increasing in spite of access difficulties.

Opportunities to encourage afforestation, reforestation and forest management investments under the Clean Development Mechanism (CDM) of the Kyoto Protocol have been slowed by the protracted process of Zambia's ratification of that agreement – that was eventually achieved in October 2006.

Protected forest areas cover 62,900 km^2, or 8.4% of Zambia, but effective management in these forests is very limited. One constraint to better forest management in Local Forests is a failure to commence the Forests Act of 1999 that offers major opportunities for participatory management processes. A recent Statutory Instrument now provides for the implementation of this initiative in limited pilot areas

The other impact of the absence of the new Forest Act is a delay in reforming the Forestry Department. Work in 2003 and 2004 developed a model for a Zambia Forestry Commission, but failure to commence the Act has relegated this reform option to an undetermined point in the future. In the resulting period of uncertainty, encroachment; degradation; and illegal developments in many forests; now threaten their viability with the result that political pressure is increasing to de-gazette some reserves (especially around urban settlements), even where headwater catchment protection, or significant biodiversity is involved.

The zones most subject to deforestation include wide (50 km to 150 km) perimeters around all major centres and along trunk roads, particularly around the Copperbelt towns, Kabwe and Lusaka, and along the Great North Road near the Tanzanian border. Demand for charcoal and the development of new farming plots (particularly tobacco and cotton farming) are the main drivers[19].

Work is now on going by the ECZ to examine the issue of alien and invasive species and this may have implications for exotic plantation development, particularly in the contexts of uncontrolled species dispersal and soil and water depletion in headwater areas and stream catchments.

3.3.4 Wildlife and Fisheries

Zambia has a relatively abundant and attractive wildlife resource, but wildlife census data are few; poorly archived; and are often gathered using inconsistent methodologies. Time-series data are rare outside the Kafue Flats, the southern Bangweulu basin and the South and North Luangwa National Parks[20].

[18] Pohjonen, V., 2004: National Reconnaissance-Scale Forest Resource Assessment 2003, Forestry Support Programme, Ministry of Tourism, Environment and Natural Resources, Lusaka

[19] National charcoal consumption is estimated to over 1 million tonnes per annum, valued at more than US$ 150 million (Forestry Support Programme, 2003: National Fuelwood and Charcoal Study, Ministry of Tourism, Environment and Natural Resources, Lusaka

[20] Pope, A. J., 2006: Preliminary Examination of Public-Private Partnerships in Wildlife Management in Zambia, World Bank, Washington

Comments on wildlife abundance and conservation status, therefore, are patchy and often speculative. However, consensus information suggests that wildlife abundance is declining - the outcome of: poverty- and opportunistic-driven commercial poaching - supplying the high-value, urban bush meat trade; selective over hunting; and habitat loss. Over 50% of all game management areas (controlled hunting areas) are considered depleted and only nine of the 19 national parks are currently commercially utilised.[21]

Fisheries resources are also declining, although catches increased briefly in the late 1990's.[22] Causative factors for declines are under-researched, but thought to include the progressive downsizing of nets; illegal fishing during the breeding season; and excessive numbers of fishing operations. Again demand factors without adequate management solutions are driving resource use beyond sustainable levels.

New technologies and applications have increased interest in aquaculture, through both pond systems and cage cultures. These offer considerable opportunities for increasing fish production in a sustainable manner, but there are considerable concerns about disease transmission and unplanned releases of exotic species into wild populations.

3.3.5 Surface and Groundwater Resources

The utilisation of surface water resources is not yet a limiting factor to development outside the Kafue River catchment (where there have been periodic requests for tighter controls on abstraction by the Zambia Electricity Supply Corporation [ZESCO]). In the Kafue Basin, extreme dry events, coupled with increased demands for hydroelectric power and domestic, industrial and agricultural water may create constraining circumstances sooner rather than later. Groundwater limitations are only of serious concern in the Lusaka area, where rapidly increasing demands to meet domestic, industrial and peri-urban agriculture consumption are placing pressure on available aquifers.

Hydropower has been the backbone of Zambia's industrial development since the early 1960's. But both the Kariba and Kafue Gorge impoundments (supplying hydropower stations) resulted in considerable and continuing impacts. The floodplain system above the Kafue Gorge dam has been significantly changed, in spite of recent efforts by ZESCO to replicate the annual flood that used to pass through the Itezhi Tezhi gorge.

Because of the looming power generation shortfall, expected throughout the East (EAPP) and Southern African Power Pool (SAPP) countries by 2008, hydropower generation is again becoming an area of focus. Prospective development sites include additional generating capacity from sites up- and downstream of the present Kafue Gorge dam; the high biodiversity Kalungwishi valley in northern Zambia; and the gorge systems of the Zambezi downstream of Victoria Falls. The last initiative has already been halted on environmental grounds twice, in the early 1980's and the late 1990's.

[21]Ministry of Finance and National Planning, 2006: Draft Fifth National Development Plan, Lusaka
[22] Enviro-Fish, 2005: State of Play Report, Capture Fisheries and Aquaculture in Zambia, Mtwara Development Corridor Project, Dar es Salaam

3.4 The Impacts of Economic Activity

Zambia's natural environment is still relatively intact and mostly uncontaminated by unsustainable activities and polluting effects. Nevertheless, there are significant localised and extensive impacts that warrant major investigation and mitigation.

The most important and extensive of these impacts result from long-term effects, including:

- degraded urban and peri-urban environments - from land, water and air contamination by the mining industry; and

- deforestation - from charcoal and fuel wood extraction and uncontrolled land clearing – mainly for shifting cultivation.

Other areas of more localised and/or shorter term impacts include:

- soil erosion and loss of land cover, often as a downstream effect of deforestation, but also in areas of saline and poorly structured soils in valley areas;

- loss of forest biodiversity and productivity for timber and non-timber forest products, resulting from illegal logging, settlement encroachment and the non-selective clear felling for charcoal production;

- local air pollution effects in industrialised valley areas on the Copperbelt and at Kafue that are prone to temperature inversions – principally during the winter months;

- air pollution over main urban areas (Lusaka, Kafue and the main Copperbelt towns) resulting from local meteorological effects combined with vehicle, industrial and domestic heating and cooking emissions – again most significant during the night time inversions during the winter months. In mining areas these are exacerbated by particles blown off tailings dams and particle emissions from cement and lime factories and smelter plants;

- water pollution created by direct and indirect flows from agricultural, mining, industrial and solid waste operations, and from sewerage treatment plants;

- groundwater contamination of aquifers in dolomite and limestone geologies underlying urban areas – from leakage of petroleum products and chemicals, waste water and septic tanks and pit latrines. All major urban areas (Lusaka, Kabwe and the Copperbelt) overlie, or are close to these aquifers.[23]

- deterioration of the built environment through inadequate solid waste management (particularly in the control of plastic products); an absence of effective littering controls; insufficient sanitation facilities, leakage from water pipes; discharge of oils and other industrial products; and the widespread use of charcoal and fuel wood in cooking and heating (leading to smoke and carbon monoxide emissions –

[23] Ministry of Finance and National Planning, 2006: Draft Fifth National Development Plan, Lusaka

both with serious implications in restricted and poorly ventilated housing occupied by many of the most poor and vulnerable households); and inadequate storm drainage;

- tourism activities have yet to create significant environmental impacts, but increased concentrations of tourist lodges in some areas and growing pressure from large hospitality corporations to access prime tourist sites will require close monitoring and strict controls.

A subject area that appears well controlled, thus far, is the handling, storage and disposal of toxic, hazardous and radio-active wastes. Storage facilities exist for radio-active waste on the Copperbelt and facilities under the Bamako and Basle Conventions which Zambia is signatory to, offer long-term options.[24]

An area that warrants especially close monitoring in the future is new mining ventures. The considerable and as yet incomplete expenditure required to clean up the accumulated impacts of copper, cobalt, lead and zinc mining on the Copperbelt and in Kabwe is not an acceptable future social cost.

The FNDP has summarised a number of economic-development-related root causes leading to degradation of the environment and erosion of natural resource stock values and land rents. These reflect many of the issues already identified and were incorporated into the preparation of the FNDP:

- ill defined property rights and land tenure issues resulting in open access and the "tragedy of the commons";

- inadequate institutional capacities;

- limited private sector investment in the natural resources sector that could stimulate growth and development;

- lack of systematic and comprehensive planning, analysis and information management systems to support decision making, operations and information distribution. Consequently it has been difficult to establish trends or to develop reliable long-term growth predictions;

- poor infrastructure in many rural areas and obsolete, or non-existent maintenance equipment;

- the rapid growth of populations and the associated over-exploitation of resources have created increasing pressure on land, resulting in deforestation, biodiversity loss, land degradation and in some areas also scarcity of agricultural land.

[24] United Nations, 2002: Johannesburg Summit 2002 – Zambia Country Profile, New York.

4 The Policy and Legislative Environment

4.1 International Environmental Conventions and Millennium Development Goals

Zambia is signatory to a variety of international conventions, many being derivatives of the Rio Declaration on Sustainable Development of 1992. They include the:

- Bamako Convention on the Ban of the Import into Africa and the Control of Trans-boundary Movement of Hazardous Wastes within Africa (1994);
- Basle Convention on Toxic Wastes (1994);
- Convention on Biodiversity (CBD) (1993) and the Cartagena Protocol on Biosafety;
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992);
- Convention on Wetlands of International Importance as Waterfowl Habitats (the RAMSAR Convention) (1971);
- Kyoto Protocol (deposited in July 2006);
- Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora (1996);
- Rotterdam Convention on Hazardous Wastes (1992);
- Stockholm Convention on Persistent Organic Pollutants (deposited in July 2006);
- UN Convention on the Law of the Sea and Implementation Agreement (1983);
- UN Convention on the Protection of World Heritage (UNESCO World Heritage) (1972);
- UN Framework Convention on Climate Change (FCCC) (1994);
- UN Framework Convention to Combat Desertification (FCCD) (1993);
- Vienna Convention and Montreal Protocol on Substances that Deplete the Ozone Layer and Amendments (1990).

The Global Environmental Facility is currently supporting a National Capacity Self Assessment for multilateral environmental agreements (MEAs), and in particular the integration of the CBD, FCCC and FCCD. These conventions, together with CITES, the Convention on the Protection of World Heritage and RAMSAR are focal issues for the FNDP.

Zambia is also working on the National Adaptation Strategy for Climate Change, has submitted its support to the Lake Tanganyika Basin Integrated Resource Management Process and has attended the African Forest Law Enforcement and Governance (AFLEG) sessions on illegal trans-frontier movement of timber.

Zambia is working towards achieving the eight Millennium Development Goals (MDGs) by the year 2015:

1. Eradicate extreme poverty and hunger;
2. Achieve universal primary education;
3. Promote gender equality and empower women;
4. Reduce child mortality;

5. Improve maternal health;
6. Combat HIV/AIDS, malaria and other diseases;
7. Ensure environmental sustainability;
8. Develop a global partnership for development

While major progress is being made on some social objectives, it is generally agreed that environmental targets – and particularly the sub-targets on reversing environmental resource depletion and mainstreaming sustainable development into national programmes – will be difficult to attain.

4.2 Natural Resources Policies

Policy frameworks exist for all major environmental sectors. Many of them have been up-dated and/or re-designed during and after the mid-1990's (forestry, wildlife, agriculture). Several others are currently in the process of modernisation and are scheduled for Cabinet approval during 2007, including the wide-ranging National Policy on Environment. The new fisheries policy is also in process.

The Decentralisation Policy is an important adjunct to all natural resources policies, because if effective management of these resources is to be achieved, the management structures and associated human and financial resources must move closer to the resource users.

4.3 Existing and New Legislation

New legislation followed the new policy frameworks and several new environment-related Acts were generated after 1990: Environmental Protection and Pollution Control (1990); Energy (1994); Mining and Minerals (1995); Wildlife (1998); Forests; and Lands (1999); and Water (2001). The basis for these elements of legislation includes the incorporation of best practices and international conventions and they represent a highly current basis for environmental management in most sectors. As noted, the new Fisheries Act is currently in process.

4.4 Regulatory Legislation and Frameworks

While environment sector principal legislation is relatively well provided for, the commencement of legislation and the subsidiary legislation is frequently less well attended to. Constraints lie in the legal drafting process where the Ministry of Justice is reported to face severe human resource limitations.

The absence of seamless and up-to-date subsidiary, regulatory legislation in many sectors is a cause for concern as it immediately weakens the impact of well-intentioned policies and legislation. It can also expose government to unnecessary levels of litigation.

4.5 Institutional Framework and its Capacity

Environmental issues are cross-cutting for most government institutions and cooperating partners, and this approach will be emphasised by the Joint Assistance Strategy for Zambia (JASZ) process. But this has the downside that it now leaves primary JASZ responsibility for

the environmental sector with the MTENR[25] on the one hand and the Finnish Government as the lead cooperating partner on the other, supported at varying levels of investment only by the United Nations system (chiefly UNDP and FAO), the World Bank, Denmark and Norway.

4.6 Government Institutions

The Ministry of Tourism, Environment and Natural Resources (MTENR) reforming actions in the late 1990's started a process of restructuring that continues. Current efforts are to harmonise and rationalise the roles of the Department of Tourism and the Zambia National Tourist Board (ZNTB). Nevertheless, a fundamental constraint – financial resource shortfalls - still constrains the Ministry, particularly in environmental and tourism database development and monitoring and in management of regulatory processes.

The other government ministries that have major environmental responsibilities, include:

- the Ministry of Agriculture and Cooperatives (previously coordinated under the now defunct Agriculture Sector Investment Programme[ASIP]);
- the Ministry of Communications and Transport (supervising the Roads Development Agency [RDA] and its Road Sector Investment Programme (ROADSIP II), and the Road Transport and Safety Council);
- the Ministry of Energy and Water Development (supervising the Energy Regulation Board [ERB], the National Water Supply and Sanitation Council [NAWASCO] and the Water Development Board); and
- the Ministry of Mines and Minerals Development (that regulates all large and small-scale mining).

One institution that is overlooked often in examination of the environmental sector is the Survey Department and its Map Sales unit. In the 1970's Zambia boasted one of the best topographic and thematic mapping and air photo collections in Africa. Since the late 1990's, there has been some investment in digitising, up-dating and extending topographic mapping by the Survey Department; similar work in the Geological Survey Department; and cross-sectoral agreement on geographic information systems (GIS) formats and data storage protocols. Nevertheless, stocks and the currency of mapping and air photo/satellite imagery has deteriorated significantly and this is an area of concern – particularly in environmental planning and monitoring – but also in the encouragement and control of all new developments.

4.7 Statutory Bodies

The MTENR has three statutory bodies with important roles in the environment. The Environmental Council of Zambia (ECZ) is responsible for administering the Environmental Protection and Pollution Control Act; the National Heritage Conservation Commission

[25] The Ministry with its directorates of Environment and Natural Resources, Planning and Information and Tourism, also hosts two environment-related statutory bodies: the Environmental Council of Zambia (ECZ) and the Zambia Wildlife Authority (ZAWA), plus the Forestry Department

(NHCC), is responsible in the heritage sector; and the Zambia Wildlife Authority (ZAWA) supervises the Wildlife Act, administers the national parks and regulates the wildlife resource in the GMA complex. Efforts to establish a Zambia Forestry Commission have so far been hampered by significant retrenchment, trade creditor and start-up costs – and increasing concerns about the cost-effectiveness of the statutory body model in reforming sector performances.

The MTENR statutory bodies also suffer from under-resourcing, with implications that are critical to the way these organisations implement their missions. For organisations such as ZAWA, tasked with joint responsibilities of developing commercial opportunities in the wildlife estate and with conserving natural resources in these areas, a shortfall of funding, coupled with demands for self-sustainability, cannot encourage decisions that support or extend conservation objectives.

4.8 Civil Society Institutions

There are few civil society and international NGO organisations with an involvement in the environment. All of them face major funding and staffing problems and have considerable difficulty in sustaining inputs to public debate. Recent environmental issues have raised the involvement and profile of environmental civil society organisations, which may have strengthen their operations[26]. The creation of the Natural Resources Consultative Forum (NRCF) by MTENR in 2005 as a public/private interface organisation is commendable, but its commencement has been problematic and support from public sector institutions to its function, limited.

A Zambia Environmental Conservation Fund is currently in the process of establishment and intends to offer a sustainable vehicle for funding into environmental activities. The Fund still awaits final approval and funding.

4.9 Environmental Monitoring Systems

While all environmental ministries and their subsidiary institutions have a mandate to undertake environmental monitoring of one sort or another, few have the staff capacity, or the financial and logistical resources to do so effectively. Consequently, sectors such as wildlife and forestry, which previously boasted significant long-term monitoring programmes and useful datasets are now woefully deficient in these records. It is perhaps not extraordinary, therefore, that the final draft FNDP contains no direct environmental monitoring indicators among its key performance indicators. Indirect indicators that are listed include only:

- the number of mining companies complying with environmental regulations;
- the number of people that can access clean water and hygienic sanitation; and
- the consumption levels of alternative energy.

[26] For example, the Chalimbana Catchment Conservation Committee, the Environmental Conservation Association of Zambia, the Wildlife and Environmental Conservation Society of Zambia, the Zambian Movement Against Corruption.

Chapter 32 of the FNDP schedules several environmental objectives. Encouragingly, there is strong emphasis on institutional strengthening; the development of baseline data, databases and monitoring capacities. It also mentions the need for the maintenance of representative ecosystems, the progressive introduction of environmental assessment mechanisms in all developments, the domestication of MEAs, and improved coordination of environmental management. However, as noted, no useful indicators have been assigned yet.

Thus while the FNDP monitoring process, rightly emphasises the rate of growth in sector production and operational capacities, there is no watching brief on key environmental issues such as:

- the rate of deforestation and land degradation;
- the status of protected areas and their natural (and especially) threatened populations;
- water abstraction rates from, and water quality in, key surface and groundwater catchments;
- air quality during the winter months in key urban areas;
- the effectiveness of solid waste management.

There is a limited level of support to these functions at a ministerial and functional unit level, but with no real cross-sectoral integration of information. In part these issues will be addressed by the emphasis in the FNDP on developing the environmental impact assessment (EIA) process into all developments.

But while this is laudable, as the Institute for Environmental Management and Assessment emphasises, the stage at which an EIA usually occurs frequently limits the options available to realise an environmentally sustainable project.

Strategic environmental assessment (SEA) is, therefore, a potentially vital additional tool for the prior avoidance of unnecessary environmental impacts, and consideration should be given to introducing the methodology on a wider scale. Regional development strategies (transport corridors and regional mining, or agricultural developments) are primary focal areas for application, as are sensitive locations (for example protected areas, world heritage sites, river and groundwater catchment developments, and energy investments).

5 Key Issues, Support Levels and Planning Frameworks

5.1 Key Environmental Issues

As noted at the outset, to casual observation Zambia's natural environment still appears largely undisturbed. From the perspective of more developed countries, this is a valid viewpoint. Some 60% of the land area is still forested, its major river catchments are still largely unpolluted, and on average air quality is generally good by global standards.

These perspectives should not encourage complacency. Environmental degradation, by virtue of its underlying biological and physical systems, is incremental and often may be an exponential process. Therefore, the identification, mapping and monitoring of existing and incipient degradation is important – preferably linked with the definition of causal, rather than symptomatic factors.

In this context, FNDP stakeholder analysis has identified several key environmental issues:

- land degradation and dereliction – mainly in mining areas, but increasingly also in peri-urban and highly settled and drought-prone agricultural areas;
- avoidance of future contamination and increased, appropriate, handling of hazardous and radioactive wastes;
- surface and groundwater pollution – in mining, urban and major agricultural areas;
- localised air pollution – again mainly in mining and major urban areas;
- deforestation – widespread but particularly evident adjacent to headwater catchments, major urban areas and trunk road systems;
- wildlife depletion – with a similar, but more extensive impact footprint;
- fish stock depletion – in all fisheries;
- loss and degradation of wetlands (floodplains, swamps, dambos and mushitus [wet drainage line forests] – significant in the Kafue River catchment;
- loss of biodiversity – as an outcome of all of the above issues[27].

5.2 Causative Factors - Driving Forces

Causative factors can generally be focussed in four principal driving forces:

- high levels of population growth (in excess of 3% for the last decades). In a stagnant, or slow-growing economy, this has been most noticeable in the low levels of formal employment and limited livelihood opportunities, particularly in the poorest (rural) areas; coupled with a dilution of traditional levels of social

[27] Ministry of Finance and National Planning, 2006: Draft Fifth National Development Plan, Lusaka

resource responsibility. The impacts are felt through coping strategies that can place heavy localised pressure on natural resources - as household demands and opportunist resource trading exceed natural resources replenishment rates;

- institutional weaknesses, including excessive centralisation and inadequate monitoring and planning - generally the outcomes of insufficient human, financial and management resources. Associated factors are a lack of emphasis on inter-sectoral coordination and integrated planning; insufficient management support; and inadequate land use planning; regulation and control; [28]

- the formulation, and particularly the rate of implementation of policies, legislation and regulatory frameworks in some sectors is weak, as is the rational integration of property holdings and associated user rights under customary and state administrative systems. Delays with the Forests Act (1999); the National Policy for Environment; the Tourism and Hospitality Bill; the Heritage Conservation Act; and the Fisheries Policy and Bill; are all areas of concern. These diminish opportunities for functional synergies; realistic growth options and integrated management options. Inevitably, these administrative vacuums create openings for opportunistic (often illegal) and unsustainable resource use; and lastly

- inadequate information dissemination – limiting knowledge among stakeholders, thereby reducing opportunities: for effective, professional decision making; hence also for appropriate developments; for cooperative environmental impact avoidance; and/or for mitigation measures.

5.3 State of the Environment - Areas of Extensive Impact

The pressure impacts of the environmental degradation issues noted in Section 5.1 are felt in many locations, but usually in a localised way. The wider systems impacts are occurring at a higher level and can be categorised into three extensive, thematic areas:

1) fragmentation of the country's protected areas and associated ecosystems;

2) deterioration of the quality of life in the main centres of human habitation (urban systems); and

3) the diminution of economic potentials in the natural resources base through short-term strategies that over-exploit, fragment and/or contaminate resources.

5.3.1 Fragmentation of the Protected Area System

Processes that are contributing most actively to fragmentation of the protected area system (incorporating the national parks, GMAs, bird sanctuaries, forest reserves and heritage sites), include:

- increased demands for land (for livelihood security and shifting settlement, and for commercial purposes such as mining, agriculture and tourism); and

[28] Ministry of Finance and National Planning, 2006: Draft Fifth National Development Plan, Lusaka

- illegal and unsustainable resource exploitation (poor agricultural land use practices; logging; general deforestation, plant biopiracy – including threatened and endangered species and plants with pharmacological potential; live animal sales – mainly of birds, reptiles, amphibia and cichlid fish; over-hunting and the bush meat trade; over-fishing and the use of very small diameter nets.

The impacts from these processes are estimated to be reducing Zambia's forest cover by some 900,000 ha per year[29], and have reduced the wildlife stocking levels in most smaller national parks to vestigial levels[30]. They are also placing increasing pressure on protected areas that hitherto - in less commercial times - largely had been taken for granted as "resources for the future", and also on threatened and endangered wildlife populations.

In current economic growth conditions, natural resource market and land values are increasingly generating land rents that exceed the low returns being generated from most protected areas (often less than US$ 10 per hectare)[31]. Protected areas are thus under threat from unsustainable commercialisation of products produced within them, exacerbated by the coping strategies of resident, or nearby, poor rural populations that undervalue resources. In these circumstances Government has either to secure its protected areas for future benefits – and pay the high regulatory costs of so doing; and/or identify innovative ways of improving the management, regulation and returns from these areas.

Both alternatives require much more effective planning and regulatory systems than are generally available now, and both need an integrated protected area planning tool. At present there is no operating national-scale, integrated, protected area function map, or classification, capable of identifying priority conservation areas and their interconnectivities with adjoining areas. Work was started on this initiative but never followed up[32].

In the absence of an holistic plan for national protected areas, there is a risk that there will be piecemeal, but incrementally deletions from the present protected area system (for example currently occurring with de-gazetting of elements of the forest estate). International experience indicates that only when these reach critical levels, or render obvious functional linkages unworkable, are they likely to move into the national psyche and remedial actions likely to be considered.

5.3.2 Deterioration in the Quality of the Human Environment

Zambia is a highly urbanised country in an Africa context, with more than 36% of the population living in urban areas[33]. Centralisation of economic development over many decades has created large urban settlements in the centre of the country, in Lusaka – the capital city – and in a largely mining-related conurbation in the Copperbelt, further north.

[29] Pohjonen, V, 2003: Reconnaissance-Level National Forest Resource Assessment, Forestry Support Programme, Ministry of Tourism, Environment and Natural Resources, Lusaka
[30] Ministry of Finance and National Planning, 2006: Draft Fifth National Development Plan, Lusaka
[31] Pope, A. J, 1995: Restoring Zambia's Depleted Game Management Areas – An Investment Analysis, WWF International, Lusaka
[32] Bingham, M G. 1998: Protected Area Master Plan for the Zambian National Park System – A Biodiversity Map of Zambia, EDF/NPWS Project, Department of National Parks and Wildlife Service, Chilanga
[33] Central Statistical Office, 2003: 2000 Census of Population and Housing – Analytical Report, Ministry of Finance and National Planning, Lusaka

In light of rapidly growing populations, key infrastructure delivery problems, particularly in these urban areas are: inadequate clean water, sanitation, road access and open space. There are also the associated social problems of high-density settlements; namely crime, respiratory, contagious and social diseases, including the most problematic - HIV/AIDS.

All these factors are worsened by increasing population densities that generate associated physical outcomes. These are impacting on health through: gaseous and particulate pollution from charcoal and fuel wood cooking and heating fires; polluting vehicle and industrial (especially metallurgical) emissions; water pollution from chemical, petroleum, industrial and human waste; littering and uncontrolled solid waste disposal; and land degradation from mining subsidence, toxic contamination of soils; overburden stripping; and the derelict products of mining activities.

Two geological factors raise the impact levels of these pollutants:

- Lusaka, Kabwe and the Copperbelt town all overlie limestone/dolomite aquifers. These formations are the source of much of the water for domestic and industrial supplies for these cities that historically influenced urban locations. But, because of their physical characteristics, they are particularly prone to unfiltered contamination from surface effluents; and

- on the Copperbelt these geologies are also associated with copper and cobalt-rich mineral deposits that support the mining and metallurgical activities in the area – and the particulate, gaseous, heavy metal, tailings and other pollutants that impact on these towns. Inversion conditions during the cooler winter months concentrate gaseous and particulate emissions (also in Lusaka), raising the risk factors on respiratory diseases especially.

5.3.3 The Diminution of Economic Potentials in the Natural Resources Base

The conundrum facing natural resource managers outside the commercial agricultural sector, is that those using the resource rarely "own" it. In the absence of this "ownership" long-term perspectives and sustainable approaches are hard to engender. Consequently, in times of economic growth and increased demand there is a strong temptation to adopt short-term, profit maximisation strategies. These frequently transform into illegal activities if demand continues. This behaviour is often exacerbated by poor administrative systems, which are either too slow, too bureaucratic, or insufficiently linked to the real market value of products. A vicious circle of resource demand – inefficient administration – quick profits – and corruption is created.

Short-term commercial strategies are now commonly being applied in most natural resource sectors:

- forestry (particularly with unplanned land encroachment in approximately 50% of all forest reserves, unregulated charcoal production; unregulated selective logging – especially in the west, south-west and north; and biopiracy);
- wildlife (the illegal (poached) bush meat trade and the misuse of hunting licenses also associated with it – widespread in most GMAs and "open areas"; hunting

based on inadequate quota determining systems – in most hunting blocks; and the illegal export of ivory, live animals and specimens);

- fisheries (fishing with under-size nets and poisons – in all fisheries; issuing of unsustainable numbers of fishing licenses; suspected illegal exports of endemic species – particularly from Lake Tanganyika);
- agriculture (encroachment into virgin lands in protected areas; short-term land use practices - e.g. chitemene in northern Zambia replaced by shifting agriculture in response to population-dependent soils depletion and/or overgrazing);
- water (poorly regulated impoundment and abstraction – mainly in the Kafue basin; revenue earning water supply connections without inadequate wastage and leakage controls; dumping of unprocessed effluent and sewerage – in most urban and farming areas).

These strategies either generate extra (usually illegal) revenues, or save on process costs. They also either permanently remove natural resource opportunities, or diminish the present and future value of both tangible and intangible resources by under-valuing sales, removing possible economies of scale, or creating significant environmental remedy costs.

5.4. Response Strategies and Policy Directions in Future Support to the Environment

Solutions to key current environmental issues are generally believed to lie in:

- progressively transferring "ownership" or medium-term user rights to those managing and/or harvesting the resources (especially in fisheries, forestry and wildlife) – that requires the enthusiastic application of new policies and a more decentralised management and regulatory style;
- significantly improved land use planning and management that encourages sustainable agricultural, fisheries and forestry practices (e.g. conservation farming; managed charcoal production; cooperative fishing zones);
- improving data collection, analysis, planning and monitoring that supports more sustainable resource utilisation and enhances regulatory efforts;
- in parallel to the UNDP "Reclassification" project, creating an holistic protected area system plan that will describe and justify a coherent, cross-sectoral and integrated set of protected areas, and permit appropriate, value-related management options;
- a complete review of the hunting sector, its wildlife population estimating/quota setting mechanisms, commercial options, and licensing, management and regulating systems;
- support to new, integrated river catchment management approaches and to a review of the availability, value and use of water resources in the Kafue River basin.

Four documents have been elaborated by government to create the foundation structures for future support to the environment: the NEAP, the National Policy on Environment, Vision 2030, and the FNDP.

5.4.1 National Environmental Action Plan

Although it was drafted in 1994, this remains an excellent document and is intended to remain the foundation for the guidance of environmental management during the FNDP.

There are few tabulations in the NEAP and in future it is worthy of an up-grade that would modernise it and incorporate additional monitoring targets and data.

5.4.2 Vision 2030

Zambia's Vision Statement is "To be a prosperous middle income nation by the Year 2030", with the future economy of Zambia characterised, *inter* alia, by:

- technologically proficiency and the capability to adopt and invest in innovation using its human and natural resources;
- sustained high and increasing productivity levels in every component of production; and
- development based on principles of sustainable environment and natural resource management.

Environment and natural resources-related sector visions and targets related to management include:

Mining - putting in place a mechanism to ensure environmental protection in mining areas so that by 2015 and 2030 the level of environmental degradation is reduced by 50% and 75%, respectively;

Agriculture - increasing land under irrigation, increase crop diversification, and preserving the agricultural resource base;

Food and Nutrition - developing and/or advocating policies and programmes that will ensure food and nutrition security, food quality and safety;

Water and Sanitation - improving access to appropriate, environmentally friendly sanitation for all Zambians; attainment of 100% access to safe and clean water by all; attainment of 100% access to sanitation by all; and fully integrated and sustainable water resource management; rehabilitation and/or re-construction of sewage treatment facilities in all major towns and cities; 80% of solid waste collected and transported; 90% of polluting industrial facilities comply to environmental legislation; and 80% of unplanned settlements upgraded and the residents provided with access to clean drinking water and sanitation.

Information Communication Technologies (ICTs) - increased access to ICT services such as Internet users, from 35,000 in 2005 to 100,000 in 2015; attaining computerisation and networking in all sectors of economy.

It has been suggested that the Vision 2030 document should receive additional work, but the framework it provides is incorporated into the target setting for the FNDP.

5.4.3 Fifth National Development Plan

The FNDP is built on achieving economic development based on a focus on four main economic pillars: mining, agriculture, tourism and manufacturing. Supporting sectors that will build the human capital base and strengthen the fabric of development include: infrastructure (including water and sanitation), education and skills development, health, order and safety and governance. The FNDP provides a medium-term planning framework covering the period 2006 to 2010.

As noted, it is agreed that the environmental aspects of the FNDP will be based on a renewed emphasis on the NEAP and the new National Policy on the Environment - that was drafted in 2004 and is currently awaiting approval by the next Cabinet.

5.5 Cooperation Structures (HIP, JASZ, Budget Support, HIPC)

Harmonisation and integration of cooperating partner support mechanisms have been an area of interest for several years. In 2004 a memorandum of understanding established the framework for Harmonisation in Practice (HIP) in donor support. While it is working in the education and health sectors, progress in other areas, including environment, is less advanced.

In late 2005 the Joint Assistance Strategy for Zambia (JASZ) was initiated to organise and focus donor support to Zambian development goals, initially as established in the FNDP. The intention of these initiatives is to increase the effectiveness of aid and to creating potential for scaling up, by organising better division of labour and scheduling of resources. The JASZ (and FNDP) processes have also recognised that environment should be a cross-cutting issue in all non-environment sector programmes.

The April 2005 signature of the Poverty Reduction Budget Support facility by some donors diversified the mechanisms for the channelling of aid. The other major factor in support to environmental issues is Zambia's achievement of the Heavily Indebted Poor Country Initiative (HIPC) completion point target in April 2005. The additional removal of 100% of pre-January 2005 external debt (which reached US$ 7.3 billion in 2001)[34] to the World Bank, IMF and African Development Bank under the Multilateral Debt Relief Initiative (MDRI),[35] will now marginally reduce the debt servicing pressure on the Treasury, possibly freeing resources for environmental issues – although the domestic debt stock and servicing levels remain high.

5.6 Possible Gaps in Resources Applied to the Environment

A number of gaps appear to exist in resources applied to environmental issues. In part this is due to the current focus of support from cooperating parties and NGOs (see Annex 1) and in part the outcome of an inadequate information base, or to institutional difficulties (absorption limitations, resistance to change, lack of response). The following sections identify areas where environmental challenges exist, and that warrant additional support.

[34] United Nations, 2002: Johannesburg Summit 2002 - Zambia Country Profile, New York

[35] Ministry of Finance and National Planning/Delegation of the European Communities, 2005: Cooperation Between the European Union and the Republic of Zambia, Joint Annual Report 2005, Lusaka

5.6.1 Polarisation from the JASZ Process

Ironically, there is a danger that the JASZ process - focussing cooperating partner inputs into areas of comparative advantage, or experience - will reduce direct support to environmental issues. Non-lead and non-active sector partners have confirmed their wish to mainstream environmental issues into all their programmes. But there is a danger that the withdrawal of some cooperating partners from immediate environment sector involvement will generate two negative outcomes:

- environmental inputs becoming marginalized and then reduced;
- difficulty in coordinating and rationalising environmental issues (including the understanding of mainstreaming actions are and how to monitor and evaluate these);

5.6.2 The Absence of Guidelines for Environmental Mainstreaming

Presently, there are no global guidelines for mainstreaming environmental issues, nor are there general, sector, or thematic targets (see 5.6.1 above). It will be essential that non-lead/active partners in the environment sector are able to develop a mainstreaming approach and introduce it (see Section 9.3 for further discussion);

5.6.3 Inadequate Environmental Monitoring Under the FNDP

The FNDP only identifies indirect environmental indicators as discussed earlier. If a reasonable balance between economic and sustainable development is to be achieved, then a small number of monitorable environmental indicators need to be identified and built into the FNDP monitoring and reporting frameworks. Some thought could be given to encouraging NGOs to be more involved in this issue, in both urban and rural areas;

5.6.4 Need for Additional Sector Support to Fisheries and Forestry and Pollution Control

Three environmental sectors currently receive very limited, or very focussed support: fisheries, forestry, and outside the CEP, pollution control.

Fisheries Sector
Production in Zambia's fisheries is either declining or static, in the face of considerable domestic and regional demand. Demand factors are mining stocks and limiting both the potential for increased production and sustainability. Greater impetus to policy, legislative and regulatory innovation; additional fishery surveys, studies to reduce post-harvest losses; fishing, harvesting and processing technologies; cold chain opportunities; and various farming techniques are all input areas that warrant attention if negative sector environmental impacts are to be controlled.

Forestry Sector
The forestry sector already has adequate policy and legislation, but needs support to regulatory frameworks (including the Clean Development Mechanism of the Kyoto Protocol); also to enhanced licensing documentation and negotiation capacity; to

considerably enhanced monitoring and operating systems; and to improved capacity in the field to regulate forest utilisation (including charcoal production); or illegal trade in wood and non-wood forest products (including biopiracy).

Pollution Control
The Copperbelt Environmental Project is mostly addressing historical, mining-related impacts on the environment. There is currently little support to routine pollution monitoring (which includes international responsibilities under several international conventions); nor to improving mechanisms for the effective implementation of environmental impact assessment (EIA) procedures (both in capacity and cost-effectiveness of delivery, and in sector application). There is also need for the wider application of strategic environmental assessment (SEA) techniques.

5.6.5 Agricultural Land Use Planning

Few efforts outside the conservation farming initiatives are addressing improvements in agricultural land use practices. One of the principal causes of Zambia's high rate of deforestation, and a major contributor to loss of surface cover, soil erosion and the sedimentation of water courses, is the absence of effective land use planning. This function received serious consideration before the 1980's, but reform of the agricultural legislation has diluted that Ministry's powers in control of poor agronomic and animal husbandry land use practices at the farm level.

Satellite imagery indicates significant levels of land use abuse in parts of Southern, Central, Copperbelt and Eastern Provinces particularly, that will increasingly affect agricultural and forestry productivity and the availability of water unless addressed.

5.6.6 Inadequate Support to Protected Area Design and Management

Threats to Zambia's protected area system have been detailed earlier. Only one initiative is currently reviewing this issue – the UNDP Reclassification and Effective Management of Protected Areas project. That initiative is not starting from a total protected areas viewpoint and excludes consideration of forest protected areas. It is also strongly driven by management considerations.[36]

Additional support is strongly recommended that will take an holistic overview of the total protected areas system (including forests, wetlands, aquatic and heritage sites) and identify mechanisms for the ecological and functional integration of these areas. The risk that needs to be addressed is the ecological fragmentation of protected areas resulting from management under several different and largely non-interactive thematic administrations. The opportunity that will exist for a limited period is the closer geographical and ecological integration of different protected areas that could be achieved by a combination of land exchanges, the limited reclassification of existing protected areas and associated minor legislative amendments. The outcome would provide enhanced, integrated ecological management of protected areas as well as improved and more focussed opportunities for economic development and poverty reversal in rural areas.

[36] Global Environmental Facility, 2005: Project Document - Reclassification and Effective Management of the National Protected Areas System, United Nations Development Programme, Government of the Republic of Zambia

5.6.7 Information Dissemination

Many of the environmental issues currently confronting the country could be significantly ameliorated or avoided by the improved availability and wider dissemination of environmental information. Only limited levels of financial and technical support are available in this arena and few cooperating partners are working consistently in this area.

Issues needing attention include: the wider dissemination of legislative and regulatory information in all environmental sectors; a wider outreach on the opportunities that exist for community and community/private sector initiatives (joint forest management, fisheries cooperatives, cooperative farming, community wildlife management and game ranching, and so on); and particularly information on the downstream impacts of natural resource utilisation options.

Governance issues can also play an important part in building trust between regulators and users and increasing the credibility of regulatory processes: through the regular dissemination of information on hunting, timber extraction, fishing and similar resource utilisation license issues and levels of performance.

The use of ICTs is expanding in Zambia and now offers huge potential for increasing the transparent transmission of environmental information; expanding the dissemination of this information in environmental education formats; and of debating important issues. Non-state actors could play an important role in this field.

The definition of future areas of environmental intervention will benefit from additional work on mainstreaming environmental issues into all areas of donor intervention.

Finally, without the availability of environmental information in databases and mapping formats, none of the above, nor effective planning, is possible. Zambia needs to reverse the trend of the last twenty years of progressive loss of environmental information sets and mapping by taking positive steps to collect, collate, analyse, map and archive information. Non-state actors, public institutions and the private sector all need to play a role in this process and the financial resources to support the process need to be actively secured.

6. Conclusions and Recommendations for Future Involvement

6.1 Matrix of Environmental Concerns Against JASZ Inputs

Zambia's natural and built environments are demonstrating the early stages of extensive human impact. In part this is a density-dependent phenomenon, but there is a concern that causation is by equal measure related to poor institutional capacities, particularly in planning and regulation. The former of these is a capacity-building issue, the latter also dependent on improved, more targeted and accountable budgetary support and strengthened governance frameworks for the environment. Environmental concerns are no longer the sole responsibility of government and other non-state actors should and can now play expanded roles in information dissemination, monitoring and self-regulation.

The JASZ/environmental issues matrix in Annex 1 was used to identify the main environmental shortcomings described in Section 5.6 above. In a refined form the matrix may prove a useful monitoring format. Mechanisms for the application of European Commission support into environmental issues are discussed in the following paragraphs.

6.2 Areas of Current European Commission Support with Environmental Applications

Traditionally, a principal focal area of European Commission support to Zambia has been physical infrastructure. This has included the reconstruction and maintenance of trunk roads, the construction, or improvement of feeder roads, and the resurfacing, or extension of airport runways, taxiways and terminal building works. It has also provided substantial support to the education and health sectors.

Non-pavement transport investments have included harbours and ferries, with other major areas of infrastructure investment in social facilities – water supply and sanitation, hospitals, clinics and associated cold chain and diagnostic equipment; and urban markets. Micro projects have channelled funding into a variety of community-level infrastructures, including schools, clinics, water supply and sanitation and tertiary feeder roads. Infrastructure-associated support has included geological mapping and small-scale mining.

The other focal and non-focal areas have traditionally included capacity building in the management of public finance and private sector development, and social service delivery (particularly education, health and social support) and more recently, agricultural investments in support of food security and agricultural diversification.

'B Envelope' support has been used for support to refugees (particularly allocated through ECHO), governance and the rule of law.

The next Country Support Strategy is now in preparation. Programmable aid will have one focal sector in support of transport infrastructure. The other focal sector will support social sector delivery, with non-focal support to food security and agricultural diversification, governance ad the rule of law and support to non-state actors – particularly through capacity building.

6.3 Mainstream Environmental Issues into the Next Country Support Programme and with Other Cooperating Partners

In view of changes to environment sector support under the JASZ process it is crucial that a common understanding is reached of the concepts and definitions related to mainstreaming environmental issues. A proposed definition could be "the process of incorporating concerns of a particular development aspect (in this case a sustainable environment) across the board in programmes, programme objectives and programme activities." In this context mainstreaming deals with all factors related to sustaining the environment in development activities. Mainstreaming environmental issues is not an end in itself – it is an approach and a means to achieve the overall goal of an improved and sustained environment.

Therefore, it is a process through which the environment can be integrated into policy development; legislation; advocacy; planning; resource allocation and implementation. The process of mainstreaming could usefully follow the stages of the project cycle – policy, planning, proposal formulation, appraisal, implementation, monitoring and evaluation processes.

The process of mainstreaming the environment generally requires the following definitive actions:

- discussion of environmental concerns and issues in different sectors;
- creating knowledge and awareness of environmental issues and benefits;
- developing processes, checklists and categories to ensure that the assessment of the possible environmental impact of development activities become routine and effective;
- incorporating appropriate environmental mitigation activities into the design, cost and scope of all projects and programmes. These may be sector- or location specific;
- identifying mitigation measures that can be incorporated into project design, are budgeted for, and become a contractual obligation;
- mitigation measures are monitored to ensure contractual measures are respected, and evaluated to determine their effectiveness;
- the on-going assessment of unexpected environmental impacts resulting from the operations of the project or programme - either positive or negative;
- ensuring improvements to environmental management are sustained after development support is finished.

In order to be useful and effective, mainstreaming requires commitment, support, advice and monitoring at the highest levels. But there also remains the need to ensure that mainstreaming efforts result in targeted interventions that promote, improved and sustain the environment.

6.4 Recommend Focal Sectors and Response Strategies Based on Environmental Concerns

Previous programming and the JASZ process has moved the EC out of direct involvement in the environment sector – although environmental issues remain a cross-cutting dimension to all EC support areas. The following sections discuss how this might be applied. Due cognisance is required of the frequent interaction of environmental issues with the other

cross-cutting gender and HIV/AIDS concerns (for example in participatory forest management and the utilisation of non-timber forest products as food and livelihood security strategies).

6.4.1 Mainstreaming Environmental Issues

Synergies can be realised from strengthening planning and inter-sector capacities if those processes are integrated with the development of direction, methodologies and contents for the mainstreaming of environmental issues into all programmes.

The EC is currently developing its draft "Environmental Integration Handbook for EC Development Co-operation"[37] that covers mainstreaming issues from the national scale (covered by the Country Environmental Profile), through SEA inputs to Sector Policy Support Programmes (SPSPs) and General Budget Support, to the use of EIAs and accompanying Environmental Management Plans (EMPs) at the project level. Other Member States and co-operating partners also have, or are considering similar documents that will require a degree of co-ordination to bring them into a common format compatible with, or strengthening Zambian documentation.

6.4.2 Probable Focal Area – Transport Infrastructure

Infrastructure will remain a focal area for EC support, so environmental issues need to contribute to these investments as a prominent feature at the feasibility, design and construction and subsequent maintenance stages. An SPSP is likely to form the framework for transport infrastructure support. Guidelines exist in the draft "Handbook" for upstream integration of environmental issues into the SPSP design process and for downstream linkages into the SEA process.

Strategic Environmental Assessment

Environmental inputs to the project cycle process should be at every stage, but will be particularly useful if imbedded at the formulation stage - but also assigned a relevant role at the post-construction stage. An issue that warrants increased attention is the development of strategic environmental assessments. These processes offer a regional, or sector environmental perspective that is frequently omitted at the detailed design and environmental impact assessment (EIA) stages - particularly in the context of feeder roads, harbours and airports and agricultural developments.

Social Cost-Benefit Analysis

Another methodology that warrants wider use in transport route identification and prioritisation (especially feeder, and remote rural roads), is increased economic and social impact analysis and social cost and benefit assignment. This is already a feature of the EC's current road sector support programme, but greater emphasis needs to be placed on the understanding and application of new techniques, and on ensuring that appropriate skills are developed. This should not be only at the technical assistance level, but also in the project concept, team leadership and monitoring and evaluation processes (i.e. increasingly moving infrastructure investments into an arena of more holistic and environmentally aware, economic prioritisation, affordability and accountability).

[37] Helpdesk Environ(ne)ment, 2005: Draft Environmental Integration Handbook for EC Development Co-operation, EuropeAid, Brussels

6.4.3 Probable Focal Area – Human Development and Financial Delivery Capacity Building

The second focal sector is likely to continue to be in general and financial capacity building, but in the targeted delivery of social services supporting realisation of MDG health and education goals. Capacity building in all sectors of government is a key concern under the Public Service Reform Programme. Consideration should be given under this focussed, sector-specific capacity building support to developing analytical and planning capacities that are also recognised as being important to the delivery of the FNDP.

Planning Skills and Systems and Inter-sector Coordination
The FNDP recognises that there is general institutional weakness in inter-sector coordination and sector and integrated planning. More emphasis is needed on these issues. It is recommended that such inputs be incorporated as cross-cutting components in all EC support areas – including budget support, infrastructure and non-focal areas.

6.4.4 Budget Support

Environmental Indicators
A substantial element of the 10th EDF will be in the form of direct budget support. Conditionalities are intentionally minimised with this form of assistance, but it is recommended that the facility be used to encourage the development and maintenance of appropriate indicators of the state of the environment in the context of national development. Access to appropriate environmental indicators can be useful in realising GDP contributions from the natural resources base.

Equally, as discussed further below, the strong focus of the FNDP on economic development raises some concerns regarding the treatment of environmental indictors that could reduce the negative impacts of inappropriate actions, or avoid such actions altogether.

It is recommended that a suite of practical environmental indicators be developed under the budget support facility and incorporated into the FNDP monitoring and evaluation process (see Section 6.7).

6.4.5 Regional Programmes

Opportunities for Strategic Development Corridor Development
Zambia has yet to build its capacity in the use of EC regional programmes. Opportunities may exist in several areas, including strategic corridor developments. These are now under increasing attention in the context of regional development within Zambia and enhanced regional transport linkages. There is also increasing private sector interest (including the sugar industry), in increasing Zambia's international trade competitiveness by reducing trans-boundary transport and transaction costs. European Commission support to COMESA and SADC are obvious avenues for this type of support as they are already involved in single border processing and similar initiatives.

Environmental issues related to these regional and trans-boundary strategies mainly focus on strategic environmental assessments: along transport and development corridors, but also in significant changes to land use patterns.

6.4.6 Probable Non-Focal Areas – Food Security, Governance and Non-State Actors

On-going EC projects will be applying support to the agricultural sector in North-Western and Western Provinces and in the drier, southern provinces. Non-focal areas for EC support under the 10th EDF may extend funding to these projects and will probably include further support to food security and agricultural diversification (including the current interest in actions under the ACP Sugar Protocol and Zambia's Sugar Sector Diversification Strategy), support to governance issues, and support to capacity building in non-state actors.

Many of the issues noted in earlier sections of this chapter should also be applied in non-focal sectors. It is recommended that environmental issues in non-focal support areas include:

- greater emphasis on and support to the mechanisms for land use planning (in particular), environmental conservation and natural resources management, in the process of agricultural diversification and improved agricultural productivity. Specific opportunities may exist under the North-Western and Western Province agricultural initiatives for integrated land use planning that could also support efforts in the forestry sector;

- attention to the application of new community/private sector ventures in support to protected forest areas in particular, with a view to supporting protected area consolidation and justification, and to increasing productivity in timber and non-timber forest products (through non-state actor and separate budget line support mechanisms);

- support to building capacity in non-state actors to support governance issues in the environmental sector, particularly in the dissemination of transparent information declarations (including more use of ICTs), and the development and maintenance of regular and independent environmental monitoring systems (provided through conservation NGO systems), and environmental education (by integration into health sector basket funding support).

These offer opportunities for complementarities with focal areas of support. They will also underpin the overall objective of EC support: the increased effectiveness of assistance - through reduced transaction costs and greater levels of benefit to the government and people of Zambia.

6.4.7 Recommendations for the Use of Horizontal Budget Lines – Environment and Forest, Water, and Energy Facilities

Horizontal budget lines are not programmable and respond to calls for proposals. Nevertheless, they offer additional opportunities for involving supporting interventions in critical environmental areas. These have been discussed in general already, but the sector focus of these budget lines may offer greater opportunities for sector-specific interventions.

One criticism of EC special budget line support, particularly for global instruments, is the significant period between application and the eventual disbursement of resources - if successful. Simplification and acceleration of the processes would allow the involvement of a

greater range of players and closer temporal links between attempts to address issues (many environmental issues need rapid and time-specific interventions) and the ability to do so.

Nevertheless, new EC instruments are, or are becoming available in the environment and forest, sugar, water and energy sectors that should incorporate environmental considerations. These may generate challenging environmental situations through large-scale sugar monoculture and out grower schemes, production transfers out of traditional crops, and by-product development.

Areas that may warrant closer investigation include the opportunities and risks associated with the following environmental response areas:

- water conservation management, and contamination avoidance and monitoring, particularly in relation to the sugar sector;
- bio fuels production and by-product treatment, potential emissions reduction and alternative energy opportunities – also in the sugar industry;
- alternative energy production options (with bio-fuel and land-fill emission turbines, solar, wind and small-scale hydropower);
- GHG and other emissions reduction, power generation, improved efficiency in charcoal production, and increased energy efficiency and conservation; and
- the use of carbon trading to leverage capital injection to afforestation and reforestation investments in depleted areas.

6.5 What are the Main Environmental Challenges and How They Can Be Addressed

Main environmental challenges facing Zambia have been discussed in Section 5 with recommended areas of intervention. These need to be reconsidered given the increasing focus in the FNDP on economic growth and the potential danger that they may be sidelined. Greater emphasis needs to be placed on environmental checks and balances.

In light of many Member States and the EC moving out of direct environment sector support, considerable emphasis is also needed on further developing and applying unified guidelines for mainstreaming environmental issues into different sectors.

Greater emphasis is needed on case-specific environmental issues during the programme/project formulation, design and procurement processes. This should be coupled with sufficient emphasis being placed in budgeting and in the drafting of the terms of reference for technical assistance, to ensure that funds and the necessary skills are assembled to address poverty and crosscutting environmental, gender and HIV/AIDS issues (i.e. the insertion of scoring criteria based on experience and skills in these areas).

Civil society is increasingly taking responsibility for environmental issues. Non-focal support is recommended for appropriate civil society environmental monitoring and advocacy actions (see 5.6.3 above). These could supplement government's efforts, particularly in areas where state intervention may be inappropriate, non-focal, or financially constrained.

One significant, and potentially costly, area of national responsibility is compliance with international conventions. It is recommended that these be examined systematically to establish realistic support mechanisms and costs and cooperative mechanisms for improving

performance – especially in technically difficult and costly areas such as the toxic and hazardous waste disposal. The budget support facility would be an appropriate avenue for this support – which would then also provide closer links to the development of appropriate FNDP environmental indicators.

6.6 Opportunities for Cooperation with Other Donors

The role of the EC with Member States and other cooperating partners in the application of environmental initiatives has become more important with the JASZ process. It is recommended that the EC Delegation's programming interactions with the Member States be increased:

- firstly to ensure that the EC's programmes and projects in the environmental sectors are fully coordinated with bilateral inputs;
- secondly to ensure that environment sector lead thinking is incorporated into EC approaches; and
- thirdly to support the development of environment mainstreaming concepts and applications.

Similar thinking should apply to non-Member State cooperating partners, both multilateral and bilateral. In part, these concerns are being addressed through sector meetings, but during interviews for this report there was consensus among cooperating partners that this dialogue could be improved.

Close coordination will be essential in unifying the environment mainstreaming process, as many donor organisations have established guidelines for involvement in the environmental sector (see Section 6.4 above).

6.7 Proposal for Relevant Environmental Indicators for Use in the National Indicative Programme

Only three environment-related indicators are presently included into the FNDP monitoring and evaluation process:

- the number of mining companies complying with environmental regulations;
- the number of people that can access clean water and hygienic sanitation; and
- the consumption levels of alternative energy.

It is suggested that in the interest of sustainable economic development the current paucity of environmental data be addressed wherever possible, including significantly more SMART[38] environmental indicators being incorporated into the FNDP. The NIP could support this initiative, either directly into projects and programmes, or into agreement on indicators for General Budget Support, or under independent processes supported by non-state actors. The following indicators are recommended, by source of information:

[38] SMART – specific, measurable, accurate, realistic and timely

State Actors

1) the number of SEAs and EIAs performed annually compared with the number of approved assessments (source – ECZ);

2) the quality of water in important river systems at key points (e.g. below the mining complexes on the Kafue River, immediately downstream of key agricultural development areas [Mpongwe and the Mazabuka/Kafue areas], and at the principal domestic water intake points on the Kafue and Zambezi Rivers) (sources – mining companies, ECZ);

3) winter month air quality in specific locations (in high density settlements in Lusaka and the Copperbelt, and downstream of major Copperbelt metallurgical plants) (sources – mining companies, ECZ);

4) the annual volume of hardwood timber extracted from protected forests, by district and the total volume and value of annual exports of hardwood timbers (Sources - surveys by non-state actors compared with Forestry Department, Export Board of Zambia and Zambia Revenue Authority);

5) the number and species of animals hunted legally on an annual basis, by hunting block sources – ZAWA, civil society publications);

6) the annual national fish harvest, by fishery (Fisheries Department).

Non-State Actors

1) the extent and rate of deforestation – through periodic satellite-based systems, or repeatable sample surveys (sources – NGOs, FAO land cover assessment, Forestry Department assessments);

2) the availability of illegal wildlife and forestry products in main urban areas (Lusaka and Kitwe) (sources – civil society surveys, ZAWA, Forestry Department);

3) the number of protected areas being managed effectively to protect biodiversity (sources – independent civil society surveys, Fisheries and Forestry Departments, ZAWA).

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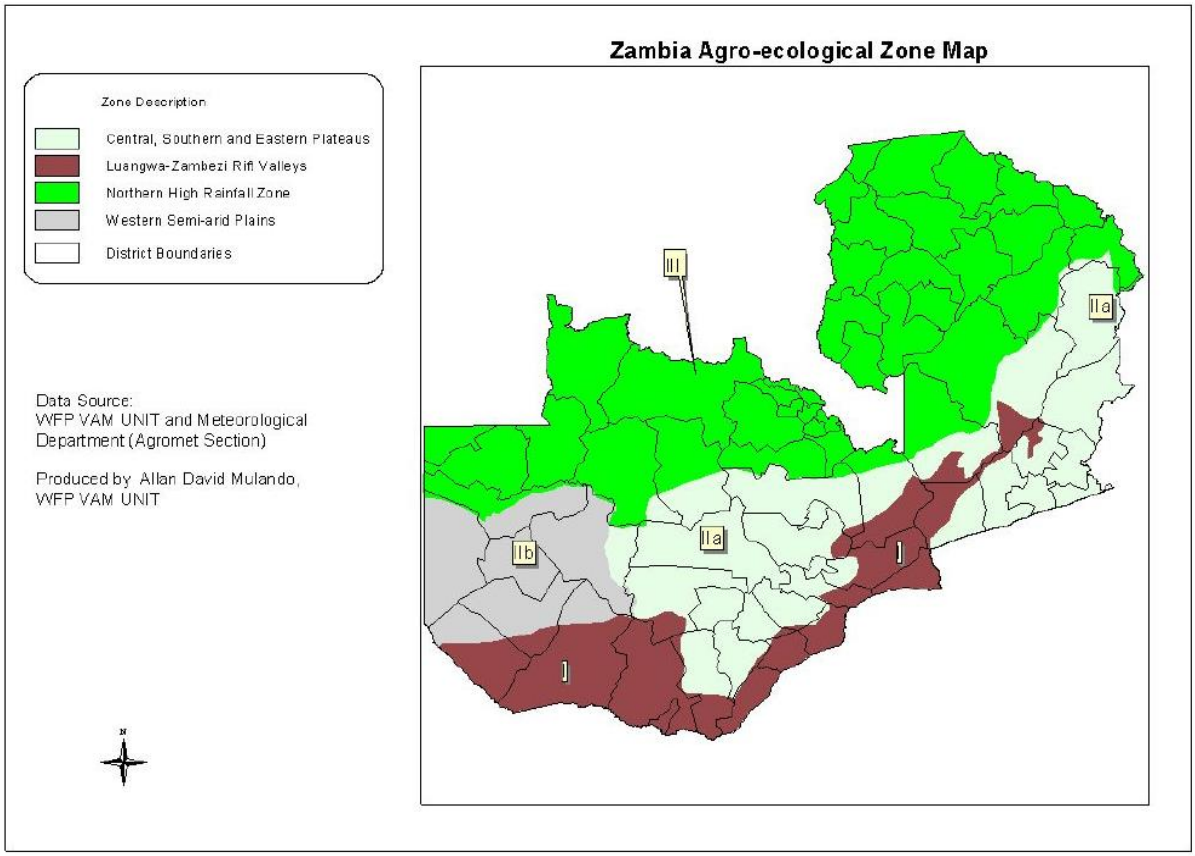
Annex 1 – Environmental Issues/JASZ Matrix

Cooperating Partner	JASZ Focus	Areas of Environmental Involvement	Main Issues
European Commission	Macro-economics, Private sector development, Transport	Transport, agriculture, small-scale mining, private sector development/export development, energy	*Limited environmental planning and regulating capacity Gaps in inconsistencies in environment-related legislation Inadequate environmental guidelines and transparency in developing large projects Inadequate pollution monitoring and control*
Member States			
Denmark	Water resources	CBNRM, environmental education, water resources, wildlife	
Finland	Environment	Agriculture, environment, forestry, private sector development	
France	None	None	
Germany	DecentralisationSocial protection/Water supply & sanitation	Food security, transport, water supply & sanitation	
Ireland	Education	Water supply & sanitation	
Netherlands	Education/Private sector development	Agriculture, private sector development, water supply & sanitation, wildlife/CBNRM	
Norway	Governance/Tourism	Agriculture, energy,environment, tourism, transport, wildlife	
Sweden	Agriculture/Health	Agriculture, energy, housing, private sector development	
United Kingdom	Governance/Health/HIV-AIDS/ Macroeconomics/Social protection	Food security	
Non-Member States			
Canada	None	None	
China	None	None	
Japan	Decentralisation	Agriculture, energy, private sector development, tourism, transport, water	
United States	Agriculture/HIV-AIDS	Agriculture, housing, private sector development, tourism	

Multi-laterals, UN Organisations	Gender, Governance, Health, HIV/AIDS	Agriculture, decentralisation, energy, private sector development, social protection, water and sanitation, environment	
FAO		Food security, fisheries, land use, farming systems, irrigated agriculure	
UNDP		Policy and legislation support, wildlife protected areas, domestication of international conventions, energy	
World Bank	Agriculture/Decentralisation/Energy/ Macro-economics/Private sector development/Tourism	Agriculture, energy, environment, food security, housing, private sector development, tourism, transport, water supply & sanitation	
Financial Institutions			
AfDB		Agriculture, transport, water supply and sanitation	
BADEA		None	
EIB		Agriculture, mining	
IMF		None	
Kuwait Fund		Transport	
OPEC Fund		Transport	

Annex 2 - Maps

Map 1 Zambian Agro-Ecological Zones



Source: World Food Programme/Meteorological Department

Map 2 Schematic Map of Zambian Biomes